THE STUDY OF THE IMPACT OF A PSYCHOLOGICAL SKILLS TRAINING PROGRAMME ON THE PERFORMANCE OF SPRINTERS

SHAFEEKA YUSUF DOCKRAT

Submitted in fulfilment

of the requirements for the degree of

MASTER OF ARTS

in The Faculty of Humanities,

University Of Pretoria,

PRETORIA.

Study Leader: Elizabeth du Preez

2003, February 4

ACKNOWLEDGEMENTS

- The financial assistance of National Research Foundation (NRF) towards this research is hereby acknowledged. Opinions expressed and conclusions arrived at, are those of the author and are not necessarily to be attributed to the National Research Foundation.

Furthermore, the following individuals are acknowledged:

- My husband, Ibraheem, for his patience and support.
- My aunt, Rashida Hassim, for all her assistance while the programme was conducted.
- Coach David van Heerden and all the athletes in his sprinting team.
- Piet Helberg and Chaka Croucamp from the Bureau for Sport Development at Technikon Pretoria for their assistance in getting the programme started.
- Elana Mauer and Gretel Crafford at the University of Pretoria for statistical support.
- Pat Scott and Geoff Miller for the 'Concentration and Personality Profile'.
- Kim Scott from Human Kinetics for the assessments.
- Luc G. Pelletier from the School of Psychology at the University of Ottawa for the Sport Motivation Scale.

The Study of the Impact of a Psychological Skills Training Programme on the Performance of Sprinters

Name: Shafeeka Yusuf Dockrat

Study Leader: Elizabeth du Preez

Department: Psychology

Degree: Master of Arts (Psychology)

ABSTRACT

This thesis attempts to assess the impact of a psychological skills training (PST) programme on the athletic performance of sprinters at Technikon Pretoria, South Africa.

The structure of the PST programme was based on the structure outlined by Wann (1997), and Winter and Martin's (1993) Sport Psychology Basic Training Programme constitutes the content of the programme. The programme consisted of five stages: education, pretests of psychological skills, the PST programme per se, an implementation phase, and posttests. The specific psychological skills that the programme attempted to enhance were self-confidence, stress management, attention, intrinsic motivation and mental imagery.

Athletic performance was measured by the sprinters' personal best times on the one hundred metre event at the beginning and end of the PST programme.

Firstly, the data was analysed to determine if there was an improvement in psychological skills and athletic performance. Thereafter the difference in athletic performance

between the beginning and end of the programme was correlated with the difference between the pretest and posttest scores of the psychological skills measured.

The research findings indicated that there was a significant improvement in the reduction of stress levels, mental imagery skills, and a greater number of athletes had an internal focus of attention. No significant differences were found in self-confidence, intrinsic motivation and the number of athletes with a narrow focus of attention. The only significant correlation was between intrinsic motivation and athletic performance.

Die studie van die impak van 'n sielkundige vaardigheidheidsopleiding-program op die prestasie van naellopers

Deur: Shafeeka Yusuf Dockrat

Studieleier: Elizabeth du Preez

Departement: Sielkunde

Graad: Magister Artium (Sielkunde)

OPSOMMING

Die doel van die tesis is om die impak van 'n sielkundige vaardigheidsopleidingsprogram op die atletiese prestasie van naellopers aan Technikon Pretoria, Suid-Afrika te bepaal.

Die struktuur van die program is gebasseer op die struktuur soos uiteengesit word deur Wann (1997), terwyl die inhoud van die program saamgestel is volgens Winter & Martin (1993) se 'Sport Psychology Basic Training Programme'. Die program bestaan uit vyf fases: opleiding, voortoetsing van sielkundige vaardighede, die sielkundige vaardigheidsopleidingsprogram per se, 'n implementeringsfase en die natoetsing. Die spesifieke sielkundige vaardighede wat die program gepoog het om te verbeter, was selfvertroue, streshantering, konsentrasie, intrinsieke motivering en visualisering.

Atletiese prestasie is gemeet aan die naellopers se persoonlike beste tye op die honderdmeter naelloop item aan die begin en aan die einde van die program.

Die data is eerstens geanaliseer om te bepaal of daar 'n verbetering in sielkundige vaardighede en atletiese prestasie was. Daarna is die verskil in atletiese prestasie aan die begin en einde van die program vergelyk met die verskil van die resultate wat tydens die voor- en natoetsing van die sielkundige vaardighede verkry is.

Die navorsingsresultaat toon 'n merkbare verbetering in die stresvlakke en visualiseringsvaardighede van die atlete. 'n Groter aantal atlete het ook 'n interne fokuspunt getoon. Daar is egter geen beduidende verskil in selfvertroue, intrinsieke motivering en die aantal atlete met 'n interne fokuspunt gevind nie. Die enigste merkbare opvallende korrelasie was tussen intrinsieke motivering en atletiese prestasie.

TABLE OF CONTENTS

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

SCHEDULE OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

Chapter 1

INTRODUCTION

1.1 BACKGROUND

This section aims to introduce the rationale for the study, by elucidating the need for exploration in this field.

Irrespective of the sport in question, an athlete's success or failure is dependent on a combination of physical and mental abilities (Nideffer, 1976). Even though athletes and coaches generally do acknowledge the importance of mental skills, they are rarely practised in a methodical manner. Usually, insufficient time is allocated for mental training because of the lack of knowledge in implementing a programme, or due to the myth that mental skills cannot be learnt. Everyone is born with specific physical and psychological strengths and weaknesses, but skills can be learned and developed. Being a champion requires that mental skills be systematically practised and integrated with physical abilities (Weinberg & Gould, 1999). A Psychological Skills Training (PST) programme provides an ideal opportunity for doing so.

However, sport psychology is a relatively new field in a country where a strong sport culture has evolved since South Africa's re-admission into the international competitive sport sphere (Grundlingh, 1997). Standards are now higher, competition is tougher, and the stakes too are much higher. Sponsors and development programmes have been instituted, and it appears as if "every movable limb has been activated" (Grundlingh, 1997, p.60). Incorporating specific psychological skills into play, is an essential mechanism for providing athletes with a performance edge over competitors. These specific psychological skills are

self-confidence, stress management, attention, motivation and mental imagery (Singer, 1992).

Potgieter (1992) cites Odendaal's (1991) paper on mental imagery in sport, which asserted that this field has generated very little research in South Africa, and hoped that more research would emanate in this country.

According to Gahwiler (in van Zyl, 1999) from the Institute of Sport Sciences, some athletes like South African cricketer Lance Klusener are naturally mentally strong, as exhibited by his consistent performance at the Cricket World Cup in 1999. He asserts that the majority of the other athletes have to practice stress management just as they practice physical skills. Van Velden, another Cape Town psychologist, commented on his observations during the Rapport Tour, that high stress levels were the cyclists' single biggest problem. The Springboks also used stress as an excuse for their embarrassing match against Wales in 1999 (van Zyl, 1999).

Although literature on PST programmes has been published only since the mid-1980's, sufficient evidence exists to support the conclusion that they are very effective and impact positively on performance in a large variety of sports (Wann, 1997). To elucidate how PST programmes have improved athletic performance in a number of different sports, Morris & Summers (1995) cite the following studies: basketball (Hughes, 1990; Kendall, Hrycaiko, Martin, & Kendall, 1990), football (Fenker & Lambiotte, 1987; Hughes, 1990), gymnastics (Cogan & Petrie, 1995), ice hockey (Anderson, Crowell, Doman, & Howard, 1988), cricket (Bull, 1995), skiing (Hellstedt, 1987), and field hockey (Bakker & Kayser, 1994). Furthermore, PST programmes have been used successfully with young (Li-Wei et al., 1992; Orlick & McCafery, 1991; Weiss, 1991), interscholastic (Anderson et al., 1988; Hellstedt, 1987; Hughes, 1990), intercollegiate (Daw & Burton, 1994; Fenker & Lambiotte, 1987;

Meyers & Schleser, 1980), elite (Gould et al., 1990), physically challenged (Asken, 1991; Clark & Sachs, 1991), as well as with athletes from different cultures (Cox & Liu, 1993), (Morris and Summers (1995).

However, in none of these studies did the sample constitute South African athletes, and more specifically sprinters. Hence, the need for this research.

1.2 PROBLEM STATEMENT

There are two subproblems that the study aims to investigate. Firstly, are sprinter's psychological skills (specifically self-confidence, stress management, attention, motivation and mental imagery) enhanced after participation in a psychological skills training programme? Secondly, does an enhancement of psychological skills correlate with an improvement in athletic performance for sprinters?

1.3 OBJECTIVES OF THE STUDY

The objectives of this study are twofold. Firstly, the study aims to reveal an enhancement of psychological skills after participating in a psychological skills training programme, and secondly that sprinter's athletic performance improves upon enhancement of psychological skills.

1.4 BRIEF OVERVIEW OF THESIS

Proceeding this introduction, the thesis continues with the literature study in Chapter 2. The literature survey covers PST programmes, psychological skills and sprinting. This is followed by a concise discussion on the research methodology used in the present research project in

Chapter 3. Chapter 4 presents the research findings and an explanation thereof. The content section of the thesis concludes with a summary of a thesis and recommendations for future research in Chapter 5. The appendices include figures, tables, and a handbook for the athlete.

Chapter 2

LITERATURE STUDY

The literature study encompasses three broad fields: psychological skills training (PST) programmes, psychological skills and sprinting. PST programmes are categorised into programmes that provide a general structure and specific PST programmes. Several programmes in each category will be discussed. The definitions, theoretical views and enhancement techniques of five psychological skills will be presented. The five psychological skills are self-confidence, stress management, attention, motivation and mental imagery. The section on sprinting provides an explanation of what sprinting is, and sprinting procedures.

2.1 PSYCHOLOGICAL SKILLS TRAINING PROGRAMMES

This section first concentrates on the general structure of PST programmes. It analyses various structures proposed by theorists who have attempted to trace the **process** of psychological skills training, in terms of several distinct stages. The second part of this section examines specific PST programmes that are presented as "packages of skills" (Morris & Summers, 1995, p.216). These specific programmes essentially constitute the **content** of PST programmes.

2.1.1 GENERAL STRUCTURES

There are relatively few general structures of the process of psychological skills training. Morris and Summers (1995) suggest that the reason for this may be that this area has not developed sufficiently that general structures of the process may be proposed. However,

Morris and Summers (1995) cite structures proposed by Martens (1987), Vealey (1988), Boutcher and Rotella (1987) and Morris (1992), and Wann (1997) has also proposed a structure for PST programmes. These structures will be discussed and the use of Wann's structure will be rationalised. Criticisms of general structures of PST programmes are also presented.

Martens's (1987) programme's structure has three phases. Martens (1987) advises first explaining to the athletes how different psychological skills impact on performance. The psychological skills training occurs in the acquisition phase. The final phase requires the athletes to practice the skills and integrate them into their performance routines. Although Martens's structure is a general structure of how the programme should proceed, in 1989 Bump, as cited in Morris and Summers (1995) developed an accompanying study guide and workbook that describes the actual content of the programme (Morris & Summers, 1995). Martens's structure has been rejected for the present study as it lacks any form of assessment.

Vealey's (1988) structure as cited in Morris and Summers (1995) also proposes three phases. The attainment phase is essentially a combination of Martens's education and acquisition phase. In the sustainment phase is when the athlete must integrate the skills into practice and competition. Her structure differs from Martens' as she adds a coping phase. In this phase the athlete develops strategies to cope with situations when skills aren't entirely effective. Vealey's model has been criticised as being too general, and not providing any insight at all on how to do the psychological skills training (Morris & Summers, 1995).

Morris and Summers (1995) also highlight Boutcher and Rotella's (1987) structure of a programme, which evolved with the aim of enhancing closed skills, even though they contend that most of the programme enhances open skills too. Their programme consists of four

phases. The sport analysis phase requires examining the psychological skills required for the sport in question. This is followed by an assessment phase where the athlete's strengths and weaknesses are determined and profiled. In the conceptualisation phase, goals are set and the athlete's commitment is ensured. The final phase concentrates on the development of the skills identified in the conceptualisation phase, applying the skills to performance and using them in competition. Although Boutcher and Rotella advocate an educational perspective, their structure appears to be more problem-oriented (Morris & Summers, 1995).

Morris (1992) in Morris and Summers (1995) proposes a five-stage structure commencing with assessment. The second stage is the basic skills training. Morris emphasises the importance of feedback of the assessment in this stage. Morris presents routine development and routine application as separate stages. The final evaluation stage refers to continuously monitoring the effectiveness of the athlete's routines and making adjustments where necessary (Morris & Summers, 1995). This structure lacks an introductory education phase.

Wann's (1997) Comprehensive Intervention Programme for Athletes constitutes five stages. In the first stage, the athletes are educated about the importance of the programme. Since many athletes are unaware of exactly how psychological skills can better their performance, this phase allows them to acknowledge just how important it is to become psychologically proficient too. The second stage is the Assessment phase wherein psychological skills and athletic performance are evaluated. In the present study, psychological skills were assessed by psychometric tests and questionnaires measuring self-confidence, state, and trait anxiety, vividness of mental imagery, motivation, and attentional style, as the PST programme attempts to enhance these skills. Performance records are used to assess athletic performance. The Acquisition stage is psychological skills training per se. Here, Winter and Martin's (1993) programme will be used. The reason why this specific programme is selected

will be discussed in the following section. In the practice stage the athletes are given a period to learn the skills and systematically integrate them into their performance situations, as well as simulate the skills that need to be applied in actual competition. It may take several months up to a year to fully understand new psychological skills, and integrate them into the actual competition situation. The actual time required for practising skills varies according to what is being learnt and how well it is learnt (Weinberg & Gould, 1999). The last stage is the final assessment stage. The same assessments used in stage 2 are re-administered (Wann, 1997).

Table 1

Overview of General Structures

	Martens (1987)	**Vealey (1988)**	**Boutcher & Rotella (1987)**	**Morris (1992)**	**Wann (1997)**
Evaluating which skills are required			✔		
Education	✔	✔			✔
Assessment			✔	✔	✔
Acquisition	✔	✔	✔	✔	✔
Practice	✔	✔	✔	✔	✔
Coping		✔			
Continuous evaluation				✔	
Post-assessment					✔

As gleaned from Table 1, none of the general structures embrace all the components. However, Wann's (1997) general structure of a psychological skills training programme is going to be used to construct a framework for the current research project. The inclusion of a final assessment stage makes this an ideal model for research purposes, as the first assessments serve as a pre-test and the final evaluations serve as a posttest. Even though this structure lacks a continuous evaluation phase, the practice phase is long enough to allow necessary modifications to be recognised and implemented. Wann's structure also lacks an evaluation of psychological skills relevant to the sport. Winter and Martin's programme that will be used in the acquisition phase explicitly states that the psychological skills focused on in their programme are relevant to "athletes in all types of sports" (Winter & Martin, 1993, p.1). Hence the absence of this component is presently not an issue. What is still a shortcoming of this structure, is that it does not include a backup coping plan for times when the psychological skills prescribed are not sufficient.

One of the criticisms of general structures is that not all athletes are adequately assessed by the formal assessments in the beginning phase of the programme. Slow progress may be a problem even with a general programme. If the initial phases are drawn out, there may be too little time to actually practice the psychological skills. Or, if there isn't immediate progress after practising the skills the athlete may get demotivated. Another problem with general structures is common logistical pitfalls, for example getting sufficient quality time to work with the athletes, and co-operation from the coach. The strongest criticism against general structures is that they are too rigid. They are not always relevant to all athletes in all circumstances and may therefore be ineffective if religiously adhered to. A general structure should provide enough guidelines to support a novice sport psychology practitioner, yet it should be flexible and adaptive enough for each specific situation (Morris & Summers, 1995).

2.1.2 EXISTING PSYCHOLOGICAL SKILLS TRAINING PROGRAMMES

Existing psychological skills training (PST) programmes constitute the acquisition and practice stage of the general structure. PST programmes are detailed intervention programmes that aim to educate and train athletes in mental preparation for sport. The goal of these training exercises is to develop new mental skills to enhance performance, not necessarily to overcome problems (Morris & Summers, 1995).

Numerous PST programmes already exist. Suinn's Seven Steps to Peak Performance (1986), and Martens's (1987) American Coaching Effectiveness Program will be elaborated upon. Rushall's (1992) Programme and Hardy and Fazey's (1990) programme for the National Coaching Foundation in Britain cited by Morris and Summers (1995), as well as Winter and Martin's Programme for the South Australian Sports Institute will also be briefly discussed.

The core methods and techniques of PST programmes developed in a somewhat ad hoc manner, responding to the pressing needs of the performance enhancement practitioners (Weinberg & Gould, 1999). Consequently, several common characteristics of PST programmes became discernible. Although present programmes contain these core characteristics, they do not all have precisely the same components, as programmes are adjusted to meet the specific needs of the individual athlete, team or sport (Weinberg & Gould, 1999).

Several PST programmes have been developed in North America. Suinn's Seven Steps to Peak Performance (1986) was one of the first training manuals for athletes. The first step is relaxation training. Progressive muscle relaxation is followed by instruction in centering which is then implemented in practice and competitions. Stress Management entails

recognising stress and using centering to control it. The third step is positive thought control techniques where negative thoughts are replace positive affirmation statements. Personal best performances are reviewed in Step four in order to develop self-regulation skills. The next step is Visuo Motor Behavioural Rehearsal (VMBR) training. In the sixth step the athlete learns to control and direct attention, and refocus after distractions. The last step trains the athlete to recognise his own energy and control it for optimal use (Suinn, 1986).

Martens's (1987) American Coaching Effectiveness Program provides training materials in six primary areas that are the same as Suinn's (1986), except for the inclusion of positive thought control techniques. Martens provides a consistent explanation or research in these six fields. In 1989, Bump (cited in Morris and Summers, 1995) published an accompanying study guide and workbook that presents questions and exercises that serve as helpful resource materials (Morris & Summers, 1995).

Rushall's (1992) programme discussed in Morris and Summers (1995) attempts to alter mental behaviour within a behaviourist framework. Training is aimed at encouraging a positive approach to the sporting experience, goal setting, developing commitment, imagery, relaxation skills, pre-competition and competition skills and team building. The procedures include overt and covert positive reinforcement, maintaining progressive behaviour records, self-control behaviours, and utilising discriminative and instructional stimuli (Morris & Summers, 1995).

Morris and Summers (1995) also mention Hardy and Fazey (1990) who developed a programme for the National Coaching Foundation in Britain. Their programme consists of four cassettes and accompanying booklets, and covers goal setting, relaxation training, mental rehearsal and concentration (Morris & Summers, 1995).

Table 2

Overview of Existing PST Programmes

	Suinn (1986)	**Martens (1987)**	**Rushall (1992)**	**Hardy & Fazey (1990)**	**Winter & Martins (1991)**
Stress Management	✔	✔	✔	✔	✔
Self-confidence	✔	✔			✔
Mental Imagery	✔	✔	✔	✔	✔
Attentional Training	✔	✔		✔	✔
Motivation			✔	✔	✔

Winter and Martin's (1993) programme will be used in the present research project. This programme lasts approximately five to ten weeks and consists of seven modules presented to athletes through a workbook and audio cassettes (Morris & Summers, 1995).

The first module in the programme is goal setting. Short- and long-term goals in sport are identified and time frames for achieving them are set. The sport psychology consultant, athlete and coach determine the activities required to accomplish the goals, and set up a training diary. Self-motivation is presented as a separate model, but it incorporates goal setting and goal visualisation. The next module trains the athlete in progressive muscular relaxation techniques. To improve concentration in the proceeding module, the athlete learns

focusing skills, how to be mentally prepared for competition and simulates competition situations during practice. The athlete also establishes pre-competition routines. Centering is learnt as well as segmenting competition and focusing on the present. The self-confidence module requires athletes to identify and record strengths in attitudes and mental approach, technical skills and knowledge and physical fitness, recognise negative thinking and use affirmations to change thoughts and feelings and develop confidence. The visualisation module trains the athlete to plan what he wants to see, hear and feel in training and competition situations, visualise the situations, record vividness of imagery experiences and determine what needs to be improved in future sessions. In the final module relaxation skills, visualisation and planning are combined to establish a mind-set that facilitates optimal performance in competition. The athletes reflect on previously successful performances, identify the effective pre-competition routines, relaxation techniques, mentally rehearsing important aspects of performance in the competition environment and establish a set of performance cues (Morris & Summers, 1995).

At this point it is important to consider Vealey's distinction between psychological skills and psychological methods. Psychological skills are the desired outcomes (viz. Increased self-confidence, reduced anxiety) associated with the implementation of psychological methods. For example, Suinn's first two steps are progressive muscular relaxation and centering. These are two psychological methods but they both aim to enhance the same psychological skill, i.e. stress management. Hence although there are seven psychological methods employed, only four skills are targeted (Hardy, Jones & Gould, 1996).

According to Vealey four methods are prominently mentioned in sport psychology literature: imagery, thought control, physical relaxation and goal setting (Hardy, et al, 1996). After examining all the models, it appears that there are five skills that are being enhanced. Judging from Table 2, only one programme aims to enhance all five skills, and that is Winter

and Martin's (1993) programme. Hence, their programme will be used in the acquisition and practice phase of the present study.

Existing PST programmes have been criticised on several grounds. Firstly, although several skills are taught, the athletes are not shown how to use them in competition situations. Secondly, the same techniques are used continuously without questioning the empirical principles underlying them. Thirdly, the manner of delivery chosen is usually the most convenient one rather than the most effective one. This is especially true regarding timing of formal programmes (Morris & Summers, 1995).

2.2 PSYCHOLOGICAL SKILLS

The present research project attempts to enhance five psychological skills identified as the critical skills in the previous section, viz. self-confidence, stress management, attention, motivation and mental imagery. The following sections elucidate what these concepts mean within the context of sport psychology, the different theories underlying each concept, and the various strategies of developing these skills.

2.2.1 SELF CONFIDENCE

> *"The whole thing is never to get negative about yourself. Sure, it's possible that the other guy you're playing is tough, and that he may have beaten you the last time you played, and okay, maybe you haven't been playing all that well yourself. But the minute you start thinking about these things you're dead. I go out to every match convinced that I'm going to win. That's all there is to it"* (Jimmy Connors, in Weinberg & Gould, 1995, p.299).

This section commences with the definition of self-confidence within the sporting context. The advantages of including self-confidence in a PST programmes are highlighted using previous research cases. The different types of confidence are discussed, as well as how self-confidence impacts on athletic performance. Two theoretical views of self-confidence will be explained. This section concludes with the methods used in sport psychology to improve self-confidence.

2.2.1.1 What is self-confidence?

Besides a general definition of self-confidence within the sport psychology context, it is also important to understand what task-confidence implies.

According to sport psychologists, self-confidence is "the belief that you have the ability to achieve the goals that you want to achieve" (Winter & Martin, 1993, p.28). Within the sporting context, self-confidence basically means to expect to win. Athletes lacking self-confidence doubt whether their abilities are good enough (Weinberg & Gould, 1995, p.300).

Task confidence prevails when athletes are particularly confident about particular aspects of their athletic performance in which they have certain expertise and are especially proficient (Winter & Martin, 1993).

Self-confidence has been selected as a skill that should be enhanced in a PST programme, as numerous studies have indicated a positive relationship between self-confidence and performance. Hardy et al. (1996) cite Mahoney and Avener's (1977) study with American Olympic gymnasts which concluded that self-confident gymnasts were more likely to qualify for the team. Hardy et al. (1996) also cites a later study by Mahoney et al. (1987) which found that elite performers had higher and more stable levels of self-confidence than non-

elite athletes. Subsequent analyses also revealed that self-confidence was a significant differentiating factor between elite and non-elite athletes. Hardy et al. cites Gould et al. (1981), Highlen and Bennet (1979), and Meyers et al. (1979) who found self-confidence to be an important distinguishing factor between successful and less successful wrestlers. In 1980, Doyle et al. and in 1994, Jones et al. (both cited in Morris and Summers, 1995) also reached the same conclusion with international rifle shooters and with swimmers respectively. However, these studies were all correlational, hence causality cannot be inferred (Hardy et al., 1996).

Several studies attempt to demonstrate the relationship between self-confidence (the expectation to win) and performance. Weinberg and Gould (1999) cite studies by Nelson & Furst (1972), Ness and Paton (1979) and Mahoney and Avener (1977). Nelson and Furst showed with arm wrestlers that the important factor in success was not physical strength, but who the contestants expected to win. Ness and Paton's study concluded that when weightlifters believed and expected, they could lift a weight more than they thought they were lifting. Research with the 1976 Men's Olympic gymnastics team by Mahoney and Avener, found that the gymnasts with self-doubts performed worse than those who expressed none. The gymnasts who exhibited the highest expectations of success, also performed the best (Weinberg & Gould, 1999).

When athletes are uncertain about their ability to succeed or expect something to go wrong, they are creating 'self-fulfilling prophecies'. This phenomenon means that if one expects something to happen, that person actually causes it to happen, irrespective of whether it's positive or negative. This inevitably leads to a vicious cycle (see Figure 1, Appendix A).

Within the sporting context, there are numerous benefits of confidence. Confidence leads to positive emotions like being more able to remain calm and relaxed when under pressure.

This emotional state allows an athlete to be more aggressive in the competition situation. Self-confidence also increases effort. The intensity of an athlete's effort, and the time she spends pursuing that goal is to a large extent dependent on confidence. When athletes of equal ability are competing, the winners are those who believe in themselves, especially in a sport like running where persistence is imperative. Lastly, confidence impacts on the game strategy. Athletes "play to win" or at the other end of the continuum, "play not to lose". These two produce very different styles of playing. A confident athlete plays to win, is not afraid of risks and utilises the situation to his advantage, whereas when an athlete is not confident, he plays not to lose, is tentative, and tries to avoid doing something wrong and messing up rather than proactively trying to make something positive happen (Weinberg & Gould, 1999).

There are three main types of confidence - optimal confidence, diffidence and overconfidence (Martens, 1987).

The form of an inverted-U illustrates the relationship between confidence and performance. Performance improves as one becomes more confident, up to an optimal point, whereafter any more increase in confidence causes performance to deteriorate (Weinberg & Gould, 1999). It deteriorates because overconfidence misleads athletes into thinking they are so good that they do need to prepare as much, nor exert as much effort as needed (Martens, 1987).

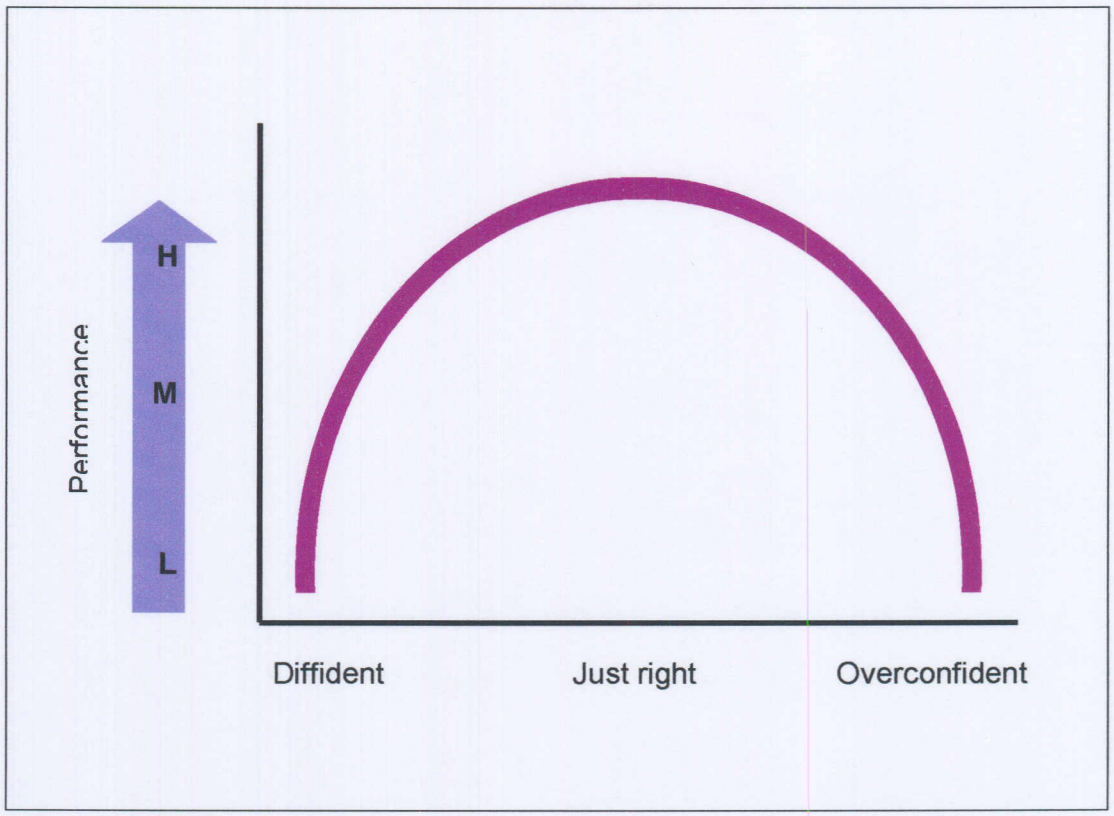

Figure 2. Optimal confidence.

From *Foundations of Sport and exercise psychology* (p. 102) by R.S. Weinberg and D. Gould, 1995, Champaign: Human Kinetics. Copyright 1995 by R.S. Weinberg and D. Gould.

Athletes with optimal self-confidence set realistic goals. Some athletes believe that self-confidence ensures good performance. Although self-confidence does not guarantee success, it equips an athlete to deal better with failure. When an athlete's self-worth is not in question, the athlete feels more free to deal with errors (Martens, 1987).

Diffident athletes have too little confidence. They fear failure so much that they are easily humiliated and behave with apprehension. Because they see themselves as losers they become losers (Martens, 1987).

> "A person who doubts himself is like a man who would enlist in the ranks of his enemies and bear arms against himself, He makes his failure certain by himself being the first person to be convinced of it" *(Dumas, in Martens, 1987, p.152).*

Overconfident athletes are those who are falsely confident. Their confidence is excessively disproportionate to their abilities. Overconfidence comprises two groups: firstly, those athletes who truly believe they are better than they really are, then there are those who appear confident, but are actually diffident. Confidence does not overcome incompetence. Hence, these athletes' performance actually declines because they believe they don't have to work very hard to succeed. Generally, overconfidence is not as prevalent as underconfidence, but the results are equally disastrous (Weinberg & Gould, 1999).

The questionnaire used in the present study measures diffidence, confidence and overconfidence. However, only the confidence score will be used.

2.2.1.2 Theories of self-confidence

Weinberg and Gould (1999) cite Bandura's (1977) self-efficacy theory which has emerged as the leading theory to explain the relationship between self-confidence and athletic performance. Vealey's (1986) sport confidence model also attempts to explain this relationship. These two theories of self-confidence are discussed in more detail below.

Bandura defined self-efficacy as a form of self-confidence, where one perceives he has the ability to perform a task successfully (Weinberg & Gould, 1999). According to Bandura's self-efficacy theory, performance accomplishments, vicarious experience, verbal persuasion and emotional arousal enhance self-efficacy (Morris & Summers, 1995), (see Figure 3, Appendix A).

Bandura suggested that a reciprocal relationship exist between performance accomplishments and self-confidence (Morris & Summers, 1995). Very often an athlete has to perform a skill that has never been performed before. In such cases coaches often use vicarious experiences/modelling to help the athletes learn a new skill. By observing others doing the skill technically, the athletes gain confidence that they too can do it. Although modelling is not as effective as one's own mastery experiences, Weinberg and Gould (1999) cite evidence by Gould & Weiss (1981), McCauley (1985) and Weinberg, Gould and Jackson (1979) that indicates that it has a demonstrated effectiveness (Weinberg & Gould, 1999). Coaches and teammates often use verbal persuasion to convince athletes that they are capable of accomplishing a certain feat. Verbal persuasion is more effective if the person trying to persuade is seen as trustworthy, and is qualified to make the judgement. The task to be accomplished must also be realistic (Morris & Summers, 1995). Emotional arousal may also impact on self-confidence. Bandura proposed that when an athlete senses an increase in physiological arousal, behaviour changes because of the change in efficacy perceptions. If

the arousal is interpreted as a sign of anxiety, this may create self-doubts, whereas if it is perceived as an indication that the body is geared up to perform optimally, self-efficacy is actually enhanced (Morris & Summers, 1995).

According to Vealey's (1986) sport confidence model, self-confidence consists of two constructs, viz. trait self-confidence and state self-confidence. Another important construct is competitive orientation, which implies that different athletes define success differently. Vealey proposes that trait self-confidence and competitive orientation interact with the objective sport situation to produce the self-confidence state, which is the most critical mediator of behaviour (Hardy et al., 1996).

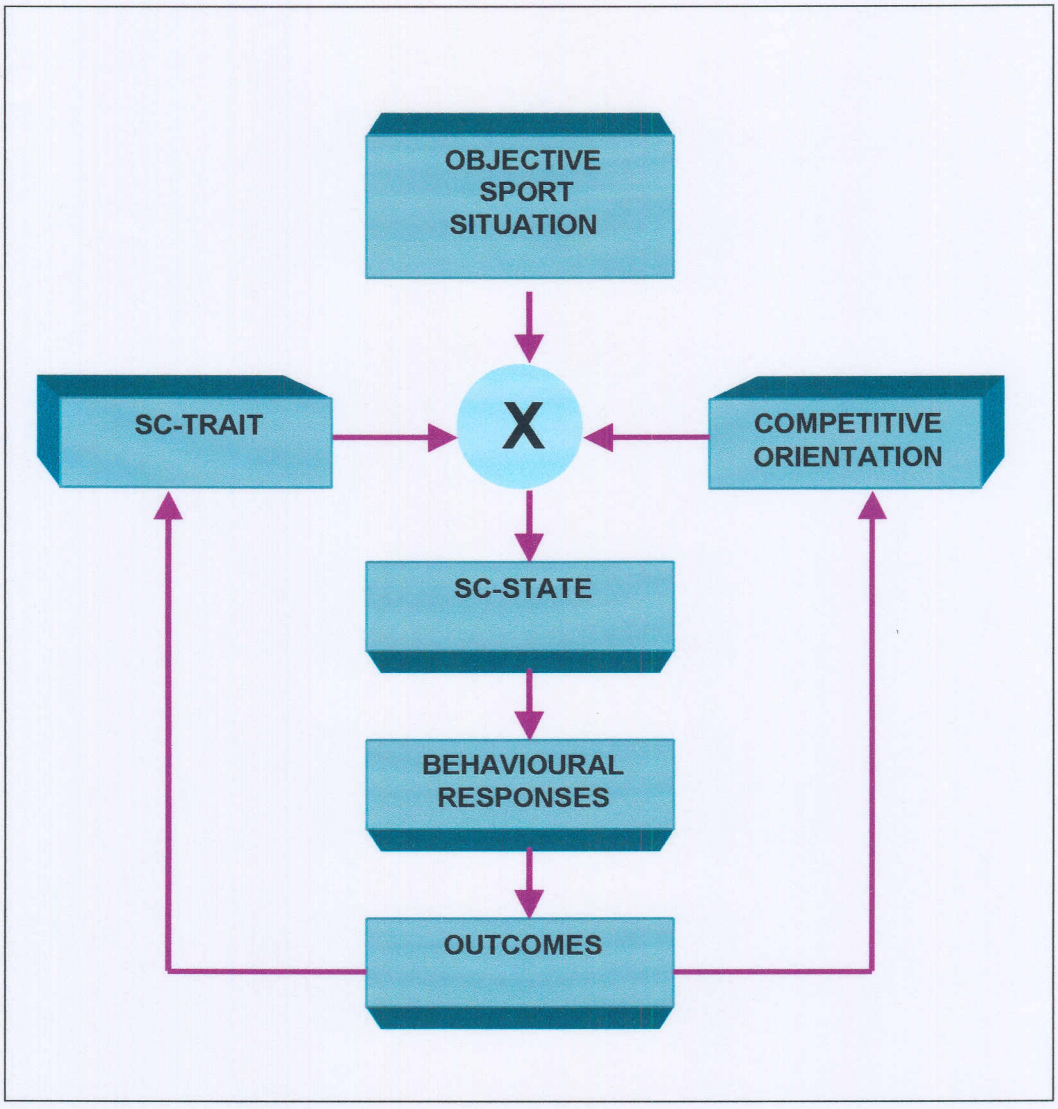

Figure 4. Vealey's (1986) sport confidence model.

From *Understanding Psychological Preparation for Sport. Theory and Practice of Elite Performers* (p. 49) by L. Hardy, G. Jones, and D. Gould, 1996, Chichester: John Wiley & Sons. Copyright 1996 by J. Wiley.

Relatively little research confirms this model, but Hardy et al. (1996) cite Martin and Gill (1991) who provide partial support even though they did not find a significant relationship between state self-confidence and competitive orientation.

2.2.1.3 Building self-confidence

Using several behavioural and cognitive strategies can enhance self-confidence. Behavioural methods include performance accomplishments, practice, competitive simulations, acting confidently, preparation, and routines. The most important cognitive strategy to build self-confidence is to consistently have constructive thoughts. These methods will be briefly discussed, elaborating on the methods employed in Winter and Martin's (1993) programme.

The most effective behavioural strategy of enhancing self-confidence is through performance accomplishments, that is an athlete's own experience of success. However, the situation becomes problematic when an athlete has had a series of losses. Self-confidence is critical to success, but also tends to allude an athlete who is constantly being defeated. Hence, it becomes a catch-22 situation. Practice then becomes extremely important. If a skill can be executed consistently during practice, one is more likely to feel confident within competitive situations (Weinberg & Gould, 1999).

Acting confidently can also help to build confidence. Since thoughts, emotions, and actions are interrelated, the more an athlete acts confidently, the more likely she is to feel confident. This is an important point to remember when you start to lose confidence, because then your opponent senses it and gains confidence. Putting on a confident image during competition, more especially after mistakes or defeats is essential. Avoid letting your body language give away signs of not being confident (Weinberg & Gould, 1999).

Competitive simulation requires the athlete to reproduce in training the circumstances, skills, and programs required in competition. This enhances both consistency of performance and consistency of self-belief when going into the competition (Orlick, 1986).

Preparation is an extremely important way to feel more self-confident (Weinberg & Gould, 1995).

> *"As long as I'm prepared, I always expect to win."* (Jack Nicklaus, in Weinberg & Gould, 1995, p.199).

An athlete can't expect to win if not prepared. Being prepared gives an athlete the knowledge that he knows he has done all he can to expect victory. An athlete should always have a strategy that takes into account how he is going to accomplish what he wants, alternative strategies, and considers opponent's abilities too (Weinberg & Gould, 1999). Winter and Martin (1993) strongly state in their programme that nothing can replace a sound, well-planned preparation spread over months.

A set precompetition routine is also indispensable. Knowing the order precisely builds confidence that extends to the competition itself (Weinberg & Gould, 1999). Although routines fall under the attention module in Winter and Martin's (1993) programme, the routines also impact on self-confidence.

Thinking positively is the crux of cognitive techniques to strengthen self-confidence. To maintain consistent results one needs to have consistently constructive thoughts and focuses when going into a competition. If the basic event is the same, and your prevent physical

preparation, convictions and competition focus is the same, then your performance, theoretically, ought to be consistent (Orlick, 1986). Thinking confidently enhances self-confidence. Athlete must think that they can and will achieve their goals. Negative and judgmental thoughts must be eliminated and replaced with positive, instructional and motivational thoughts (Weinberg & Gould, 1999). Winter and Martin (1993) use positive affirmations to boost self-confidence in their programme. Affirmations are positive statements that must be continuously repeated. The assist athletes in being more positive and constructive with their thoughts, feelings and reactions. The athletes first identify situations towards which they have negative attitudes, and try to change the attitudes with affirmations.

2.2.2 STRESS MANAGEMENT

Most athletes experience at least some anxiety during competition, but the ability to manage that anxiety, as well as use it to their advantage differentiates elite from non-elite athletes. The literature on peak performance also identifies being relaxed during performance as one feature of peak performance (Hardy et al., 1996). For this reason, stress management techniques has been selected as a component to be included in the training programme. To gain a clearer idea of stress management, this section first focuses on the definition of stress and related concepts, the stress process and the causes of stress. The different theoretical views of how arousal and anxiety influence athletic performance are discussed. The section concludes with a discussion on the actual stress management techniques.

2.2.2.1 What are stress, arousal and anxiety?

To manage stress effectively, one needs to first understand what it entails. This section aims to define stress and arousal. Anxiety is a multifaceted concept that is firstly divided into

somatic and cognitive anxiety and secondly, into state and trait anxiety.

Stress is a notable imbalance between demands and response capability, in situations where failing to meet that demand has important repercussions (Weinberg & Gould, 1999). It is a process, a series of events that leads to a particular end. McGrath propose a model that conceptualises stress as constituting four interrelated stages, specifically environmental demands, perceptions, responses and behaviours (Weinberg & Gould, 1999).

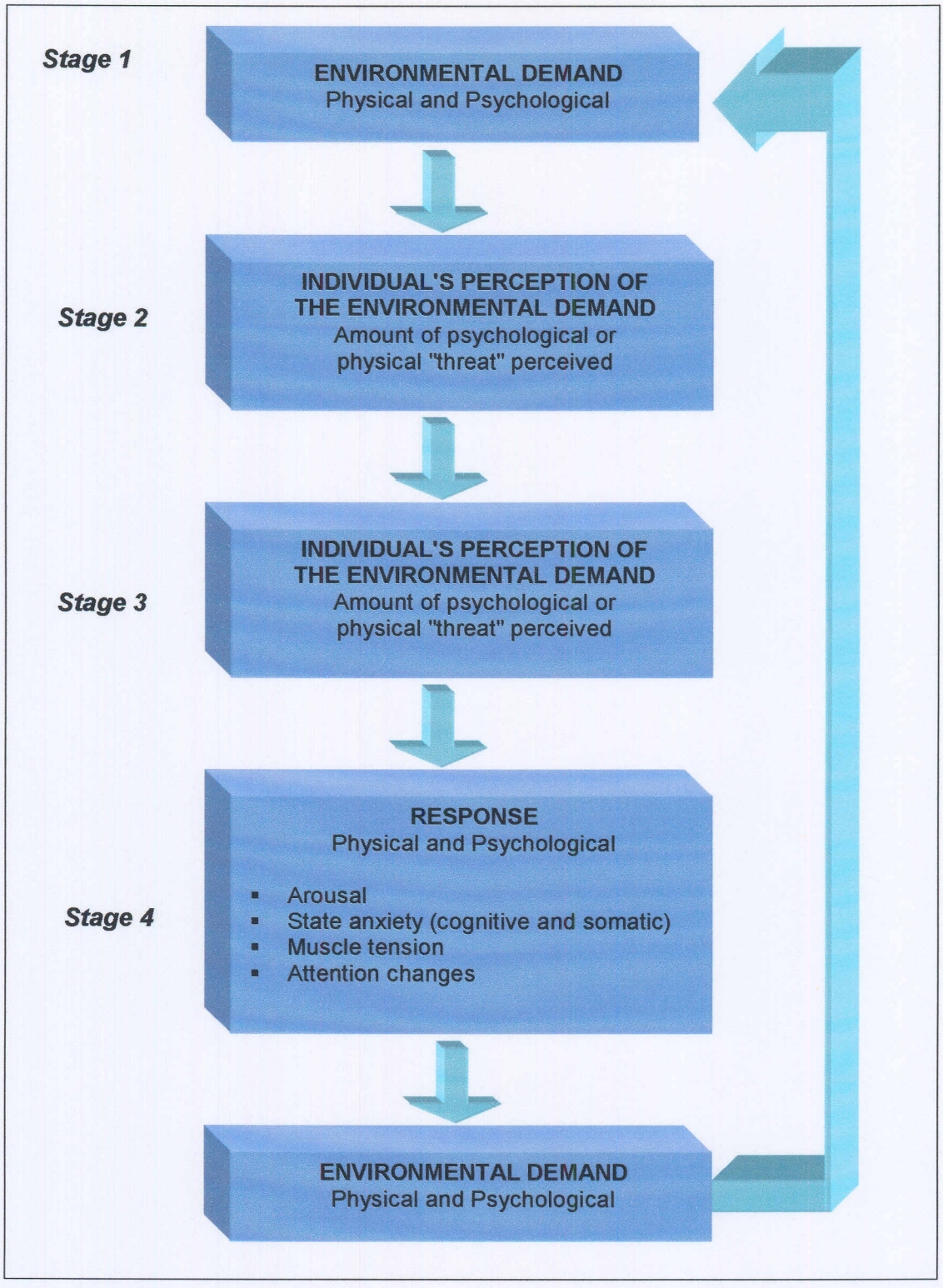

Figure 5. Stress process.

From *Foundations of Sport and exercise psychology* (p. 97) by R.S. Weinberg and D. Gould, 1995, Champaign: Human Kinetics. Copyright 1995 by R.S. Weinberg and D. Gould.

Gould and Krane (in Weinberg & Gould, 1995, p.92) define arousal as "a general physiological and psychological activation of the person that varies on a continuum from deep sleep to intense excitement. " A highly aroused person is mentally activated and will experience an elevated heart rate, respiration and sweating. Arousal is not automatically associated with either pleasant or unfavourable events. Both types of events may increase arousal significantly (Weinberg & Gould, 1995).

Morris & Summers (1995, p.30) cite Anshel, Freedson, Hamill, Haywood, Horvat and Plowman's (1992) definition of anxiety provided by the *Dictionary of the Sport and Exercise Sciences* which defines anxiety as a "subjective feeling of apprehension or perceived threat, sometimes accompanied by heightened physiological arousal". This indicates two components: firstly, a cognitive process and secondly, a somatic response Morris et al. (in Hardy et al., 1996, p.17) defined cognitive anxiety as "the cognitive elements of anxiety, such a negative expectations and cognitive concerns about oneself, the situation at hand and potential consequences". Somatic anxiety is "once perception all the physiological bearish of factors elements of the anxiety experience, that is, indications of Autonomic arousal and unpleasant feeling states such as nervousness and tension. Certain types of relaxation technique seem to work better for particular types of anxiety. Hence there are relaxation technique should be matched were there are types of anxiety experienced, cognitive anxiety might be treated were carved mental relaxation technique and somatic anxiety must be addressed words are physical relaxation technique (Hardy et al., 1996).

Another important distinction should be made between state and trait anxiety. State anxiety is the fluctuating element of anxiety. It is an emotional state that is distinguished by subjective, consciously perceived feelings of uneasiness and tension, and linked with arousal of the autonomic nervous system. Trait anxiety, on the contrary is part of one's personality. It is an acquired behavioural disposition that affects behaviour. Research consistently indicates that

there is a direct relationship between trait and state anxiety. However a person who is strongly trait anxious may have gained enough experience in a specific threatening situation, and does not perceive that situation as a threat anymore and does not experience the corresponding state anxiety. Likewise, trait anxious athletes may have learned coping skills to deal with the state anxiety in competition (Weinberg & Gould, 1999).

The present project aims to measure trait anxiety, somatic state anxiety and cognitive state anxiety.

2.2.2.2 Theoretical views

Sport psychology literature has no shortage of literature on stress theories. Spence and Spence's drive theory, the inverted-U hypothesis, Yuri Hanin's zone of optimal functioning theory, multidimensional anxiety theory, Hardy's catastrophe model and reversal theory will be elaborated upon.

Initially psychologists saw the relationship between arousal and performance as direct and linear. Morris and Summers (1995) discuss Spence and Spence's (1966) drive theory which postulates that when one's arousal or state anxiety increases so does his performance. But many athletes found that their performance deteriorated when they were overly aroused or too anxious. Hence, little scholarly verification exists for the drive theory (Weinberg & Gould, 1999). Later research also indicated that this theory was valid for performing easy motor tasks, but not for more difficult motor tasks (Morris & Summers, 1995).

According to the inverted-U hypothesis an increase in arousal will be associated with an increase in performance up to a certain point. This point is the optimal level of arousal. Any increase in arousal thereafter will lead to a decline in performance (Weinberg & Gould, 1999).

Although most athletes, coaches and sport psychologists accept this hypothesis, it has been recently criticised. The shape of the curve has been questioned, whether optimal arousal is always at the midpoint of the arousal continuum, and the nature of arousal itself (Weinberg & Gould, 1999).

One of the goals of the present programme is to assist the athletes to develop an ability to recognise when their own arousal levels are too low or too high and to learn how to get it into the optimum area (Winter & Martin, 1993).

Weinberg and Gould (1999) discuss Yuri Hanin's (1986) zone of optimal functioning (ZOF) theory, which proposed that top athletes each have a zone of optimal state anxiety wherein best performance occurs. Where this zone lies varies in different athletes. This theory differs from the inverted-U hypothesis in two ways. Firstly, the optimal level of anxiety is not necessarily at the midpoint of the anxiety continuum, but fluctuates amongst different individuals. Secondly the optimal level of state anxiety is not a single point but a bandwidth. Coaches should assist athletes to identify and reach their own particular zone of state anxiety (Weinberg & Gould, 1999).

The ZOF theory failed to examine whether the cognitive and somatic components of anxiety influence athletic performance differently. These state anxiety components are generally acknowledged to affect performance differently (Weinberg & Gould, 1999).

According to the multidimensional anxiety theory, cognitive state anxiety (worry) is negatively related to performance. An increase in cognitive state anxiety leads to decreases in performance. However somatic state anxiety follows an inverted-U pattern. Hence state anxiety is multidimensional with the two components having different effects on performance. Overall, research has indicated that the two anxiety components differentially predict

performance, but the exact predictions of multidimensional anxiety theory have not been constantly supported (Weinberg & Gould, 1999).

Weinberg and Gould (1999) also discuss Hardy's (1990) theory which addresses the relationship between arousal and cognitive anxiety. Hardy's catastrophe model predicts that physiological arousal is related to performance in an inverted-U pattern, but only if the athlete has low cognitive state anxiety. If cognitive anxiety is high, the increase in arousal at some point reaches a threshold just beyond the point of optimal arousal level and thereafter the athlete experiences a rapid decline in performance, i.e. a catastrophe occurs. Hence, arousal may have strikingly different effects, depending on the level of cognitive anxiety. To regain the optimal level of functioning, the athlete has to completely relax again. This theory has received good scientific support (Weinberg & Gould, 1999).

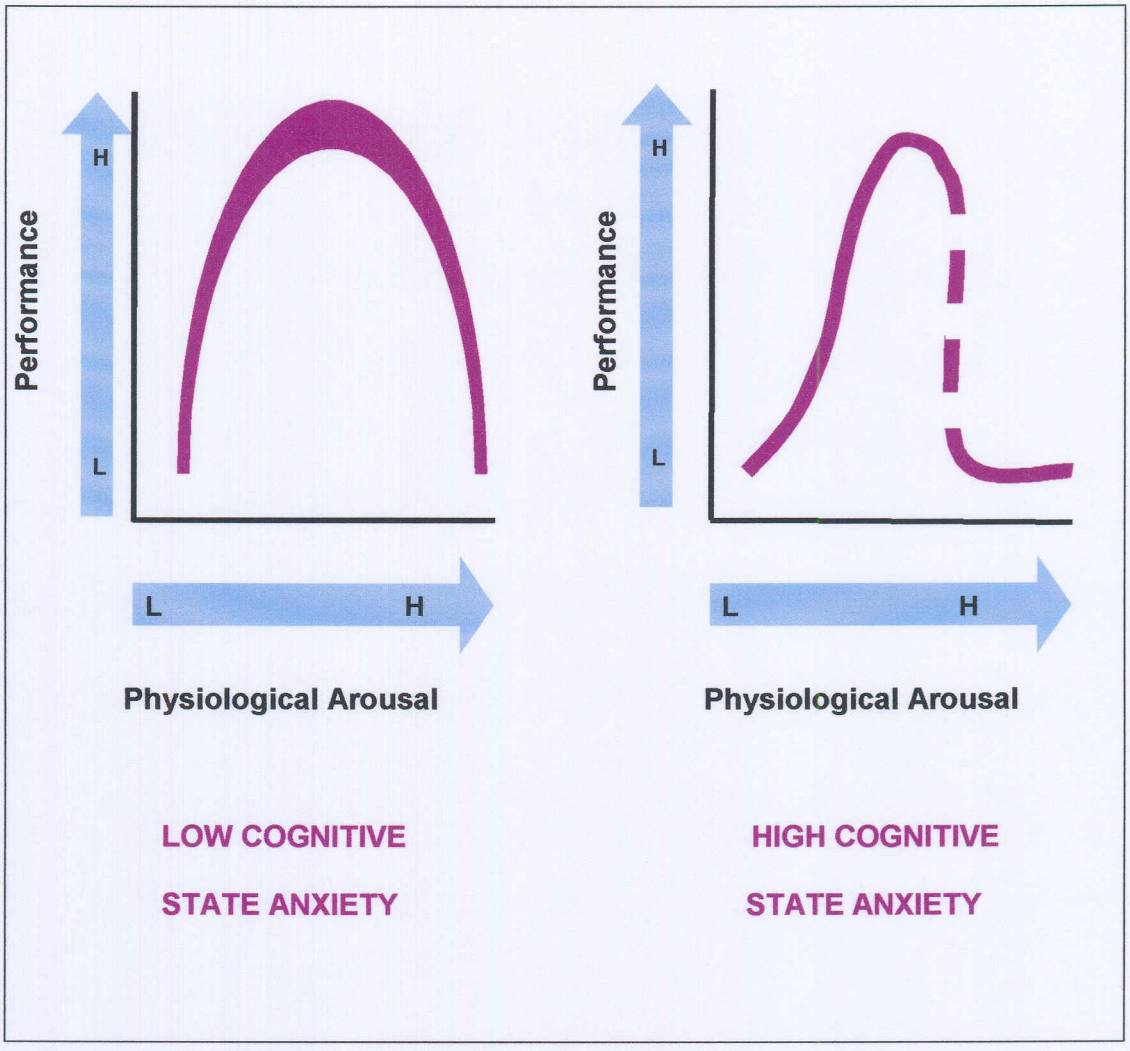

Figure 7. Catastrophe model.

From *Foundations of Sport and exercise psychology* (p. 105) by R.S. Weinberg and D. Gould, 1995, Champaign: Human Kinetics. Copyright 1995 by R.S. Weinberg and D. Gould.

Weinberg and Gould (1999) discuss Kerr's (1985) reversal theory which asserts that the manner in which arousal impacts on performance depends on how the athlete interprets the arousal level. If arousal is interpreted positively, performance will be positively affected, and if arousal is interpreted negatively, performance in influenced negatively (Weinberg & Gould, 1999).

2.2.2.3 Stress management techniques

This section elaborates on several relaxation and stress management techniques, particularly progressive muscular relaxation, autogenic training, the use of other psychological skills and routines to reduce anxiety, stress inoculation training as well as some general guidelines for managing anxiety.

Progressive muscular relaxation (PMR) entails the systematic focus of attention on several groups muscle groups throughout the body. The athlete progresses through the body tensing and then releasing the tension from each muscle group in turn. This basic procedure has been adjusted in many ways, including differential PMR that involves partial relaxation of the muscles . This brings about a greater self-awareness of degrees of bodily tension and their implications for sporting performance. Ost's applied relaxation technique has not received much attention in the sport psychology context (Hardy et al., 1996). Almost every PST programme uses this relaxation technique, Winter and Martin's programme being no exception. Hence, this technique forms a central part of relaxation training in the present programme.

Hardy et al. cite Nideffer and Dechner's (1970) and Kukla's (1976) studies. Nideffer and Dechner have reported a case study where progressive relaxation was used to improve a shot putter's performance. Using a group design, Kukla executed progressive relaxation with

high school baseball plays a, and found a reduction in state anxiety and improved batting performance under stressful conditions in comparison to the control group, as well as improved serving performance. Although research has generally shown a decrease in state anxiety, the results relating to performance do not always show improvements and tend to be inconsistent (Hardy et al., 1996).

Autogenic training is a type of self-hypnosis where the athlete learns to create several physical concomitants of the hypnotic state. These include heavy and warm limbs, rhythmical breathing and heartbeat, a warm solar plexus and a cool forehead. A passive attitude is imperative (Morris & Summers, 1995).

Psychological skills like imagery, attentional control training and thought stopping (dealt with in other sections) also qualify as relaxation techniques (Morris & Summers, 1995).

Several relaxation and cognitive techniques can be included into competition routines to help the athlete control performance-related stress. The purpose of this plan is to reduce the detail on which the athlete must focus. The plan can take note of key segments, task and mood relevant cues and words, stress control routines, word/action to control actions and thoughts, a brief stress management technique, an attention controlling procedure, a refocusing element to guide thoughts and feelings in a more positive direction (Morris & Summers, 1995).

Stress inoculation training is not a single technique, but a general term referring to a treatment combining didactic teaching, Socratic discussion, cognitive restructuring, problem solving and relaxation training, behavioural and mental rehearsal, self-monitoring, self-instruction and self-reinforcement, and attempting to modify the environment (Meichenbaum, 1985).

Listed below are some general guidelines for managing anxiety:

- Focus on what can be controlled
- Thinking about practice situations
- Remembering the worst case scenario
- Keeping active
- Using cognitive strategies
- Developing a mental plan
- Being realistic
- Having fun
- Avoiding using the W-I-N word
- Using game simulation in practice
- Keeping things in perspective
- Systematic desensitisation (Morris & Summers, 1995).

2.2.3 ATTENTION

This section first highlights the attentional problems that necessitate attentional training. The section is then subdivided into an explanation of what attention entails, theoretical models of attention and concludes with techniques to enhance attentional skills.

According to Hardy et al. (1996), attention can impact on performance in two ways. Firstly, a loss of concentration can impair performance. Secondly, maintaining concentration can possibly be a problem for some athletes.

Weinberg & Gould (1999) contend that attending to past events can cause an athlete to lose focus. A lot of athletes can't forget a bad mistake that just occurred. This prevents them

from focusing on the present Conversely, attending to future events is also a problem. This is more prevalent with younger athletes who think about the repercussions of particular actions. Such thinking usually occurs in the form of "what if?" remarks. This type of worrying adversely impacts on concentration, causing a stronger likelihood of mistakes and poor performance. Besides worry being distracting in itself, it also causes excess muscle tension that obstructs performance too (Weinberg & Gould, 1999).

Attending to too many cues can also be a major impediment to concentrating optimally. There are too many distractions in the environment vying for the athlete's attention. Spectators may influence concentration and resultantly performance by forcing the athlete to try too hard, but they may also have a positive effect by making the athlete play better to impress those that he knows (Weinberg & Gould, 1999).

In order to deal with concentration problems like those just noted attentional training has been included in the PST programme.

2.2.3.1 What is attention?

A brief definition of attention will be followed by an explanation of the two dimensions of attention.

Morris & Summers (1995, p.64) cite William James (1890) definition, which defines attention as "...the taking possession by the mind, in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought. Focalisation, concentration of consciousness is of its essence. It implies withdrawal from some things in order to deal effectively with others." Within the sporting context, athletes use the term "focus" to describe concentration (Winter & Martin, 1993).

Hence, a key dimension of attention is *selectivity*, i.e. focussing on relevant environmental cues whilst ignoring irrelevant cues. Another important aspect is that the focus of our mental effort is *shiftable*. Some shifts are involuntary like when attention is diverted to a sudden change, such as a loud noise. Other shifts are voluntary. Shifts may also be from internal to external stimuli or vice versa. Attention may also have *more than one focus* at a time (Morris & Summers, 1995).

2.2.3.2 Models of attention

Nideffer's theory of attentional style has emerged as the leading theory of attention in sport psychology. However, Boutcher's preliminary integrated model of attention and sports performance, the information processing theory, and Allport and Kahneman's limited supply of resources theory will also be discussed.

The most beneficial research on the role of attentional style in sport has developed from Robert Nideffer. Nideffer theorises that attentional focus lies on two dimensions viz. Width (broad/narrow) and direction (internal/external). A broad attentional focus lets one perceives numerous occurrences at the same time. This type of attention is important where athletes have to contend with a rapidly changing environment. A narrow attentional focus is required when an athlete is only responding to one or two cues. An external focus directs attention outward on an object or opponent. An internal focus is aimed inward at thoughts and emotions (Weinberg & Gould, 1999). Sports differ in their requirements for focusing. The optimal attentional focus of a sprinter should be narrow internal (Cox, 1994). The present project aims to categorise into which quadrant the athlete falls.

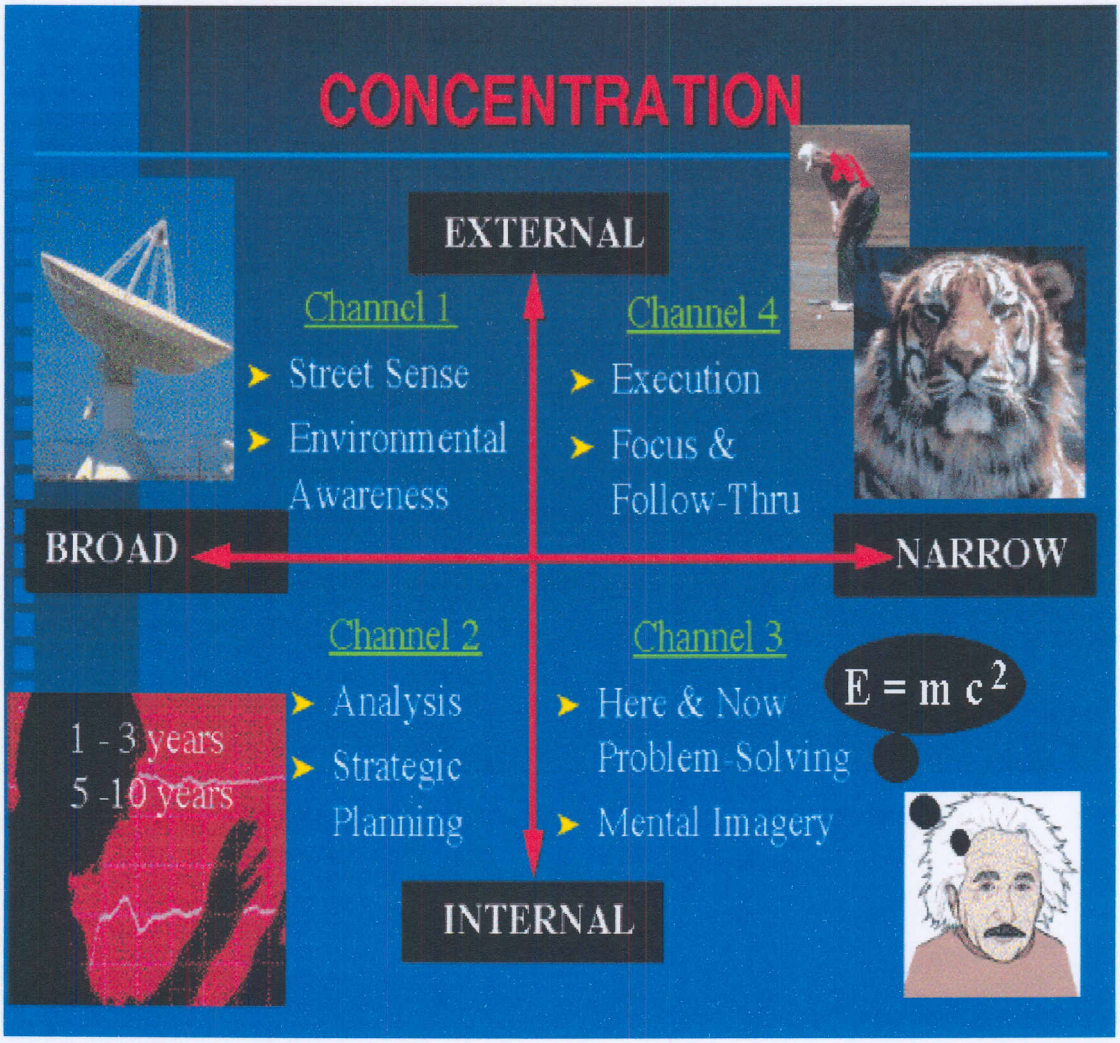

Figure 8. Dimensions of attention.

From *The Attentional and Interpersonal Style Inventory (TAIS)*, retrieved March 13, 2001, from http://www.rembisz.com/tais3/html

Boutcher's preliminary integrated model of attention and sports performance takes into account individual differences, environmental influences, and fluctuations in the athlete's arousal level, and infers that attention may be evaluated in various ways. This model predicts that enduring traits, demands of an activity and environmental determinants impact the level of physiological arousal. When a task is being executed, this arousal is channelled into either controlled processing, automatic processing, or a combination of the two, depending on the nature of the task. Optimal attentional states are achieved when the athlete has achieved an exact balance between controlled and automatic processing required for that specific task. The feedback loops in the model allow for interaction between the numerous factors and for attention to be affected during and after performance. Hardy et al. (1996) suggest that this model is relatively speculative, with the current format being too vague and simplistic.

The information processing theory presumes that there is a limit to how much information can be processed at a particular time. Consequently, one needs to be selective in what is processed in order to prevent a cognitive overload. The argument is that there is a bottleneck somewhere in the information-processing system that enables one to perceive only a portion of the information present in our environment (Morris & Summers, 1995).

Morris and Summers (1995) discuss Allport's (1980) and Kahneman's (1973) limited supply of resources theory that presumes there is a limited supply of cognitive resources that are undifferentiated and unspecialised. These resources can be freely allocated in varying amounts to different tasks. Hence, any number of tasks may be performed simultaneously as long as the cumulative demand on resources does not exceed the given supply. If however, the demand is greater than the limit, performance on one of the tasks will deteriorate. The implication of this theory for an athlete is that in numerous sporting situations there is a large amount of relevant and irrelevant data that can be processed which

presents the athlete with a potential overload. To deal with the situation the athlete has to learn what to attend to and what to ignore, and when to shift attention (Morris & Summers, 1995). Extensive practice is one way to decrease resource demands, as it leads to *automaticity.* Automatic processing is the "activation of a learned sequence of elements or behaviours in permanent memory," (Moates & Schumacher in Morris & Summers, 1995, p.66). This allows fast, effortless performance not requiring conscious control.

2.2.3.3 Enhancing attentional skills

Both behavioural and cognitive strategies can be used to enhance attentional skills. Behavioural techniques include game simulation activities, practicing under unfavourable conditions, utilising cue words, routines, eye control and centering. Cognitive methods to improve focus are non-judgemental thinking, remaining focused in the present, stopping or parking thoughts, shifting attention appropriately, mental imagery and performance segmenting. These methods will be discussed briefly.

The first behavioural strategy, that is, game simulation activities, reduces the negative outcomes associated with novelty as well as the stress related to high level races. Morris and Summers (1995) presume that when athletes have been practising in an environment close to the race settings, then they will have enhanced coping strategies for the real race. The closer the practise sessions resemble the actual race, the better the effect. Simulation training takes two forms, viz. Physical practice in the presence of simulated competition stressors and metal rehearsal of the actual competitive event.

Secondly, the more an athlete practices under unfavourable conditions and with distractions present, the better prepared he is to deal with them during an actual race (Weinberg & Gould, 1999).

Cue words may help to trigger specific responses. For example, a sprinter may say "explode" to ensure that he gets off the starting blocks well. A cue word can be instructional, motivational or emotional (Weinberg & Gould, 1999).

Routines focus concentration and aid in mental preparation for a race. Mental imagery and cue words should be incorporated into routines too. When a sprinter is not actually running (e.g. during breaks in competition) the mind may often wander. Making imagery and cue words part of one's routine during this time can assist the athlete to mentally focus for the race. It also allows the athlete to be more task focused and balance emotional states (Weinberg & Gould, 1999). Winter and Martin (1993) use pre-competition routines as well as within-competition routines in order to focus concentration in their programme. Their pre-competition routine include preparation in terms of diet, travel, warm-up, visualisation and goal setting and should be adaptable to any competition venue.

Athletes must practice eye control. As eyes wander and focus on task-irrelevant cues like the crowds, opponents' action, coaches and team-mates, so does the mind. Eyes should be kept on the floor, focused on equipment, or on an empty spot on the track (Weinberg & Gould, 1999).

Although centering is a relaxation technique it is also used to focus attention. Athletes have always known that an easy way to refocus after concentration starts to decline is to take a deep breath and relax the muscles. Winter and Martin (1993) also use centering as a focusing method.

A cognitive strategy that can be used by the athlete is non-judgemental thinking. What usually leads to a drop in performance is the tendency to judge performance all the time and

classify it as good or bad. Once this happens, the athlete starts to generalise about certain aspects of his behaviour. The brain then overrules the body causing extra muscle tension, more effort, a drop in concentration, and impaired decision-making (Weinberg & Gould, 1999). Faults should not be ignored entirely, but look at nonjudgementally. Athletes should not automatically generalise that they are pathetic sprinters. They should look objectively at what affected performance that day, and see constructively what can be done about it (Weinberg & Gould, 1999).

Staying focused in the present also helps to concentration. Past- and future-orientated thinking tends to produce attentional difficulties. Avoid thinking about what just happened, or what might occur. Remaining in the present/immediate future forces a focused concentration throughout the race (Weinberg & Gould, 1999).

If an athlete's mind wanders into the past, future or lingers on irrelevant matters, he should try the technique of thought stopping. When the athlete becomes aware of negative or distracting thought, he should eliminate the thought by saying/thinking something like "stop", I'm not going to think about this", etc. Some athletes "see" a big red stop sign in their mind, others find an action like snapping their fingers to stop themselves from thinking about something. He should then replace the negative thought with realistic self-talk by focussing on something that is task relevant (Potgieter, 1997).

Distracting thoughts can be dealt with by parking them, i.e. put them aside for another time after the race. Write the thought on a paper and put it away, use a self-talk instruction or visualisation. After the race deal with the issue by "unparking" it (Morris & Summers, 1995).

Learning to shift attention helps an athlete to shift focus across internal-external and broad narrow dimension (Weinberg & Gould, 1999).

When an athlete makes an error, he should use it as an opportunity to learn. Quickly analyse why the mistake was made and mentally rehearse the way it should be done correctly (Morris & Summers, 1995). Rehearsing game concentration by using mental imagery is good practice for concentration. A sprinter may see herself get a great start of the blocks, hit their strides, and then stay loose and relaxed during the last 20 yards in the race, where they actually usually tighten up (Weinberg & Gould, 1999).

Winter and Martin (1993) also use a strategy called performance segmenting. The competition is segmented in terms of logical divisions in performance. By breaking the race down into segments, and having a plan for each segment, concentration is improved.

2.2.4 MOTIVATION

Motivation affects one's choice of activity, the effort deployed to pursue goals, the intensity of effort when pursuing goals, and persistence when confronted with adversity and failure (Weinberg & Gould, 1999). Motivation is what pushes an athlete to train day after day and to work harder to improve performance. When coaches are questioned about essential qualities of successful athletes, strong self-motivation and personal commitment are consistently mentioned. Lay persons commonly equate sport psychology with motivation. Inevitably, motivation has also been included in the programme (Winter & Martin, 1993). This section on motivation commences with an elucidation of the concept of motivation. It is followed by elaborations on the different theoretical views of motivation, and closes with guidelines to build motivation.

2.2.4.1 What is motivation?

Several concepts are fundamental to understanding motivation within the sport psychology context. Motivation, amotivation, intrinsic motivation (to know, toward accomplishments, and to experience stimulation) extrinsic motivation (external regulation, introjection and identification) as well as achievement motivation will be defined.

Motivation is "the direction and intensity of one's effort" (Sage, cited in Weinberg & Gould, 1995, p.60). Direction of effort indicates whether one seeks out, approaches, or is attracted to certain situations while Intensity of effort denotes the amount of effort one applies to a specific situation (Weinberg & Gould, 1999). The relationship between direction and intensity is illustrated in Figure 9 (see Appendix A).

Amotivation is very similar to the concept of learned helplessness. Amotivated athletes do not see a connection between their actions and the outcomes of their actions. They feel incompetent and a lack of control. They are neither intrinsically nor extrinsically motivated. They feel that they no longer have any good reasons to train. Eventually they drop out of the sport in question (Pelletier, Fortier, Vallerand, Tuson, Brière & Blais, 1995).

Within the sporting context, intrinsic motivation (IM) refers to participating in a sport solely for the pleasure and satisfaction derived from it. An intrinsically motivated athlete participates in sport voluntarily, in the absence of material rewards or external restraints. The tripartite taxonomy of IM recently proposed, reveals the presence of three types of IM: IM to Know, IM to Accomplish things, and IM to Experience Stimulation. IM to Know prevails when an athlete participates in a sport for the satisfaction experienced when learning something new and discovering knew techniques. IM toward Accomplishments is the motivation to participate in sport in order to feel competent and create unique achievements. IM to Experience

Stimulation pushes an athlete into a sport to experience stimulating sensations (Pelletier et al., 1995).

Extrinsic motivation (EM) drives an athlete into a sport as a means to an end and not for their own sake. Different types of EM can be ordered along a self-determination continuum. From lower to higher levels of self-determination, they are external regulation, introjection and identification. External regulation refers to behaviour that is directed by external factors like material rewards or constraints imposed by others. Externally regulated athletes partake in sport to receive praise from their coach or parents. In such cases, participation is not for fun but to gain rewards or to avoid negative consequences. With introjection, previously external sources of motivation have been internalised to the extent that their actual presence is no longer required to drive behaviours. Rather, the behaviours are reinforce through internal pressures like guilt and anxiety. Athletes will therefore participate in sport because they feel compelled to be in good shape, and feel embarrassed when they are not in best form. Identification predominates when the athlete values participation in sport as important and therefore performs it out of choice. At this level, although the activity is still performed for extrinsic reasons, it is internally regulated and self-determined. They are participating in sport because they feel their involvement contributes to their growth and development as individuals (Pelletier et al., 1995).

The three types of IM will be measured in the present study, and aggregated to give a global measure of IM.

Competitiveness is the sporting term used for achievement motivation. Martens (1976) defined it as "a disposition to strive for satisfaction when making comparisons with some standard of excellence the presence of evaluative others " (Weinberg & Gould, 1999, p. 74). It is important to look as achievement motivation as situation-specific. Martens's definition is

restricted to circumstances where one is being evaluated by others. But many athletes compete with themselves even when they are not being evaluated by anyone else (Weinberg & Gould, 1999).

2.2.4.2 Theoretical views of motivation

In terms of motivational theories, the energisation theory, cognitive evaluation theory, trait-centred view, situation-centred view and interactional view will be elaborated upon.

The energisation theory (see figure 10, Appendix A) predicts that performance and goal attractiveness are facilitated by difficult but attainable goals. Also, potential motivation is a function of an athlete's need for a goal, the incentive value of the goal and the degree to which he expects to receive the goal if the task is completed (Wann, 1997). Research testing the principles of the energisation theory has been supportive. However, it has not been tested in sport settings (Wann, 1997).

According to the cognitive evaluation theory (see figure 11, Appendix A) people have an innate need to feel personally competent and self-determining. Hence, particular events will increase motivation to the extent that they enhance athlete's perceptions of personal competence and self-determination. Conversely, if a specific event causes a decrease in the athlete's perceptions of either their personal competence or self-determination, then intrinsic motivation too will decrease. Self-determination is operationalised in terms of locus of causality (Hardy et al., 1996).

Cognitive evaluation theory accounts for two types of rewards. Controlling rewards aim to affect an athlete's behaviour, and decrease intrinsic motivation. Informational rewards provide information about one's competence at a task, and tend to increase intrinsic

motivation. If an athlete thinks that the coach's praise is intended to control behaviour, this praise will decrease her intrinsic motivation, but if the athlete thinks that the praise is supposed to provided information about her successful performance, intrinsic motivation will increase. Therefore, trainers have to very careful abut the rewards they give to athletes (Wann, 1997).

In terms of the participant-centred or trait-centred view, motivated behaviour is predominantly a function of individual characteristics. Therefore personality, needs and goals of an athlete determine motivated behaviour. Some athletes have characteristics that predispose them to success and high levels of motivation, whereas others are naturally susceptible to being unmotivated. This theory has generally been rejected because it ignores environmental factors in determining motivation (Weinberg & Gould, 1999).

The situation-centred view is the direct opposite of the previous one. This view asserts that motivation level is essentially determined by the situation. This view has not been favoured as there are lots of times when athletes remain motivated in spite of their negative environment (Weinberg & Gould, 1999).

The Interactional view (see figure 12, Appendix A) contends that motivation is a function of the interaction between participant factors and situational factors. This view has been most widely accepted (Weinberg & Gould, 1999).

2.2.4.3 Guidelines to build motivation

Goal setting is the single most important method of strengthening motivation and achievement motivation. This will be discussed in more detail. Other concepts relevant to building motivation that will be highlighted are attributions, attending to unique and shared

motives in groups, structuring situations, how leaders affect motivation, behaviour modification, visualisation and different motives.

Goal setting is the process of selecting acceptable targets and objectives. These targets and objects are called goals. Goals may be technical, tactical , psychological or physiological. According to Silva and Weinberg (1984), goal setting is generally seen as a motivational tool. However, goals also provide focus and direction. They also produce better results and provide additional ways of developing an athlete (Morris & Summers, 1995). Winter and Martin (1993) contend that short term goals provide an athlete with the direction and motivation required attaining long-term goals.

There are seven primary principles of goal setting:

1. Make goals as specific as possible
2. Divide long-term goals into a series of short-term goals with deadlines
3. Provide clear and regular feedback to the athlete
4. Make goals challenging, not too easy nor too difficult
5. Be flexible. Goals may need to be altered if circumstances change.
6. If the coach, athlete and sport psychology set goals together, the athlete tends to be more commitment to the achievement of the goal setting.
7. Write down the goals, prioritise and set clear time frame. Keep a goal diary (Morris & Summers, 1995).

On a formal level, goal setting is going to be used as the primary motivational tool in the present programme.

Several other methods of building motivation are:

- Monitor and alter attributional feedback. Mastery goals must be emphasised and attributions linked to the individuals goals (Weinberg & Gould, 1999).

- Inappropriate attributions must be assessed and corrected. The attributions athletes make in practice and competition must be continually monitored. The maladaptive attributions must be corrected and that athletes use attributions that facilitate achievement motivation should be ensured (Weinberg & Gould, 1999).

- The environment can be changed to enhance motivation. By dividing athletes into competitive and recreational division, it enhances participation rates, as athletes can play at a level they're comfortable with (Weinberg & Gould, 1999).

- Leaders influence motivation. An instructor's actions or inactions and attitude can impact on the motivational environment. Hence it is necessary to sometimes act more upbeat than one feels (Weinberg & Gould, 1999).

- Behaviour modification can be used to change undesirable participant motives. Sometimes a participant has negative or entirely extrinsic motives for engaging in sport. In such settings it may be appropriate to alter motives (Weinberg & Gould, 1999).

- Individuals within groups should be flexibly attended to. Athletes have shared and unique motives. Although there are some general motives, bear in mind that motives can vary greatly, and some athletes can have very unique motives. The following guidelines can give some idea of the athlete's motives:

  (i) Observe the athletes and take note of what they like and don't like about the sport

  (ii) Informally talk to significant others and try to gain an idea of the motives for participation

(iii) Continually ask the athletes to write out their reasons for participating (Weinberg & Gould, 1999).

- Both situations and traits motivate people. Hence both should be taken into account (Weinberg & Gould, 1999).

- At times an athlete may want to be doing something else as well. It is important to be aware of these conflicting interests. They can impact strongly on participation (Weinberg & Gould, 1999).

- People have multiple motives for involvement and it is extremely important to understand why the athlete is participating. Possible motives are provided in Table 3 (Weinberg & Gould, 1995).

Table 3

Motivational Categories For Sport Participation

Category	Description
Social Approval	Parental, peer or coach approval
Competition	Against time, fellow team members and rival teams
Self-mastery	Achieving control over mind and body
	Feeling more in control of body movements
	Learning new skills
Lifestyle	Habit
	Lack of something better to do
	Introduced to activity at an early age
	Parents decided this for you

Fear of failure	Critical comment from others
	Self-criticism
	How others might view your performance
Physical fitness and	Feeling healthy
health	Increased muscle tone
	Keeping in good shape
	Gaining greater physical strength
Friendship and personal	Fellow team members
associations	Models
Success and	Participating in important contests
achievement	Achieving in training and personal goals
Tangible pay-offs	Athletic scholarships
	Travel
	Extra attention
Recognition	Peers, public and special people
	Younger and older people
Intimidation/control	Coach being angry at you
	Coach directing and running your life
Heterosexuality	Being more attractive to the opposite sex
Competing conditions-	Competing before a large enthusiastic crowd
crowds	Being seen as a 'favourite'
Independence-	Deciding your own training schedule
individuality	Being viewed as an individual
	Practising alone
"Family"	Team members, coaches and opponents
Emotional release	Letting you feelings out
	Feeling exhilarated

Status	Seen as important, a role model
	Feeling respected
Self-direction/awareness	Getting a focus in life
	Attaining a greater sense of confidence
	Feeling special as a person
Understanding reasons	Understanding reasons for techniques and regulations

Note: From *Foundations of sport and exercise psychology* (p. 67), by R.S Weinberg and D. Gould, 1995, Champaign: Human Kinetics. Copyright 1995 by by R.S Weinberg and D. Gould.

The coach should attempt to provide multiple opportunities. Structuring a situation to enhance motivation, may imply that all motives must be taken into account. This also enhances performance (Weinberg & Gould, 1999).

- Winter and Martin (1993) also use visualisation to enhance motivation. This is another example of a psychological skill also being a psychological method. Visualisation will be discussed in more detail in the following section.

Motives change over time. Motives for participation must be continually monitored to detect these changes (Weinberg & Gould, 1999).

2.2.5 MENTAL IMAGERY

This section on mental imagery continues with a rationale for including imagery training in the present programme. Following in the subsequent sections are a discussion of what exactly mental imagery is, theories of how it works, and basic guidelines of imagery training. There are numerous anecdotal reports of mental imagery working.

Several good athletes and international coaches include imagery in their daily training. Weinberg and Gould (1999) cite a study conducted at the United States Olympic Training Centre by Murphy, Jowdy and Durtschi (1990), concluded that 90% of Olympic athletes used some form of imagery and 97% of these athletes felt it helped their performance. Also, 94% of coaches of Olympic athletes used imagery during their training sessions. Weinberg & Gould (1999) also cite case studies by Lane (1980), Titley (1976) and Suinn (1976) that reported significant improvement in performance after using imagery. Feltz and Landers (1983), Richardson (1967) and Weinberg (1981) (cited in Weinberg & Gould, 1999) have provided scientific experimental evidence supporting the use of imagery in learning and performance enhancement. The effectiveness of imagery has been shown in basketball, football, swimming, karate, skiing, volleyball, tennis, track and field, scuba diving, soccer, volleyball, gymnastics and golf (Weinberg & Gould, 1995; Wann, 1997).

Cumulatively the studies reveal that imagery is very helpful to performance. Hence, the inclusion of imagery training in the present research project (Wann, 1997).

2.2.5.1 What is mental imagery?

This section sets forth the definition of mental imagery, lists the different types of imagery and highlights the importance of mental imagery by elucidating the uses and applications of imagery within sport.

Mental imagery, visualisation, mental rehearsal/practice and visual motor behaviour rehearsal all refer to creating or recreating an occurrence in the mind (Weinberg & Gould, 1999).

Corbin (in Morris & Summers, 1995, p. 341) defines mental practice as "the repetition of a task, without observable movement, with the specific intent of learning". Richardson's

definition (in Morris & Summers, 1995, p. 341) conceptualises mental imagery as "all those quasi-sensory and quasi-perceptual experiences of which we are self-consciously aware and which exist for us inn the absence of those stimulus conditions that are known to produce their genuine sensory or perceptual counterparts".

There are two primary types of imagery, internal imagery and external imagery. Internal imagery is when one imagines executing a skill from his/her own vantagepoint. A runner would see the track from his point on it, feel the ground where he's standing, and see the crowds from the field. Because internal imagery is from a first person perspective the images accentuate the feel of the movement. External imagery allows one to see himself as an external observer would. It allows a person to see himself as if on videotape. With this type of imagery, the kinaesthetic feel of the movement is minimised. Very little difference has been found between internal and external imagery with regard to performance. Weinberg and Gould cite Murphey et al.'s 1990 survey with Olympic athletes which revealed that they used both. What is important is that the athlete gains a vivid controllable image. Some evidence suggests that internal imagery may be preferable as it makes it easier to bring in the kinaesthetic sense, feel the movement, and simulate actual performance skills, but the research is still inconclusive (Weinberg & Gould, 1999).

There are numerous applications of mental imagery. Imagery immediately after physically practising a new skill or even integrated with it may be very effective in learning a new skill. Regularly practising skills that have already been learnt is essential. Mentally practising skills may be done during long trips or when an athlete is injured. In a closed skill sport like running, the sprinter knows precisely what the performance entails. Mentally rehearsing the complete race can help to automate the sequence. Although this can be done at any time, when it's done just before the race it is called a preview. The whole race can also be replayed afterwards. Reviewing positive aspects can boost self-confidence, while attending to the

negative, allows one to detect weaknesses and errors that can be worked on. Review should be left until a few hours after the competition, as one is usually relatively emotional after a match or race (Morris & Summers, 1995).

Strategies may be learnt through using imagery. This is particularly beneficial in team sports. Members of a team can use imagery to enhance their performance of a new offensive strategy by familiarising themselves with the roles of their team mattes, as well as fitting in temporally and spatially. Once the strategy has been learnt imaging strategy implementation against the actual competitors can aid in sharpening the strategy the week before competition (Morris & Summers, 1995).

Just as it is important to warm up cold tight muscles to prepared for the first few minutes of the match, it is as necessary not to be mentally cold. Imagery can serve as a mental warm-up (Morris & Summers, 1995).

Examine a routine or a skill to detect a problem and then correct it in preparation for the next physical practice session or competition. Running though the skill at regular pace in order to identify the section where the problem occurs can be ensued by a slow motion rerun for the detailed examination of the precise difficulty (Morris & Summers, 1995).

Imagining a relaxing scene can produce feelings of relaxation. First practice imagining a relaxing scene on your own at home, then just before practice, and when you're used to it before a competition. If anxiety is cognitive and not physiological imaging a scene where you are coping effectively helps (Morris & Summers, 1995).

Imagery can be used to developing psychological skills. An example here could be to imagine the concentration developing exercises. To build self-confidence, imagine being

confident and successful, but also be realistic (Morris & Summers, 1995).

Imagery can propitiate physical recovery from injury, especially to soft tissue. It can also be applied to the aches that are related to heavy training. Physically, an increased blood flow to an injured area, as well as warmth speed up recovery. Hence, imagining the increased blood flow and warmth can lead to measurable increases in specific areas (Morris & Summers, 1995).

2.2.5.2 Theoretical views

Although there is general consensus that the use of mental imagery has a positive impact, there are different perspectives as to why it is actually beneficial (Wann, 1997). Psychoneuromuscular theory, symbolic learning theory, psychological skills hypothesis, and the set theory all provide different explanations.

Psychoneuromuscular theory contends that imagery propitiates performance by producing 'innovation' (stimulation) in a person's muscles that is very similar to actual physical movements (Wann, 1997). When an athlete imagines himself in a particular physical activity, there are small characteristic undetectable muscular impulses reflecting the visualised activity. Wann (1997) cite studies by Hale (1981), Harris and Robinson (1986), Jacobson (1931), Wang and Morgan (1991) and Suinn (1976) that all indicate evidence supporting this theory.

Symbolic learning theory asserts that imagery enhances performance by providing a person with a mental code and plan of his movements, thereby making the movement more familiar and automatic. Wann (1997) cites Hind et al.'s (1991) and Ryan and Simmons's (1981) empirical evidence advocating this view. The support lies in the finding that imagery is most

successful with activities that have a large cognitive component (Wann, 1997).

There is also the psychological skills hypothesis. Recently sport psychologists have been proposing the view that imagery also works through the development and refinement of psychological skills. Imagery can enhance concentration, decrease anxiety and boost confidence. These are all necessary skills to improve performance. Imagery is also a beneficial instrument to practice and lean several psychological skills (Weinberg & Gould, 1999).

The set theory presumes that imagery facilitates performance by assisting the athlete to modify his level of physiological arousal for optimal performance and helping the athlete to pay attention to task-relevant cues only (Potgieter, 1997).

2.2.5.3 Basics of imagery training

This section provides information about specific times when imagery should be used, the two key dimensions of imagery training, as well as the limitations of mental imagery.

Imagery should be used before and after practice. Have a 10-minute imagery session before and after each practice session. Before practice, the athlete must visualise the skills, routines and plays they will be performing. After practice, the athlete must review the strategies they worked on. As the sensations of the movements will still be fresh in their minds, it can improve the imagery . Imagery should also be used before and after competition. Imagery before a competition helps to refine actions and reactions. Imagery should fit with ease into the precompetition routine. After an event the athlete get a good image of the things that were done well. Imagery can be used in breaks in action during competition and practice (Weinberg & Gould, 1999).

It may sometimes be difficult to find a quiet spot before practice, so there may be times when an athlete does not practice imagery for several consecutive days. At such times the athlete must schedule 10 minutes at home so that the imagery routine is not interrupted (Weinberg & Gould, 1999).

When recovering from injury, imagery can be extremely beneficial. Athletes have to be trained to use imagery with relaxation techniques to minimise anxiety about an injury. They can also use imagery to rehearse physical performance skills. Ieleva and Orlick (1991) as cited in Weinberg and Gould (1999) found that positive healing imagery and performance imagery was related to quicker recovery times (Weinberg & Gould, 1999).

There are two key dimensions to imagery, viz. vividness and controllability (Weinberg & Gould, 1999). Vivid images require that all the senses must be used to make the images as detailed and realistic as possible. The experience should come "alive" in the mind. The more the image resembles the actual event, the greater the transfer to actual performance. The athlete should see the stadium, the type of surface, and the spectators; feel the emotions and thoughts of competition; and try to hear the sounds when a race is in progress - the cheering and the commentators. The athlete also has to be able to control the image. The athlete must learn to manipulate the images so that they do what they are being instructed to do. Being able to control images allows the athlete to visualise what has to be accomplished, instead of seeing errors (Weinberg & Gould, 1999).

There are however some limitations of imagery. Imagery is only beneficial if the person has some skills of the task in question to serve as the basis for the mental practice. The greatest contribution of imagery is in activities that have cognitive and visual components. In 1988, Burhans, Richman and Bergey's as cited in Weinberg and Gould, (1999) study of runners did

not find any differences between subjects who had imagery and those who didn't. The final inadequacy is that only imagining behaviour is not enough. A positive outcome has to be visualised too (Weinberg & Gould, 1999).

2.3 SPRINTING

An elaborate discussion on sprinting is not required in the present study, as the psychological skills rather than the technical skills are the focus of the programme. The proceeding sections on sprinting therefore only define sprinting, and the respective segments in the 100 metre race.

2.3.1 WHAT IS SPRINTING

Sprinting is a type of running where the athletes run the entire distance at their maximum speed. It requires an all-out effort by the sprinter to move as fast as he/she can over the designated distance in as short a time as possible (Cooper, Lavery & Perrin, 1970). F.A.M. Webster defines sprinting as the "running of such short distances as a man can cover at top speed in one continuous effort (Warden, 1986).

There are three basic sprinting events; namely the hundred metre sprint, the two-hundred metres sprint and the four-hundred metres sprint.

The present study assesses performance on the hundred metre sprint.

2.3.2 THE HUNDRED METRE SPRINT

The following section set out the specific segments of the one-hundred metre race in detail. A

basic understanding of the segments is necessary to understand the athlete's motives for establishing certain goals, as well as assisting the sprinter to segment the race for concentration purposes.

The 100m race is basically segmented into the start, leaving the blocks, full speed sprinting and sprinting through the finish tape. Based on coaching experience and experimental evidence, the procedures tabulated in Table 4 (see Appendix B) have been suggested (Cooper et al., 1970).

Chapter 3

METHODOLOGY

The goals of the study were to determine if psychological skills were enhanced by participation in a PST programme, and whether the changes in psychological skills were related to an improvement in athletic performance. This chapter first sets out the hypotheses that attempt to operationalise these goals. The methodology section also encompasses the research design utilised, the sample used, the details of the PST programme, the data collection, and statistical procedures utilised.

3.1 HYPOTHESES

Hypothesis 1

H_0: There is no significant improvement in the psychological skills of sprinters at the end of the PST programme

H_1: There is a significant improvement in the psychological skills of sprinters at the end of the PST programme

Hypothesis 1a

H_{0a} : There is no significant improvement in self-confidence levels of the sprinters at the end of the PST programme.

H_{1a} : There is a significant improvement in self-confidence levels of the sprinters at the end of the PST programme

Hypothesis 1b

H_{Ob} : There is no significant decrease in stress levels of the sprinters at the end of the PST programme.

H_{1b} : There is a significant decrease in stress levels of the sprinters at the end of the PST programme.

Hypothesis 1c

H_{Oc} : There is no significant increase in the number of sprinters with a narrow and internal attentional style at the end of the PST programme.

H_{1c} : There is a significant increase in the number of sprinters with a narrow and internal attentional style at the end of the PST programme.

Hypothesis 1d

H_{Od} : There is no significant improvement in motivation levels of the sprinters at the end of the PST programme.

H_{1d} : There is a significant improvement in motivation levels of the sprinters at the end of the PST programme.

Hypothesis 1e

H_{Oe} : There is no significant improvement in vividness of mental imagery of the sprinters at the end of the PST programme.

H_{1e} : There is a significant improvement in vividness of mental imagery of the sprinters at the end of the PST programme.

Hypothesis 2

H_O : There is no significant improvement in athletic performance of the sprinters at the end of the PST programme.

H_2 : There is a significant improvement in athletic performance of the sprinters at the end of the PST programme

Hypothesis 3

H_O : There is no significant relationship between the increase in athletic performance of the sprinters and the enhancement of psychological skills at the end of the PST programme.

H_3 : There is a significant relationship between the increase in athletic performance of the sprinters and the enhancement of psychological skills at the end of the PST programme.

Hypothesis 3a

H_{Oa} : There is no significant relationship between the athletic performance of the sprinters and self-confidence at the end of the PST programme.

H_{1a} : There is a significant relationship between the athletic performance of the sprinters and self-confidence at the end of the PST programme.

Hypothesis 3b

H_{Ob} : There is no significant relationship between the athletic performance of the sprinters and stress levels at the end of the PST programme.

H_{1b} : There is a significant relationship between the athletic performance of the sprinters and stress levels at the end of the PST programme.

Hypothesis 3c

H_{Oc} : There is no significant relationship between the athletic performance of the sprinters and the narrow-internal attentional style at the end of the PST programme.

H_{1c} : There is a significant relationship between the athletic performance of the sprinters and the narrow-internal attentional style at the end of the PST programme.

Hypothesis 3d

H_{Od} : There is no significant relationship between the athletic performance of the sprinters and motivation levels at the end of the PST programme.

H_{1d} : There is a significant relationship between the athletic performance of the sprinters and motivation levels at the end of the PST programme.

Hypothesis 3d

H_{Od} : There is no significant relationship between the athletic performance of the sprinters and vividness of imagery at the end of the PST programme.

H_{1d} : There is a significant relationship between the athletic performance of the sprinters and vividness of imagery at the end of the PST programme.

3.2 RESEARCH DESIGN

This section provides an explanation of the research methodology used in the present programme, identifies the variables, outlines the research design and the problems associated with the specific design.

A quantitative research method was used. The essential characteristics of a quantitative method are hypothesis testing, concepts are in the form of discrete variables, measures are systematically created before data collection and are standardised, data are in the form of numbers from precise measurements, theory is to a large extent causal and deductive, procedures are standard and assumed to be replicable, and data are analysed utilising statistics, tables or charts, and discussing how what they show relates to the hypotheses (Neuman, 1994).

More specifically, an experimental research method was used to determine if a psychological skills training programme improved the performance of athletes and enhanced their psychological skills. This is an experimental design because the independent variable is being implemented and controlled by the researcher, and the effects on the dependent variable are noted (Kerlinger, 1986).

The independent variable (X) is the PST programme. It is independent in the sense that it is not influenced by any other variable in the experimental situation. There are two dependent variables (DV's), Y_1 and Y_2. The first dependent variable is psychological skills. The second is athletic performance. These two variables are the presumed effect variables. The DV's are dependent in the sense that performance and psychological skills are assumed to depend on, or be influenced by participating in the PST programme (Kerlinger, 1986).

A one-group pretest-posttest design will be implemented (Kerlinger, 1986).

$$Y_{b1+b2} \qquad X \qquad Y_{a1+a2}$$

According to Kerlinger (1986), the essential feature of this design is that the sample group will be compared to itself. There is no control group, because there is no pre-existing equivalent group. Hence, being compared to itself is theoretically the best choice as it implies that all possible independent variables associated with the subject's characteristics are controlled. The procedure of this research design commences with measuring the group on the dependent variable before experimental manipulation (pretest). The independent variable is then implemented. Thereafter the subjects are measured again on the dependent variable (posttest). The difference scores ($Y_{a1+a2} - Y_{b1+b2}$) are examined to determine the impact of the independent variable (Kerlinger, 1986).

This design has been criticised as there are numerous other factors that can also contribute to the change in scores. Firstly, the measurement procedure may change the subjects. Such procedures are called reactive measures because they themselves cause the subjects to react, not necessarily the experimental manipulation. History and maturation may also affect posttest scores, and pose a danger to the present study too. The longer the period of time between the two testings, the stronger the chance of extraneous factors influencing the subjects, and consequently the posttest scores. History refers to the variables or events that are specific to the particular experimental situation, while maturation refers to events that are general to any particular situation, and reflect change or growth. A statistical phenomenon that can negatively impact results is the regression effect where test scores change as a "statistical fact of life": on retest, on the average, they regress toward the mean (Kerlinger, 1986).

3.3 RESEARCH POPULATION

The type of sampling as well as the subjects who constitute the sample are discussed in this section.

3.3.1 Sampling method

A nonprobability sampling method was used as the sample was not randomly selected. More specifically, purposive sampling was used. There was an intentional attempt to obtain a representative sample by utilising a presumably typical group of sprinters as the sample (Kerlinger, 1986).

3.3.2 Description of the sample

The Bureau for Sports Development at Technikon Pretoria, South Africa was approached for subjects, and the team that was allocated were 15 sprinters who run for Technikon Pretoria. The team consists of 15 sprinters, 8 females and 7 males (Figure 13). The age range was relatively wide. Age ranged from 15 years to 25 years (Figure 14).

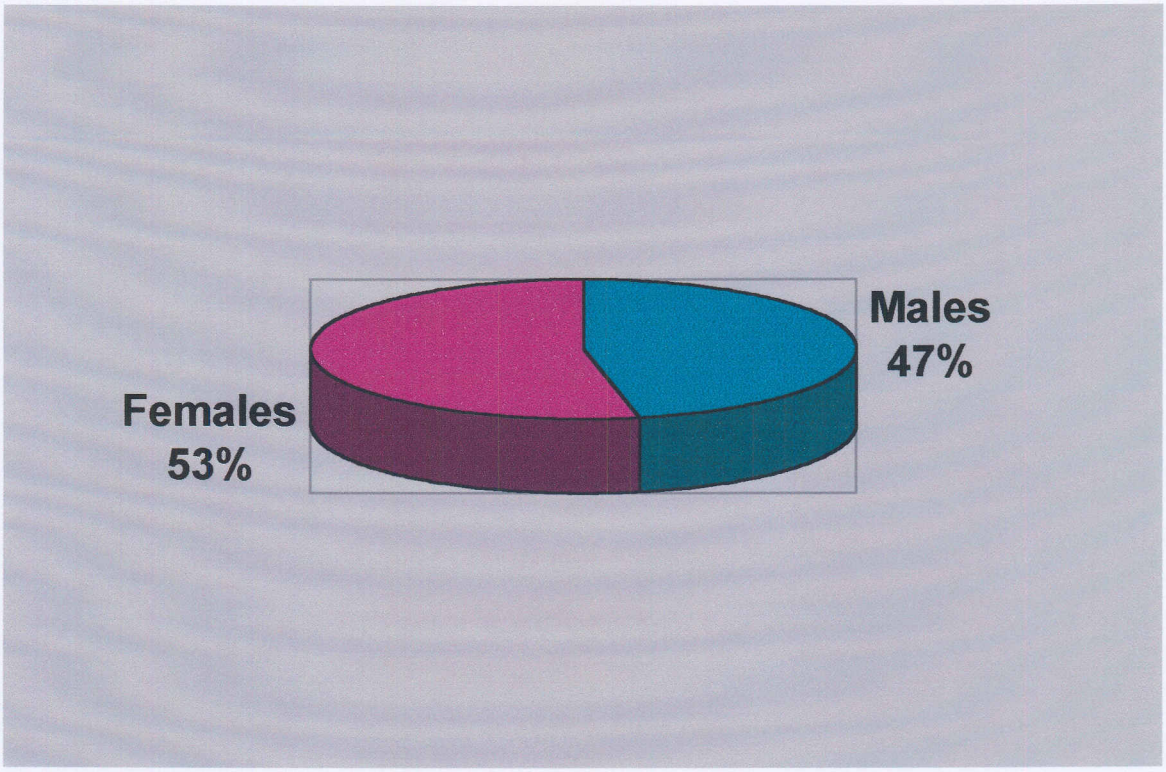

Figure 13. Gender

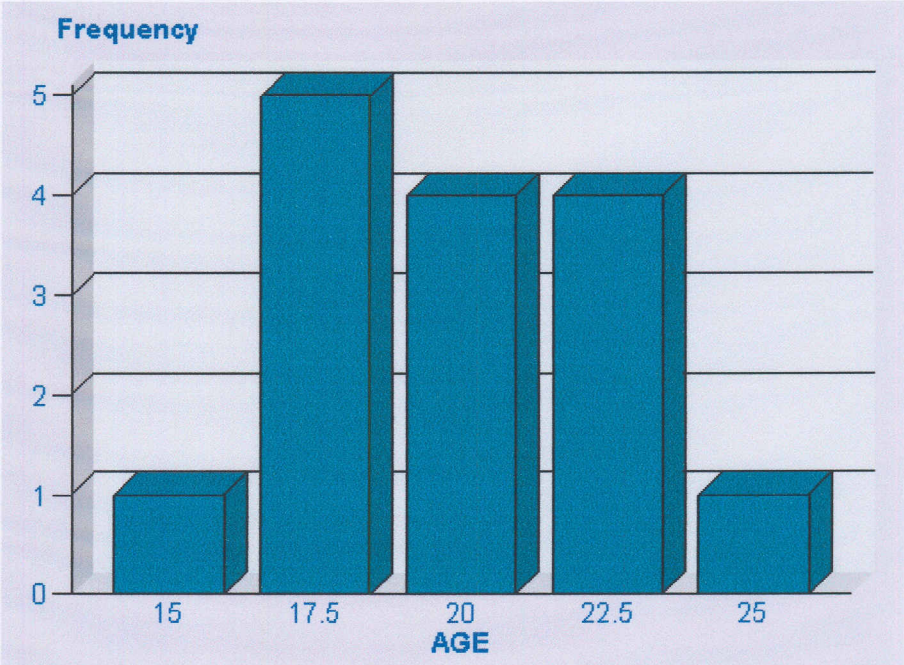

Figure 14. Age.

3.4 THE PSYCHOLOGICAL SKILLS TRAINING PROGRAMME

Detailed information regarding the PST programme will be presented in the proceeding sections. Specifically, when and how the programme was implemented, as well as limitations of the programme.

3.4.1 WHEN TO IMPLEMENT A PSYCHOLOGICAL SKILLS TRAINING PROGRAMME

This section emphasises the timing and the duration of the programme.

The optimal time to initiate a programme is during the off-season or preseason when there is sufficient time to acquire new skills. During this time, there is a relative absence of competition pressure (Weinberg & Gould, 1999). In South Africa, the sprinting season commences in September and ends in April. The winter programme commences in May and ends in August. The primary aim of this programme is to keep the athletes fit and to continue training during the off-season. Hence, the winter programme is the ideal time to commence with the PST programme for sprinters.

Although psychological skills training is an ongoing process, the initial formal programme should last 3 to 6 months. The particular sport, time available, prevailing mental dexterities and the sprinters' commitment also determines how long the programme lasts (Weinberg & Gould, 1999). The winter programme lasts four months. This is sufficient time to implement the formal programme, as long as athlete attendance is consistent.

The biggest mistake usually made is to commence the programme during the running season, generally because of a slump in performance. Coaches then resort to PST training

out of desperation. However, in such cases the training is rarely effective. These skills cannot merely be learnt overnight (Weinberg & Gould, 1999).

The programme commenced at the ideal time. However, due to the high attrition rate, and the limited time available for completion of the study, the programme was implemented a second time, commencing in January with the posttests implemented in October.

3.4.2 IMPLEMENTATION OF THE PROGRAMME

In this section the five stages of the physical programme will be elucidated. The general structure of the programme was based on the stages outlined by Wann (1997). The reasons for selecting this structure were explained in Chapter 2. In order to simplify the facilitation of the programme, the athlete's worksheets were adapted from Winter and Martin's (1993) original materials and compiled into a handbook (see Appendix C) .

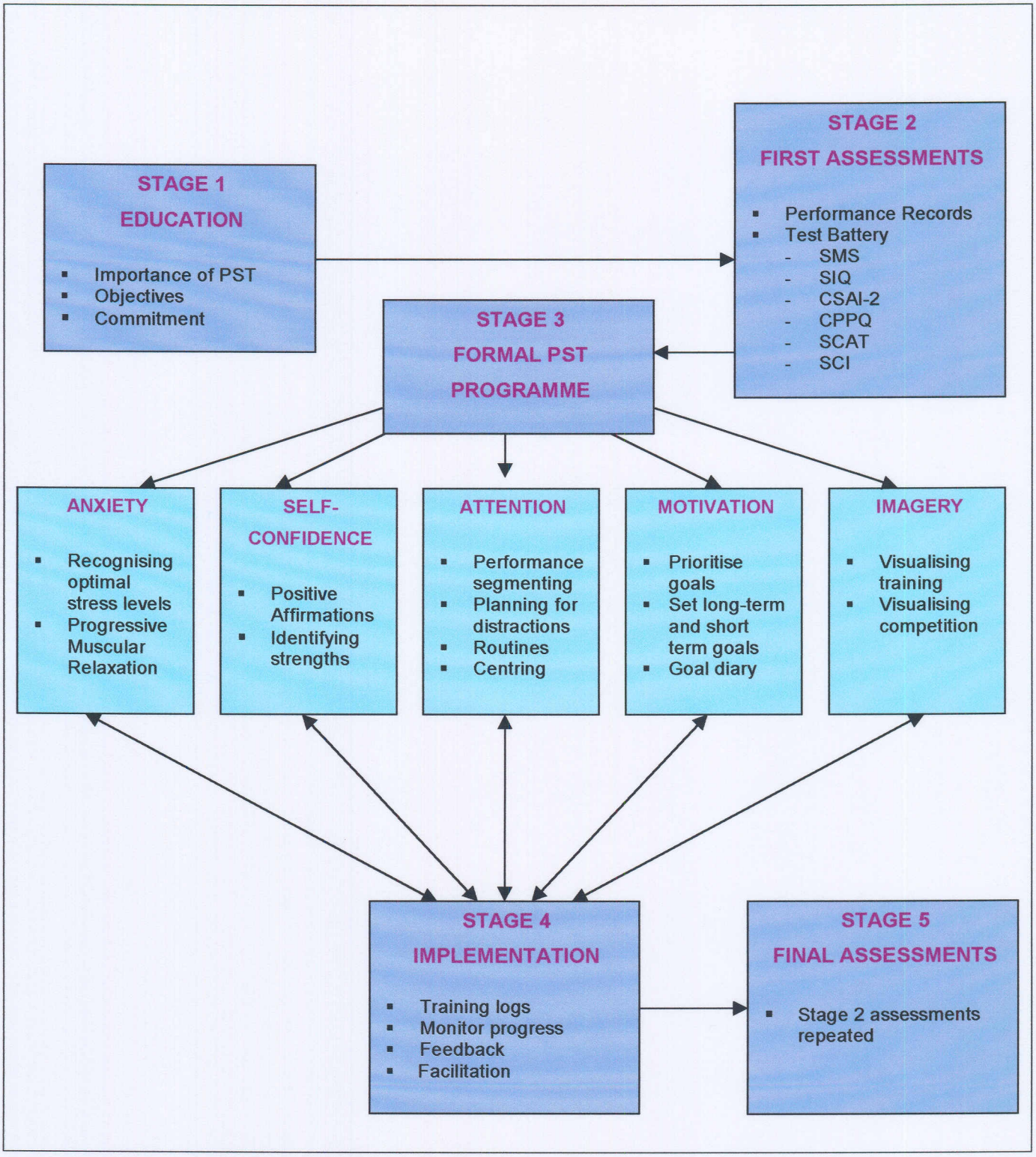

Figure 15: PST Programme

Stage 1

Educate about the importance of the programme

The athletes were asked to state the psychological skills that they think are important in sprinting and how important they think the psychological aspect of performance is. The time and attention do they devote to psychological skills as opposed to physical skills was also discussed.

The athletes were explained to how psychological skills can be learnt just like physical skills (Weinberg & Gould, 1999).

The athletes were informed about the difference between educational and clinical sport psychology consultants. PST is an educational approach to mental preparation. If there are more serious problems, the athlete should consult a psychologist (Weinberg & Gould, 1999).

Stage 2

Assessment of psychological skills (psychometric testing) and athletic performance

Six tests measuring self-confidence, stress levels, vividness of mental imagery, motivation, and concentration style were administered by the researcher.

- **Assessing Self-confidence**

The two inventories predominantly used to assess self-confidence are the Psychological Skills Inventory for Sport (PSIS) and The Sport Confidence Inventory (SCI). These two will be briefly discussed.

The PSIS is an inventory of psychological skills, self-confidence being one of skills evaluated (Hardy et al., 1996). Although Morris and Summers (1995) regard the PSIS as one of the major tests, Hardy and Nelson (1992) as cited in Morris and Summers (1995) have questioned the validity of its use in research.

The SCI assesses confidence both in physical and mental terms. This questionnaire can be used to identify which areas need to be worked on. The SCI was used to assess the sprinters' level of confidence (Weinberg & Gould, 1995).

- **Assessing Attentional Style**

Only one attention test is emphasised throughout the literature. Nideffer (1976) constructed the Test of Attentional and Interpersonal Style (TAIS) which will be elaborated upon.

The TAIS has 144 items and 17 subscales, 6 of which measure attentional style (Weinberg & Gould, 1999). The TAIS has proven its internal consistency. TAIS items correlate highly (median 0.53) within scales and moderately across scales. It also has good test-retest reliability. Test-retest reliability for the subscales ranges from a low of 0,60 to 0,93 with a median of 0,83. Evidence for its construct validity has been found, by correlating TAIS scale scores with the same individuals' scores on other psychometric instruments, like the Wechsler Adult Intelligence Scale and the Minnesota Multiphasic Personality Inventory (MMPI). With regard to its predictive validity, two studies have related TAIS scores to actual performance measures. In both studies, behaviour correlated with TAIS scores (Nideffer, 1976).

Although the TAIS was the ideal test to use, the only reason it wasn't utilised was because it was not cost-effective for the present purpose. The Concentration and Personality Profile

Questionnaire (CPPQ) was also developed by Nideffer (1994). It is a shortened version of the TAIS consisting 23 items, and measures the same constructs. The CPPQ asks the athletes to measure these constructs whereas the TAIS measures them directly (G. Miller, personal communication, April 4, 2001).

The relevant subscales of the CPPQ are the attentional subscales: width and direction.

- **Assessing Motivation**

The Sport Motivation Scale (SMS) was recently developed to assess motivation. This 28-item scale measures intrinsic motivation, extrinsic motivation and amotivation in sports settings. As Pelletier and his associates have only developed this instrument in 1995, there is little empirical research on the scale's reliability and validity. However, Pelletier et al. (1995) obtained preliminary evidence of the sound psychometric properties of the scale via two studies. The first study supported the seven-factor structure of the scale, provided some evidence for the construct validity for the SMS, and showed an adequate level of internal consistency. The second study indicated satisfactory test-retest reliability after being administered on two occasions.

- **Assessing Anxiety**

Anxiety is not generally assessed by one questionnaire. There are three predominant reasons for assessing cognitive and somatic anxiety separately:

(i) The two types of anxiety may have different antecedents.

(ii) They affect performance differently. Cognitive anxiety impacts more on purely cognitive tasks, while somatic anxiety will have a negative effect on refined motor tasks.

(iii) Treatment differs (Morris & Summers, 1995).

There are several cognitive measures of anxiety. The Manifest Anxiety Scale (MAS) ascertains chronic trait anxiety, but does not make any predictions with regard to differences in performance between high and low anxious persons. The State-Trait Anxiety Inventory (STAI) is a relatively precise measure of A-trait and A-state. However it is not sport specific. The Sport Anxiety Scale (SAS) measures cognitive and somatic anxiety. The two assessments that will be used are the SCAT and the CSAI-2. The Sport Competition Anxiety Test (SCAT) measures somatic anxiety. It measures the trait anxiety component only. The Competitive State Anxiety Inventory-2 (CSAI-2) measures state anxiety. It measures both cognitive and somatic anxiety(Morris & Summers, 1995).

Anxiety is not usually measure physiologically, because there isn't one single physiological response to the anxiety state. Somatic response to positive and negative arousal may be similar. The relationship between any two measures of anxiety is weak, different athletes' nervous systems respond differently to anxiety, and emotional and physiological responses can't be separated (Morris & Summers, 1995).

- **Assessing Imagery**

Martens's (1982) Sport Imagery Questionnaire (SIQ) appearing in Weinberg and Gould (1995, p.295) is the only sport-specific test. It measures imagery on a visual, auditory, kinesthetic and emotional level. Although it has not been sufficiently validated, it is widely used in applied sport psychology (Morris & Summers, 1995). This evaluation measures how well athletes can use all their senses when imagining (Weinberg & Gould, 1999). However as this is the only sport-specific questionnaire available, it was used in the current project.

Stage 3

Psychological skills training per se

Winter and Martin's (1993) PST programme for the South Australian Sports Institute was used to provide the training. The rationale for utilising this programme is set out in detail in Chapter 2.

An athlete's manual were adapted from their basic training programme (see Appendix C), in order to simplify facilitation of the programme.

The athletes were consulted three times a week for 2 hours per day by the researcher. Completing the worksheets was facilitated individually with each athlete. Although this could have been done in a group, and would have therefore been much less time-consuming, working with the athlete individually had numerous advantages. Valuable qualitative data was gleaned, rapport was established and it built trust in a manner that would not have been gained from group work, as several of the athlete's 'group persona' was very different from what was presented individually.

Although Winter and Martin's (1993) programme provides audio cassettes as training aids, the researcher personally presented the same information. The training exercises were practised in a group.

Stage 4

Practice

The athletes were given a period to overlearn the skills and systematically integrate them into their performance situations. This practice period lasted six months and provided the

athletes with an opportunity to integrate the mental skills into their training and competition situations.

Stage 5

Assessments

The same assessments used in stage 2 were re-administered by the researcher.

3.5 DATA COLLECTION

In accordance with Wann's (1997) structure of the process of a PST programme, Stage 2 and Stage 5 of the programme represented the data collection phases of the study. The pretests were administered in Stage 2 and the posttests were administered in the final stage.

3.6 STATISTICAL PROCEDURES

The choice of statistical techniques available was severely restricted as a result of the size of the sample. To test the first hypothesis, that is, to determine if there was a significant difference in psychological skills between the beginning and end of the programme, Wilcoxon signed ranked tests were used. This test was selected as it is a nonparametric test, that is, it can be used for ranked data, and for data for which the normal distribution cannot be assumed (Galpin, 2001). A paired t-test was used to determine if there is a significant improvement in athletic performance to test the second hypothesis, as the data to test this hypothesis was continuous and interval data. Furthermore, this data met the assumptions of normality, allowing a parametric test to be used (Rosenthal & Rosnow, 1991). To test the third hypothesis, performance was correlated with the various psychological skills using Spearman's correlation coefficient. Due to the nature of the data and the distribution of the

data, Spearman's coefficient was used instead of Pearson's r. (Rosenthal & Rosnow, 1991).

Chapter 4

RESULTS

The results of the analyses of the data are presented in this chapter. For each hypothesis or subhypothesis tested, it is stated where the data to test the hypothesis was located, a table summarising the results is displayed, and the results are analysed in terms of whether the relationship is significant or not.

4.1 ANALYSIS AND INTERPRETATION OF SCORES

4.1.1 ANALYSIS AND INTERPRETATION OF TESTS FOR HYPOTHESIS 1

Hypothesis 1

H_1: There is a significant improvement in the psychological skills of sprinters at the end of the PST programme

Hypothesis 1a

H_{1a} : There is a significant improvement in **self-confidence** levels of the sprinters at the end of the PST programme.

The data to test this hypothesis was located in the pretest and posttest scores of the Self-Confidence Inventory (SCI). The inventory consisted of three scales: Underconfidence, Confidence and Overconfidence. The score on the Confidence scale was used.

Wilcoxon's test was administered on the difference between the pretest and posttest scores

of the SCI, and produced the following results:

Table 5

Hypothesis 1a

	Test Statistic	*p-value*	*df*
Wilcoxon	14.5	0.1747	14

At the 0.05 level of significance, $p > 0,05$. This implies that there is not a significant difference between the confidence scores at the beginning and at the end of the programme.

A possible reason for not being significant is the timing of the administration of the respective tests. The pretests were administered closer to the end of the season, while the posttests were administered closer to the begin of the competition season. At the end of the season, it is more likely that the athletes will remember past performances as they were more recent compared to the posttests, where the athletes have to think back to before the training period. And, past performance has been strongly linked to self-confidence (Morris & Summers, 1995).

Hypothesis 1b

H_{1b} : There is a significant decrease in **stress** levels of the sprinters at the end of the PST programme.

Three types of stress were measured using two questionnaires. The data were located in the pretests and posttests of the Competitive State Anxiety Inventory 2 (CSAI-2) and the Sport Competition Anxiety Test (SCAT). The CSAI-2 consists of three subscales: cognitive state anxiety, somatic state anxiety and state self-confidence. The scores on the state self-confidence subscale will not be used. The SCAT score yields a measure of trait anxiety.

The Wilcoxon test examining the difference in cognitive state anxiety scores on the CSAI-2 yielded the following results:

Table 6

Hypothesis 1b

	Test Statistic	*p-value*	*df*
Wilcoxon	7.5	0.0047	14

At the 0.05 level of significance, $p < 0.05$. This implies that the difference in cognitive anxiety scores is significant.

Furthermore, an inspection of the basic statistical measures of central tendency of the pre- and posttest, indicate that the mean, median and mode on the posttest was lower than those measures on the pretest.

Table 7

Measures of central tendency – Cognitive Anxiety

	Pretest	Posttest
Mean	26,4	20,2
Median	27	20
Mode	31	24

Hence, it may be deduced that cognitive anxiety was significantly lower at the end of the PST programme.

The Wilcoxon test administered on the somatic state anxiety scores on the CSAI-2 generated the following results:

Table 8

Hypothesis 1b (Somatic Anxiety)

Test Statistic		*p-value*	*df*
Wilcoxon	9.0	0.0105	14

At the 0.05 level of significance, $p < 0,05$. This implies that there is a significant difference between the pretest and posttest scores.

Looking at the measures of central tendency of the scores, posttest measures were lower than pretest measures.

Table 9

Measures of central tendency – Somatic Anxiety

	Pretest	Posttest
Mean	26,7	22,3
Median	27	21
Mode	30	21

It can also be concluded that somatic state anxiety was lower at the end of the programme.

The Wilcoxon test administered on the SCAT scores supplied the following results:

Table 10

Hypothesis 1b (Trait anxiety)

	Test Statistic	*p-value*	*df*
Wilcoxon	14.0	0,0270	14

At the 0.05 level of significance, $p < 0,05$. This suggests that there is a significant difference between the pretest and posttest scores on the SCAT.

Taking into consideration the following measures of central tendency, posttest scores were less than pretest scores.

Table 11

Measures of central tendency – Trait Anxiety

	Pretest	Posttest
Mean	23,3	20,4
Median	25	21
Mode	25	14

In may be therefore be assumed that trait anxiety also decreased after participation in the PST programme.

Hence, all three types of anxiety assessed, cognitive state anxiety, somatic state anxiety and trait anxiety were significantly reduced after participation in the PST programme.

Hypothesis 1c

H_{1c} : There is a significant increase in the number of sprinters with a narrow-internal **attentional style** at the end of the PST programme.

The data is located in the Concentration and Personality Profile (CPPQ). The concentration profile describes the athletes on two dimensions. The first dimension is width, which may be broad or narrow. The second dimension is direction, which may be internal or external.

Wilcoxon's test was firstly applied to the data to determine if the width of attention of the athletes had changed to yield a greater number of athletes with a narrow width of attention. The Wilcoxon test rendered the following results:

Table 12

Hypothesis 1c

	Test Statistic	P-value	DF
Wilcoxon	2.0	1,000	14

At the 0.05 level of significance, $p > 0,05$ suggesting that there is no significant difference in the number of athletes with a narrow focus of attention.

The data was then examined to determine if the direction of attention of athletes has altered to produce more athletes with an internal direction of attention. A Wilcoxon test was again used to analyse the results, and produced the following information:

Table 13

Hypothesis 1d

	Test Statistic	P-value	DF
Wilcoxon	0.0	0,0078	14

At the 0.05 level of significance, $p < 0,05$. This indicates that there is a significant difference in the number of athletes with an internal focus of attention.

Table 14

Frequencies – Direction of attention

	Pretest	Posttest
Internal	1	6
External	14	9

An inspection of the amount of athletes with a specific direction of attention focus, reveals that there was an increase in the number of athletes with an internal focus of attention after participation in the PST programme.

Hence, it may be presumed that there is a significant increase in the number of athletes with an internal focus of attention.

Hypothesis 1d

$\mathbf{H_{1d}}$: There is a significant improvement in intrinsic motivation levels of the sprinters at the end of the PST programme.

The data to test this hypothesis was located in the pretest and posttest scores on the Sport Motivation Scale (SMS). The SMS consists of seven subscales: amotivation, intrinsic motivation to know, intrinsic motivation to accomplish things, intrinsic motivation to experience stimulation, and the three types of external motivation, viz. external regulation, introjection and identification. A global score for intrinsic motivation was obtained by summing the scores on the scales measuring intrinsic motivation to know, intrinsic motivation to accomplish things, and intrinsic motivation to experience stimulation.

The Wilcoxon test administered on the total intrinsic motivation scores produced the following results:

Table 15

Hypothesis 1d

	Test Statistic	*p-value*	*df*
Wilcoxon	51.0	0.6087	14

At the 0.05 level of significance, $p > 0,05$. This denotes that there is no significant difference in intrinsic motivation scores between the begin and end of the PST programme.

This result could have been guessed even prior to statistical analysis of the scores. The high rate of attenuation experienced probably already revealed that intrinsic motivation had not increased.

Although the process of goal setting is relatively straightforward, its simplicity may also have been its weakness. It may be speculated that the athletes may sometimes consider the idea of goal setting rather dull and boring (Morris & Summers, 1995). The experience of sport psychologists suggests that there are few athletes who actually utilise the technique of goal setting to its optimum. For goal setting to by genuinely effective in increasing intrinsic motivation, it needs to be an integral part of the athlete's total programme. This necessitates the coach allocating attention and time to reviewing of training and competition goals (Morris & Summers, 1995). Although the athletes were given an implementation phase to integrate skills into their total programme, the coach and sport psychology consultant operated parallel to each other. This limited the effectiveness of the development of the technique of goal setting and the programme as a whole.

Hypothesis 1e

H_{1e} : There is a significant improvement in vividness of mental imagery of the sprinters at the end of the PST programme.

The data testing this hypothesis was located in the pretest and posttest scores on the Sport Imagery Questionnaire (SIQ).

The Wilcoxon test administered produced the following results:

Table 16

Hypothesis 1e

	Test Statistic	*p-value*	*df*
Wilcoxon	9.0	0,0037	14

At the 0.05 level of significance, $p < 0,05$, implying that there is a significant difference in imagery scores.

A review of the basic measures of central tendency indicate that scores on the posttest were less than scores on the pretest.

Table 17

Measures of central tendency – Imagery

	Pretest	Posttest
Mean	34,9	27
Median	32	27
Mode	33	23

Thus, it may be deduced that vividness of mental imagery improved at the end of the programme.

4.1.2 ANALYSIS AND INTERPRETATION OF TESTS FOR HYPOTHESIS 2

Hypothesis 2

H_2 : There is a significant improvement in athletic performance of the sprinters at the end of the PST programme

The data to test these hypotheses were located in the coach's performance records of the personal best times on the one-hundred metre event of the athletes at the beginning and end of the PST programme.

The t-test administered produced the following results:

Table 18

Hypothesis 2

T-Tests			
Difference	*df*	*t Value*	*Pr* > |*t*|
Posttest - pretest	9	-3.41	0.0077

At the 0.05 level of significance, $p < 0,05$. This indicates that there is a significant difference between athletic performance at the beginning and end of the programme.

An examination of the basic central tendency measures reveal that posttest values are lower than pretest values.

Table 19

Measures of central tendency – Athletic performance

	Pretest	Posttest
Mean	12,413	12,146
Median	12,375	12,225
Mode	13	12

Hence, it may be inferred that there is an improvement in athletic performance after participation in the PST programme.

4.1.3 ANALYSIS AND INTERPRETATION OF TESTS FOR HYPOTHESIS 3

Hypothesis 3

H_3 : There is a significant relationship between the increase in athletic performance of the sprinters and the enhancement of psychological skills at the end of the PST programme.

Hypothesis 3a

H_{1a} : There is a significant correlation between the athletic performance of the sprinters and self-confidence at the end of the PST programme.

The data to test this hypothesis was located in the difference between the personal best times at the beginning and end of the programme, and the difference between self-

confidence scores at the beginning and end of the programme. These two values were correlated using Spearman's Correlation Coefficient. The analysis generated the following results:

Table 20

Hypothesis 3a

Spearman Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations	
	Self-confidence
Athletic Performance	0.03395 0.9258 10

At the 0,05 significance level, p > 0,05 implying that the correlation is not significant.

Hypothesis 3b

H_{1b} : There is a significant correlation between the athletic performance of the sprinters and stress levels at the end of the PST programme.

The data to test this hypothesis was located in the difference between the personal best times at the beginning and end of the programme, and the difference between cognitive anxiety (CSAI-2) scores, somatic anxiety (CSAI-2) scores and trait anxiety (SCAT) scores on the pretest and posttest. These two values were correlated using Spearman's Correlation Coefficient. The analysis produced the following results:

Table 21

Hypothesis 3b (cognitive anxiety)

Spearman Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations	
	Cognitive anxiety
Athletic performance	0.18829 0.6024 10

At the 0,05 significance level, p > 0,05 implying that the correlation is not significant.

Table 22

Hypothesis 3b (somatic anxiety)

Spearman Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations	
	Somatic anxiety
Athletic performance	-0.17848 0.6218 10

At the 0,05 significance level, p > 0,05. This indicates that the correlation is not significant.

Table 23

Hypothesis 3b (trait anxiety)

Spearman Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations	Trait anxiety
Athletic performance	0.06791 0.8521 10

At the 0,05 significance level, p > 0,05. This implies that the correlation is not significant.

Hypothesis 3c

H_{1c} : There is a significant correlation between the athletic performance of the sprinters and the narrow and internal attentional style at the end of the PST programme.

The data to test this hypothesis was located in the CPPQ pretest and posttest results and the personal best times at the beginning and end of the programme. These two values were correlated using Spearman's Correlation Coefficient. The analyses generated the following results:

Table 24

Hypothesis 3c (width)

Spearman Correlation Coefficients	
Prob > |r| under H0: Rho=0	
Number of Observations	
	Width
Athletic Performance	-0.50912
	0.1329
	10

Table 25

Hypothesis 3c (direction)

Spearman Correlation Coefficients	
Prob > |r| under H0: Rho=0	
Number of Observations	
	Direction
Athletic performance	0.35028
	0.3211
	10

The p values for both width and direction are > 0,05. This implies that both correlations are insignificant.

Hypothesis 3d

H_{1d} : There is a significant correlation between the athletic performance of the sprinters and intrinsic motivation levels at the end of the PST programme.

The data to test this hypothesis was located in the difference between the personal best times at the beginning and end of the programme, and the difference between intrinsic motivation scores assessed by the SMS at the beginning and end of the programme. These two values were correlated using Spearman's Correlation Coefficient. The analysis generated the following results:

Table 26

Hypothesis 3d

Spearman Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations	
	Intrinsic motivation
Athletic performance	0.5662 0.0879 10

At the 0,1 level of significance, $p < 0,1$, in conjunction with the r value of 0.5662 indicates that there is a significant correlation between intrinsic motivation and athletic performance.

Hypothesis 3e

H_{1d} : There is a significant correlation between the athletic performance of the sprinters and

vividness of imagery at the end of the PST programme.

The data to test this hypothesis was located in the difference between the personal best times at the beginning and end of the programme, and the difference between imagery scores of the SIM on the pretest and posttest. These two values were correlated using Spearman's Correlation Coefficient. The analysis yielded the following results:

Table 27

Hypothesis 3e

Spearman Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations	
	Imagery
Athletic performance	0.08025 0.8256 10

At the 0,05 significance level, $p > 0,05$. This indicates that the correlation is not significant.

Chapter 5

CONCLUSION

This chapter concludes the research report presenting the strengths and limitations of the study, and recommendations for future research.

5.1 STRENGTHS OF THE STUDY

5.1.1 Effectiveness of the PST programme

The programme tested led to an improvement of several psychological skills. Cognitive state anxiety, somatic state anxiety and trait anxiety were reduced, and the vividness of mental imagery was enhanced, and a higher number of athletes had an internal focus of attention after participation in the PST programme. However, the programme failed to strengthen intrinsic motivation, boost self-confidence and increase the number of athletes with a narrow focus of attention.

In a review of 23 studies published by Greenspan and Feltz (1989) and cited in Weinberg and Gould (1999), Greenspan and Feltz concluded that in general educationally based psychological interventions effectively enhance competitive performance of collegiate and adult athletes. Vealey's 1994 review, also cited in Weinberg and Gould (1999), found that in 9 of 12 studies psychological interventions led to improved performance (Weinberg & Gould, 1999). The present study is approximately consistent with these previous studies, as there was an overall improvement in psychological skills and performance.

5.1.2 Multiple skills under investigation

According to Gould and Krane (1992) as cited in Morris and Summers (1995) much of the research in sport psychology limits its theoretical value by testing only one theory in a particular study. They suggest testing two or more theories in the same study in order to glean more information.

Although the present study did not test theories, it considered more than only one skill. Martens (1987) contends that psychological skills are closely interrelated. He depicted the relationship between some psychological skills as illustrated in Figure 16 (Appendix A).

5.2 LIMITATIONS OF THE STUDY

5.2.1 Sample size

The small sample size is perhaps the biggest limitation of the study, having two major implications on the statistics. Firstly, it reduced the power of the study, and secondly, it limited the range of statistical procedures suitable for analysis of the present data.

Power refers to the probability of rejecting the null hypothesis when the null hypothesis is false, and therefore requires rejecting. It is the probability of not overlooking an effect or relationship that exists. Power depends on the test statistic used to determine the significance level, the level of alpha (α), the sample size and the size of the effect being studied (Rosenthal & Rosnow, 1991). The relatively small sample size, in conjunction with small effects being significant when testing using athletic performance as a variable, implies low power levels for this study.

This is particular evident in the testing of Hypothesis 3. Hardly any significant correlations

were found. This was likely due to the small sample size, rather there actually not being significant correlations (Rosenthal & Rosnow, 1991).

The small sample size also ruled out the use of more suitable statistical procedures. Multivariate techniques could have been more appropriate to illustrate the relationship between psychological skills and performance.

Despite the sample size being a serious problem, it is a difficulty that will be tough to overcome. Athletic teams are generally restrictive in terms of numbers. In order to obtain a large sample size, a study of this nature will have to be carried out on a large scale, and will require ample resources. However, many between group differences will also prevail amongst the teams, which could threaten the external validity of such studies.

5.2.2 Duration of the programme

Although the programme spanned nine months, some athletes were injured for a significant proportion of the programme, which gave them limited opportunities for practice and implementation of physical and psychological skills. This in turn affected performance on the posttests and personal best times at the end of the programme.

5.2.3 Attrition

When the PST programme commenced, there were 25 athletes in the sprinting team. At the end of the programme, only 15 of those athletes were still on the team. 40% of the participants had dropped out of the sprinting team. Out of the 10 dropouts, 5 dropped out because they had entered full-time employment, 2 had received sport scholarships at other tertiary institutions and 1 no longer had the time for training because her studies had become very demanding. Only 2 athletes dropped out due to amotivation.

Besides being a major threat to the completion of the present study, the scale of attrition from sport, especially in the teenage years is a serious concern to sport organisations too (Morris & Summers, 1995).

5.2.4 Commitment to the PST programme

The education phase initially appeared to be successful. The athletes unanimously agreed that psychological skills training was important and indispensable, and needs to be done on a regular basis. They were very enthusiastic about the PST programme. However, in practice, athletes were hesitant to actually devote time to their mental training, preferring to utilise their time for physical training instead. The athletes' lack of commitment to the programme could have been a significant factor affecting the impact of the programme.

A possible method of dealing with this problem, could be to follow the goal setting process discussed in the section of motivation. This process should take place at the beginning of the programme and be specifically related to psychological skills development.

5.2.5 Limitations of the research design

The criticisms of the research design employed were discussed in Chapter 3. Of particular relevance to the present study is the issue of maturation. Athletic performance could have improved simply by maturation while adhering to the regular training programme, and not due to the impact of the PST programme.

A simple longitudinal design would have countered this problem to a large extent. The same sprinters athletic performance and psychological skills could have been measured over

several years before implementation of the programme (Rosenthal & Rosnow, 1991).

5.2.6 Limitations of the PST programme

- **Lack of a team building component**

Vogt and Griffith (in Morris & Summers, 1995, p.423), define team building as "the process by which a work group becomes more effective in accomplishing its tasks and in satisfying the needs of group members".

Despite sprinting competitions focusing on individual achievement, the sprinters trained as a team. Hence, team spirit emerged as being very meaningful. Amongst numerous other motives, Weinberg and Gould (1999) listed social approval and "family" as possible motives for participation. Teammates are significant as they provide social approval and a sense of family. Several sprinters' motivation to attend training was negatively affected by these needs not being adequately met. Including a team building component, may have been a beneficial strategy to strengthen motivation.

- **Personal counselling**

Parfitt and Hardy (1993) as cited in Morris and Summers (1995) contend that one of the roles of the sport psychology consultant is that of a counsellor. As a counsellor, the sport psychology consultant can assist the athlete with problems like coping with injuries, disappointing performances in competition, and low motivation (Morris & Summers, 1995). But besides such problems that are directly related to performance, personal problems can also impact on performance. Hence, very often it is necessary for the sport psychology consultant to provide counselling for personal problems too. Winter and Martin's (1993)

programme does not provide a facilitator with any training in basic counselling skills.

- **Psychology of the athlete**

One of deficiencies of the study is that self-confidence was not boosted. Research into effective techniques to modify athletic self-confidence has been limited. Mental skills are vital strategies to be used in the development of self-confidence. However, self-confidence is only one component of the athlete's psychology – childhood experiences, belief systems, emotions and cognitions . To alter the psychology of the athlete requires moving the athlete from one set of perceptions and habits to a new set that augments self-confidence. Self-confidence will only be enhanced if the psychology of the athlete is changed. Hence, attention needs to be focused on the psychology of the athlete and the mechanisms for change (Morris & Summers, 1995).

- **Relevant life skills**

The present PST programme demanded facilitating the development of certain life skills that did not affect performance directly on an ad hoc basis. Two life skills that were recurrently visited were time management and problem solving skills.

- **Injuries and illness**

Many athletes participating in the programme missed out on training sessions for a considerable duration due to sport injuries or illness. Injuries and illness create a new set of pressures for athletes. Not only do these athletes have to endure the psychological trauma associated with the physical pain and sometimes stressful treatment, but they are also vulnerable to the frustration of not being able to train and compete, and in some cases, they

can't even participate in their usual life activities. Studies by Kolt and Kirkby (1994), Madden, Kirkby and Mc Donald (1989), and Kirkby, Kolt and Lindner (1995) as cited in Morris and Summers (1995) have revealed a connection between injury and negative psychological states in athletes.

Winter and Martin's (1993) programme did not deal directly with coping during illness or when injured. Consequently, when the athletes were injured, they also missed out on psychological skills training.

5.3 RECOMMENDATIONS

5.3.1 Longitudinal research

Sport psychology research has predominantly been cross-sectional. Very few studies have observed the same group of subjects over an extended period of time to understand development and change processes. Longitudinal research appears to be relatively unattractive largely because both the organisations interested in the practical outcomes of research, and the academics who judge each others work on by published reports, expect a rapid outcome (Morris & Summers, 1995).

Longitudinal research on the impact of psychological skills training on athletic performance could present a more comprehensive understanding on the internalisation of psychological skills and their long-term impact on athletic performance (Morris & Summers, 1995).

5.3.2 Consideration of Maslow's hierarchy of needs

Within the South African context, it is essential to take Maslow's hierarchy of needs into

consideration when implementing a psychological skills training programme. According to Maslow's (1970) theory of self-actualisation, as cited in Weiten (1989) human needs are organised in a hierarchy, and lower level needs must be satisfied before higher needs can be fulfilled (see Figure 17, Appendix A), (Weiten, 1989). This theory was strikingly evident when working with sprinters from diverse backgrounds. Coming from an impoverished environment resulted in athletes missing training sessions because of not being able to afford transport costs, hunger, or quitting athletics completely to enter full time employment. At an elite level of competition, this may not be as serious a problem, but at the level of the present study, financial issues contributed to the high attrition rate. This programme facilitates self-actualisation, and psychological skills become secondary if lower level needs are not being met. Without even considering higher level needs, how can an athlete even run optimally if he is starving!

5.3.3 Needs analysis and flexibility

Morris and Summers (1995) cite Parfitt and Hardy's (1993) criticisms of the highly structured approach to psychological skills training. Parfitt and Hardy stress the importance of a needs analysis in the early stages of working with an athlete. It is not always safe to assume that PST is the treatment of choice in all circumstances. As was evident from the programme, there may be time-management or personal life difficulties. Other potential issues include coach-athlete communication problems, psychological barriers from a major injury, or anxiety about a career in sport. Failure to check for such problems may lead to wasted time, effort and other resources and consequently providing ineffective PST (Morris & Summers, 1995).

Although all the athletes were assessed at the beginning of the programme, they were only tested on the skills that they were going to receive training in. Because a structured programme was going to be administered and tested, all the modules were adhered to, even

when athletes had an adequate score for a particular skill. Additional problems that were prevalent were dealt with when they were identified during the programme. This was the biggest advantage of facilitating the programme with each athlete individually. Morris and Summers (1995) advocate this type of flexibility, emphasising that each athlete is different and what is appropriate in one situation may not be appropriate in another.

5.4 CONCLUSION

Wann's (1997) framework and Winter and Martin's (1993) programme have much to offer to the development of psychological skills, particularly stress management, attention and mental imagery. However, more techniques for enhancing self-confidence and intrinsic motivation can be included.

The present study adequately illustrated that a psychological skills training programme has a positive impact on the development psychological skills. An increase in athletic performance was also revealed. However, the precise relationship between the enhancement of psychological skills and the improvement of athletic performance is still unclear, as the very small sample size increases the likelihood of rejecting the null hypothesis when the null hypothesis is false, and requires rejecting.

Chapter 6

BIBLIOGRAPHY

Belciug, M. (1988). *Causal attributions in competitive athletics.* Unpublished Doctor Philosophiae thesis, University of Pretoria.

Botha, K. (1999). *Die evaluering van 'n streshanteringsprogram.* Unpublished Magister Atrium thesis, University of Pretoria.

Cooper, J.M., Lavery, J. & Perring, W. (1970). *Track and field for coach and athlete* (2nd ed.). New Jersey: Prentice-Hall.

Cox, R.H. (1994). *Sport psychology: Concepts and applications* (3rd ed.). Dubuque: Brown & Benchmark.

Dick, F.W. (1987). *Sprints and relays.* London: British Amateur Athletic Board.

Galpin, J. (2001). *Statistical research design and analysis (Study guide for STATS511).* Johannesburg: University of Witwatersrand.

Greeff, A.P. (1979). *Sport- en ontspanningsdeelname as bydraende faktore tot beter weerbaarheid in die Suid-Afrikaanse Weermag.* Unpublished Magister Atrium thesis, Universiteit van die Oranje-Vrystaat: Bloemfontein.

Grundlingh, A. (1997). Sport psychology: New field, new challenge. *Unisa Psychologia, 24,* 59 - 62.

Hardy, L., Jones, G. & Gould, D. (1996). *Understanding psychological preparation for sport. Theory and practice of elite performers.* Chichester: John Wiley & Sons.

Kerlinger, F.N. (1986). *Foundations of behavioural research* (3rd ed.). Florida: Harcout Brace Jovanovich College.

Martens, R (1987). *Coaches guide to sport psychology.* Champaign: Human Kinetics.

Meichenbaum, D. (1985). *Stress innoculation training.* New York: Pergamon Press.

Morris, T.M. & Summers, J. (1995). *Sport psychology: Theory, applications and issues.* Milton: John Wiley & Sons.

Neuman, W. L. (1994). *Social research methods: Qualitative and quantitative approaches* (3rd ed.). Boston: Allyn & Bacon.

Nideffer, R.M. (1976a). *The inner athlete.* Champaign: Human Kinetics.

Nideffer, R.M. (1976b). Test of Attentional and Interpersonal Style. *Journal of Personality and Social Psychology, 34* (3), 394-404.

Nideffer, R.M. (1985). *Athlete's guide to mental training.* Champaign: Human Kinetics.

Nideffer, R.M. (1994). *Focus for success* [Computer software]. New York: Compton's New Media.

Noakes, T. (1986). *Lore of running* (2nd ed.). Cape Town: Oxford University Press.

Orlick, T. (1986). *Psyching for sport.* Champaign: Human Kinetics.

Pelletier, L.G., Fortier, M.S., Vallerand, R.J., Tuson, K.M. & Briere, N.M. (1995). Toward a new measure of intrinsic motivation, extrinsic motivation, and amotivation in sports: The sport motivation scale (SMS). *Journal of Sport and Exercise Psychology, 17*, 35-53.

Potgieter, J.R. (1992). *Readings in sport psychology.* Stellenbosch: University of Stellenbosch.

Potgieter, J.R. (1997). *Sport psychology. Theory and practice.* Stellenbosch: University of Stellenbosch.

Roberts, G.C., Spink, K.S. & Pemberton, C.L. (1999). *Learning experiences in sport psychology* (2nd ed.). Boston: McGraw Hill.

Rosenthal, R & Rosnow, R.L. (1991). *Essentials of behavioral research* (2nd ed.). Boston: McGraw Hill.

Santrock, J.W. (1992). *Life-span development* (4th ed.). Dubuque: Wm. C. Brown.

Singer, R.N. (1992). What in the world is happening in sport psychology. *Journal of Applied Sport Psychology, 4,* 63-76.

The attentional and interpersonal style inventory (TAIS). Retrieved March 13, 2001, from http://www.rembisz.com/tais3/html

Van Zyl, J (August 1999). Breekpunt. *Insig,* 30 - 31.

Wann, D.L. (1997). *Sport psychology.* New Jersey: Prentice-Hall.

Warden, P. (1986). *Sprinting and hurdling.* Wiltshire: The Crowood Press.

Weinberg, R.S. & Gould, D. (1995). *Foundations of sport and exercise psychology.* Champaign: Human Kinetics.

Weinberg, R.S. & Gould, D. (1999). *Foundations of sport and exercise psychology.* Champaign: Human Kinetics.

Weiten, W. (1989). *Psychology: Themes and variations.* California: Brooks/Cole.

Winter, G. & Martin, C. (1993). *Sport psych* (4th ed.). Adelaide: Hyde Park Press.

Winter, G. & Martin, C. (1995). *A practical guide to sport psychology.* Adelaide: Hyde Park Press.

Appendix A
FIGURES

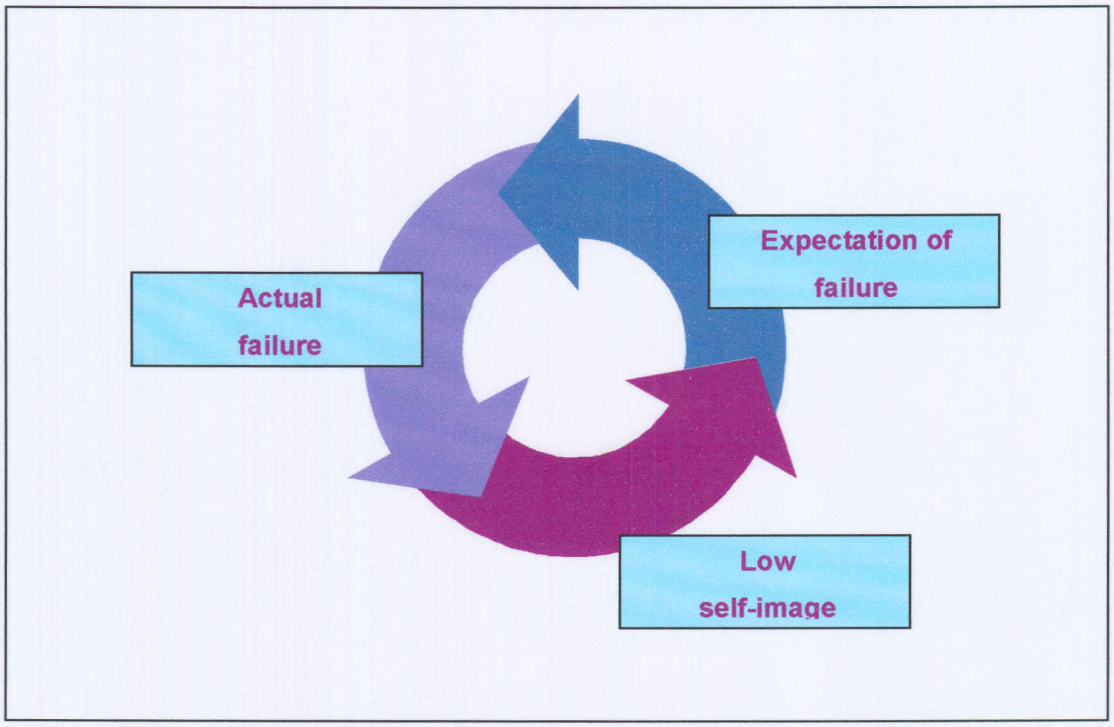

Figure 1. Vicious Circle.

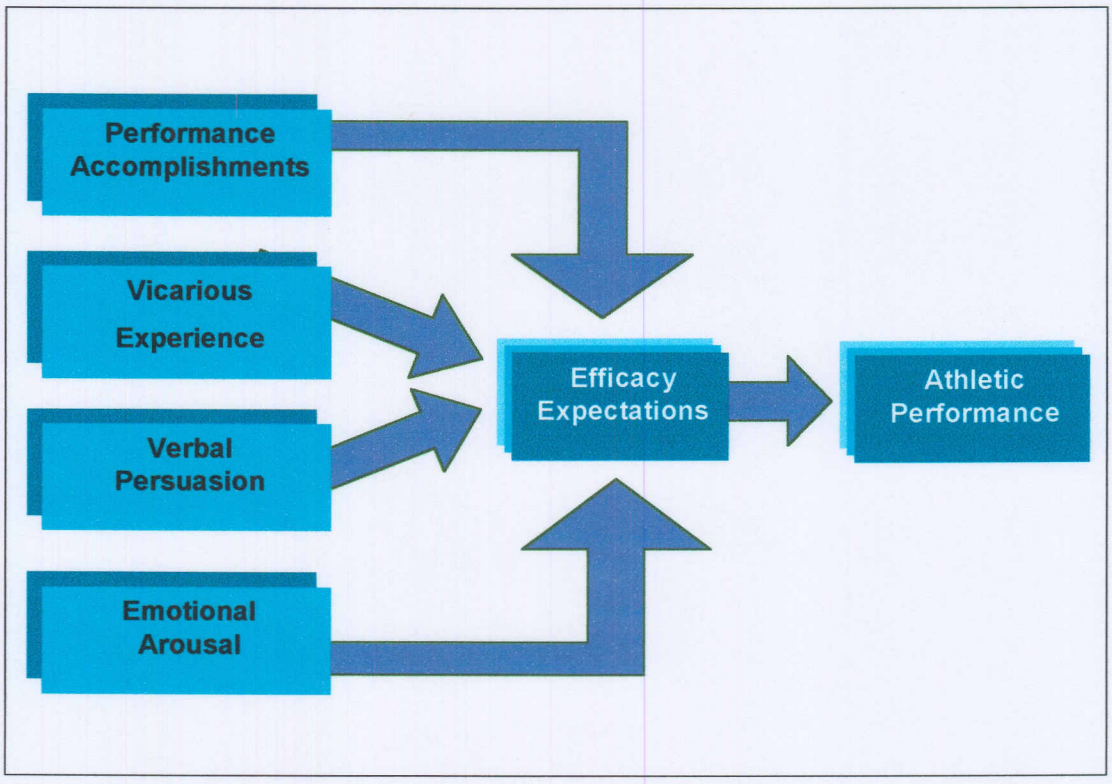

Figure 3. Bandura's Self-Efficacy Theory.

From *Foundations of Sport and exercise psychology* (p. 308) by R.S. Weinberg and D. Gould, 1995, Champaign: Human Kinetics. Copyright 1995 by R.S. Weinberg and D. Gould.

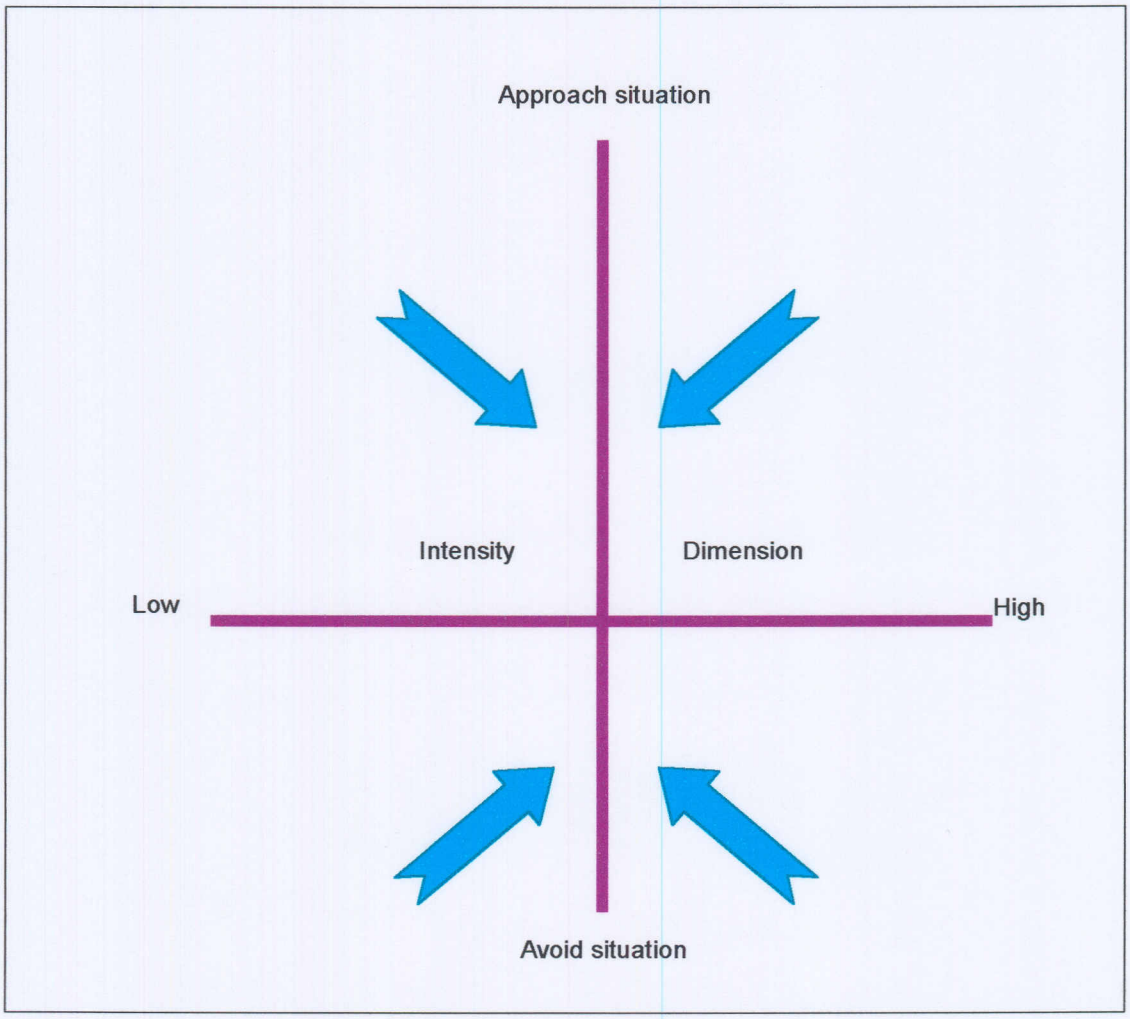

Figure 9. Relationship between direction and intensity.

From *Foundations of Sport and exercise psychology* (p. 60) by R.S. Weinberg and D. Gould, 1995, Champaign: Human Kinetics. Copyright 1995 by R.S. Weinberg and D. Gould.

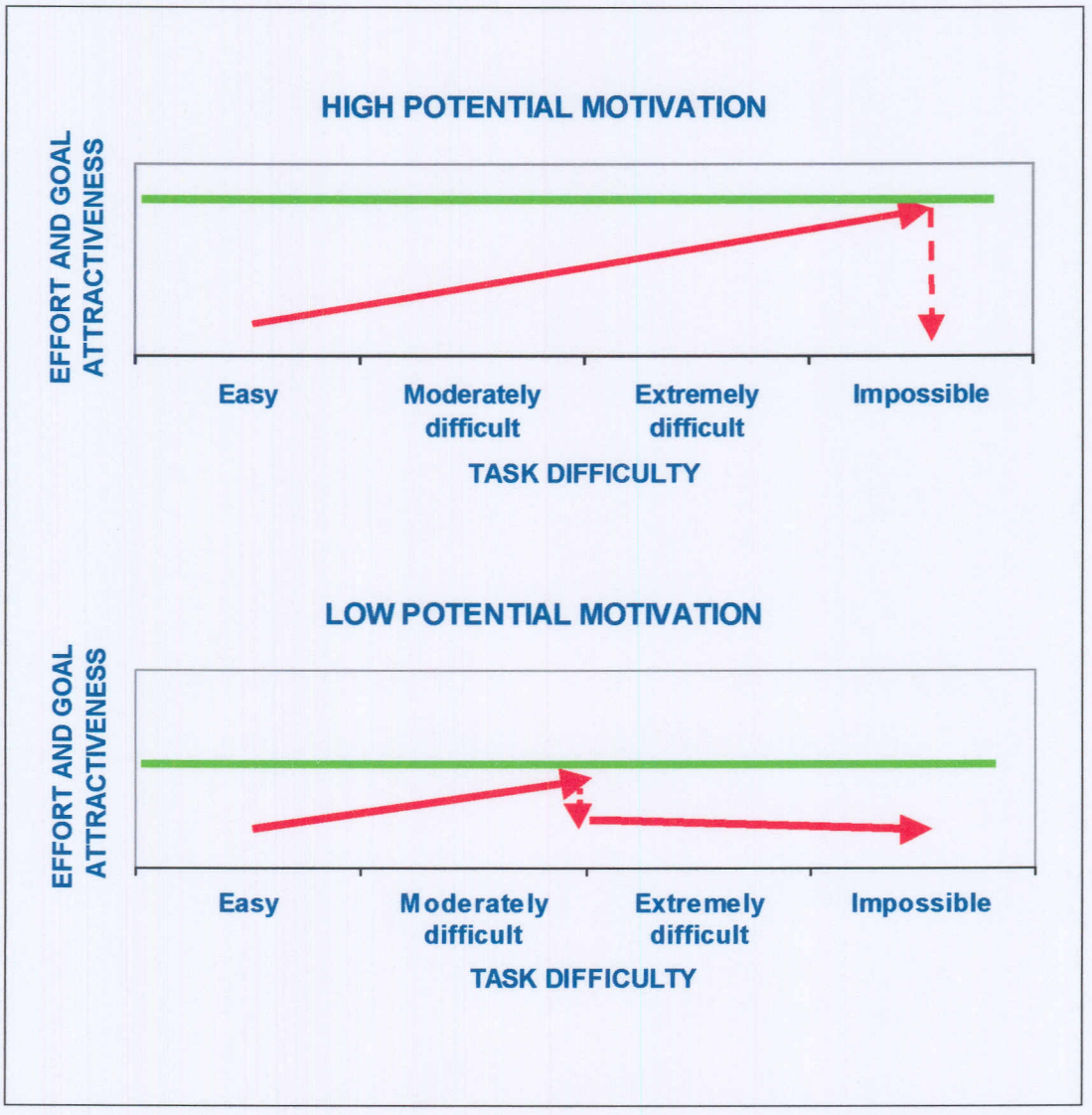

Figure 10. Energisation theory.

From *Sport Psychology* (p. 168) by D.L. Wann, 1997, New Jersey: Prentice-Hall. Copyright 1997 by Prentice-Hall.

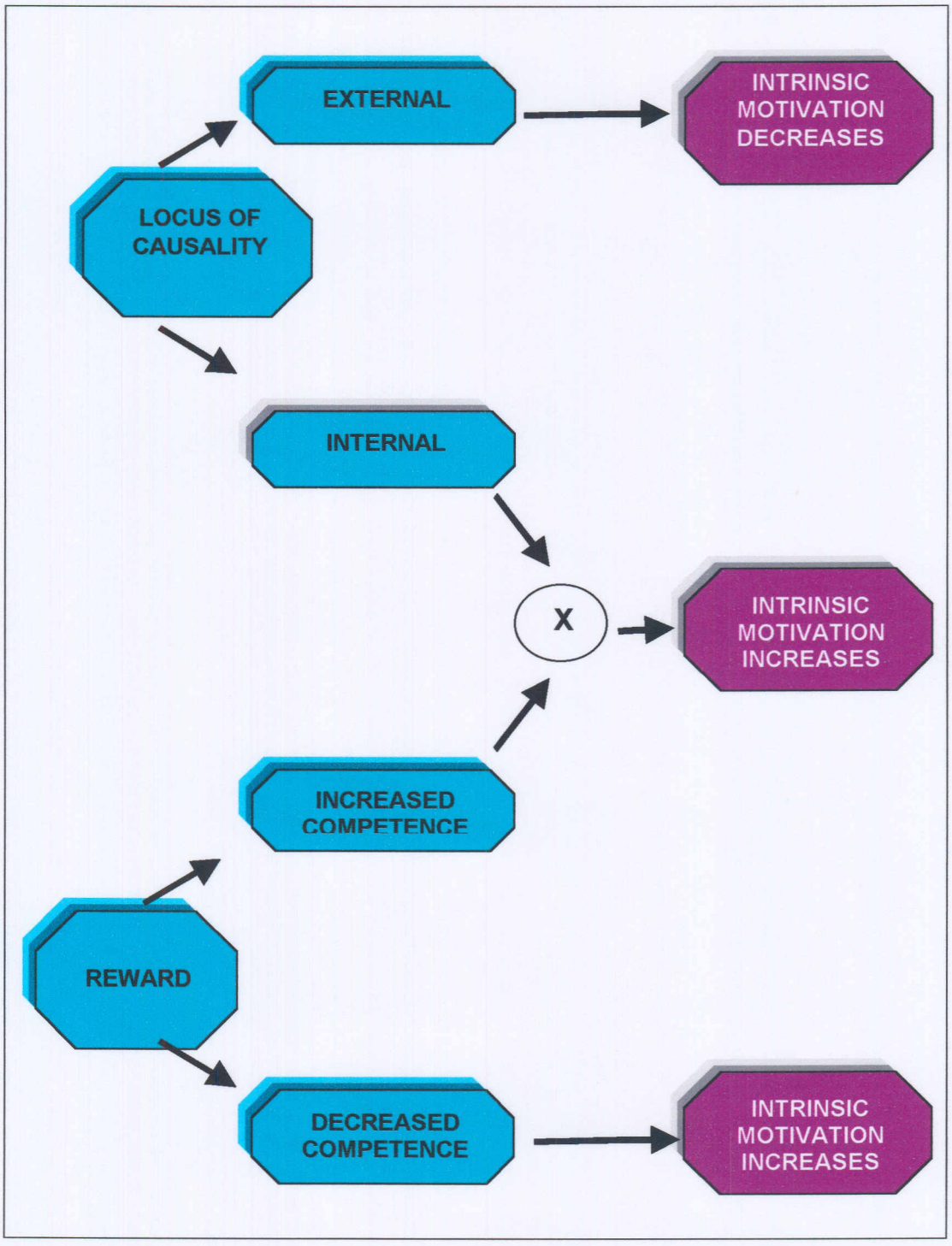

Figure 11. Cognitive evaluation theory.

From *Understanding psychological preparation for sport. Theory and Practice of Elite Performers* (p. 75) by L. Hardy, G. Jones, and D. Gould,1996, Chichester: John Wiley & Sons. Copyright 1996 by J. Wiley.

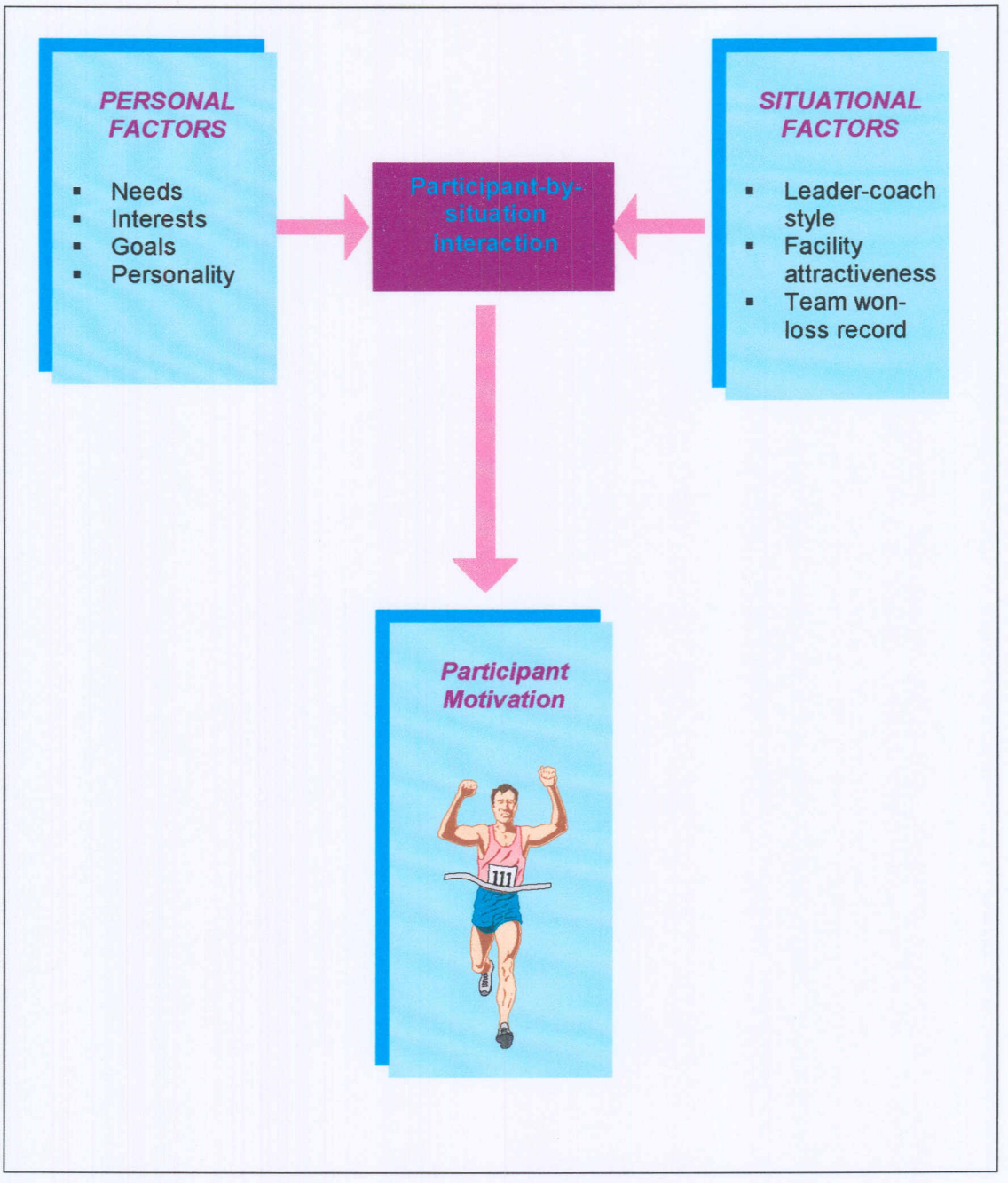

Figure 12. Interactional view of motivation.

From *Foundations of Sport and exercise psychology* (p. 63) by R.S. Weinberg and D. Gould, 1995, Champaign: Human Kinetics. Copyright 1995 by R.S. Weinberg and D. Gould.

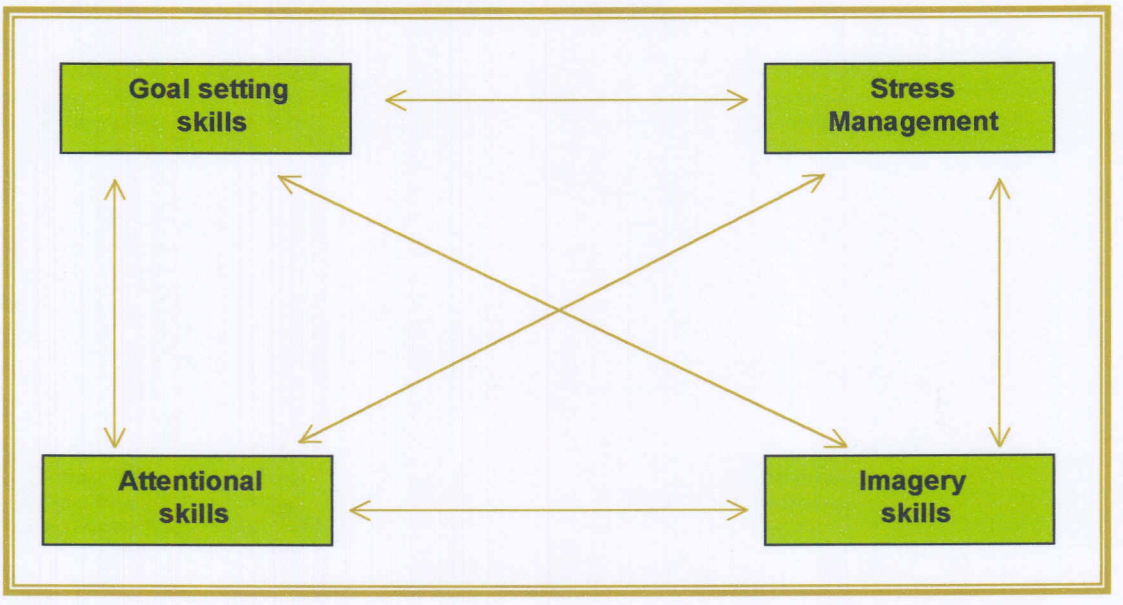

Figure 16. Interrelationship between psychological skills.

Adapted from *Coaches Guide to Sport Psychology* (p. 308) by R. Martens, 1987, Champaign: Human Kinetics. Copyright 1987 by Human Kinetics.

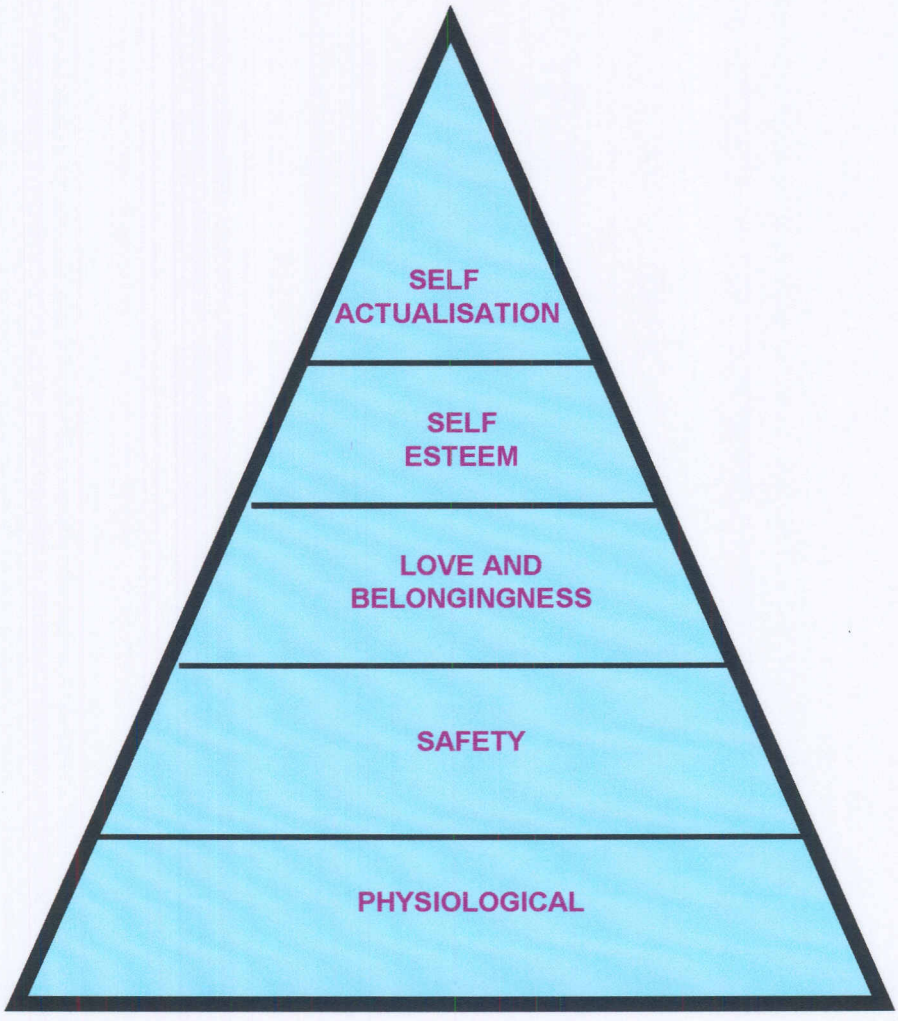

Figure 17. Maslow's Hierarchy of Needs.

Adapted from *Life-span Development* (4th ed.) (p. 65) by J.W. Santrock, 1992, Dubuque: Wm. C. Brown. Copyright 1992 by Wm. C. Brown.

Appendix B

TABLES

Table 4

Cooper et al's (1970) description of segments in the hundred metre sprint

Segment		Procedure
Starting procedures	1	The blocks must be set at the athlete's preferred distance.
	2	The front legs should be placed in a starting "set" position at an angle of approximately 80°. Alternatively, the rear leg can be extended almost completely, as this helps the sprinter to go forward more easily in the first step.
	3	The sprinter assumes a standing position immediately behind the blocks.
	4	When the starter says, "Go to your marks", the athlete takes one or two relatively deep breaths. He should be in a relaxed position on the blocks.
	5	The sprinter positions himself directly in front of the blocks, hands on the ground, the feet backed into the starting blocks, placing first the front feet and then the rear feet against the blocks.
	6	The hands are dusted off and the rear knee is kept on the ground.

7 The hands are placed on the ground with the wrists rotated outward. The body weight is borne on the fingers with only the finger and thumb tips being in contact with the ground.

8 The arms should be perpendicular to the ground, with the two thumbs 20cm apart.

9 The head must be loose, relaxed and allowed to hang down.

10 When the starter commands "set", the athlete takes one quick breath. The body weight should be pushed upward and forward over the hands. The legs then move fast enough to keep the body from falling. The sprinter must be less balanced in this position so that he can fall forward when he releases his hands. The focus should be on sound. After hearing the trigger, he should concentrate on moving off the blocks as quickly as possible.

11 The hips are "set" are elevated to a point slightly above the shoulders, so that as the runner leaves the blocks he raises his shoulders just above the hips. The force from the legs is then directed forward and only slightly upward.

12 The eyes are focused on a point on the ground directly in front of the body, so that the head hangs down and is relaxed.

Leaving the blocks

13 At the sound of the gun, the slightly bent arm is gently thrust forward at shoulder level. The other arm is moved vigorously toward the rear so that the arms move in opposition to the feet.

14 The sprinter must focus on taking the first step as rapidly as possible. The first step is approximately 45 to 75 centimetres from the starting line, and slightly inward from a straight line down the track. The foot taking the first step should be behind the weight centreline of the body, and should barely clear the ground when moving forward. If the foot is lifted upward, the body is thrown upward and prevents the sprinter from moving forward fast enough.

15 The foot should be pointed almost straight ahead when it strikes the ground. The knee must be pointed in the direction of the run for the sprinter to move more linearly.

16 The head should be lifted gently as the runner leaves the block, so that he focuses on a spot 6 to 9 metres ahead, as he moves forward. The body lean forward is extreme.

17 The sprinter must gradually straighten into a completely upright position. Each step should be longer until this position is achieved.

18 The first few strides after leaving the blocks should be relatively long. The sprinter should get a firm fast start and attempt to maintain top speed as long as he can.

Full speed sprinting	19	When reaching the full running position, the sprinter should pull his hips under him and try to roll his hips as he runs, thereby increasing the length of each stride. The sprinter among the leaders at this point can win the race if he is more able than the others to maintain this speed are.
	20	The sprinter must maintain proper arm and leg action. Arms should move slightly in toward the middle of the body for smooth relaxed action. The hand should be slightly cupped with the thumb pushing against the forefinger to prevent the arm from becoming tense. Legs from the first step to slightly beyond the upright position should move vigorously with a high knee lift.
	21	The running form should be smooth, relaxed and appear effortless.
Sprinting through the finish tape	22	The runner approaches the finish tape.
	23	The shoulder is thrust forward into the tape.
	24	The sprinter must run through the tape and go beyond it about 9 metres before slowing down.

Note. Adapted from *Track and Field for Coach and Athlete* (2nd ed.) (p. 18), by J.M. Cooper, J. Lavery, and W. & Perring, 1970, New Jersey: Prentice-Hall. Copyright 1970 by Prentice-Hall.

APPENDIX C

PSYCHOLOGICAL SKILLS TRAINING PROGRAMME

Athlete's Handbook

STAGE 1
EDUCATION

1.1 Can you think of any mental/psychological skills that are relevant in sprinting?

1.2 How important do you think psychological skills are in sprinting? Why?

1.3 How much time and attention do you devote to practising psychological skills?

(Wann, 1997)

STAGE 2 ASSESSMENTS

SMS (Pelletier et al., 1995)

Using the scale below, please indicate to what extent to what extent each of the following items corresponds to one of the reasons for which you are presently practising your sport.

		Does not correspond at all		Corresponds moderately			Corresponds exactly	
1	For the pleasure I feel in living exciting experiences	1	2	3	4	5	6	7
2	For the pleasure it gives me to know more about the sport that I practice	1	2	3	4	5	6	7
3	I used to have good reasons for doing sports, but now I am asking myself if I should continue doing it	1	2	3	4	5	6	7
4	For the pleasure of discovering new training techniques	1	2	3	4	5	6	7
5	I don't know anymore. I have the impression that I am incapable of succeeding in this sport	1	2	3	4	5	6	7
6	Because it allows me to be will regarded by people that I know	1	2	3	4	5	6	7
7	Because, in my opinion, it is one of the best way to meet people	1	2	3	4	5	6	7
8	Because I feel a lot of personal satisfaction while mastering certain difficult training techniques	1	2	3	4	5	6	7
9	Because it is absolutely necessary to do sports if one wants to be in shape	1	2	3	4	5	6	7
10	For the prestige of being an athlete	1	2	3	4	5	6	7
11	Because it is one of the best ways I have chosen to develop other aspects of my self	1	2	3	4	5	6	7
12	For the pleasure I feel while improving some of my weak points	1	2	3	4	5	6	7
13	For the excitement I feel when I am really involved in the activity	1	2	3	4	5	6	7
14	Because I must do sports to feel good about myself	1	2	3	4	5	6	7
15	For the satisfaction I experience while I am perfecting my abilities	1	2	3	4	5	6	7
16	Because people around me thin it is important to be in shape	1	2	3	4	5	6	7
17	Because it is a good way to learn lots of things which could be useful to me in other areas of my life	1	2	3	4	5	6	7
18	For the intense emotions that I feel while I am doing a sport that I like	1	2	3	4	5	6	7
19	It is not clear to me anymore: I don't really think my place is in sport	1	2	3	4	5	6	7
20	For the pleasure that I feel while executing certain difficult movements	1	2	3	4	5	6	7
21	Because I would feel bad if was not taking time to do it	1	2	3	4	5	6	7
22	To show others how good I am at my sport	1	2	3	4	5	6	7
23	For the pleasure that I feel while learning training techniques that I have never tried before	1	2	3	4	5	6	7
24	Because it is one of the best ways to maintain good relationships with my friends	1	2	3	4	5	6	7
25	Because I like the feeling of being totally immersed in the activity	1	2	3	4	5	6	7
26	Because I must do sports regularly	1	2	3	4	5	6	7
27	For the pleasure of discovering new performance strategies	1	2	3	4	5	6	7
28	I often ask myself why I can't seem to achieve the goal s that I set for myself	1	2	3	4	5	6	7

SIQ (Martens in Weinberg & Gould, 1995, p.290)

As you complete the Sports Imagery Evaluation form remember that imagery is more then just seeing or visualising something in your mind's eye. Vivid images may include not only visualising, but also experiencing all the senses - hearing, feeling, tasting, and smelling. Along with these sensations, you may also experience emotions, moods, or certain states of mind.

Below you will read descriptions of five general sport situations. You are to imagine that general situation and provide as much detail from your imagination as possible to make the image just as "real" as you can. Then you will be asked to rate your imagery on four dimensions:

1. How vividly you so for visualised the image
2. How clearly you heard the sounds.
3. How vividly you felt your body movements (kinestatic sense) during the activity
4. How clearly you were aware of your state of mind or moods or felt the emotions of the situation.

After you read each general description, think of a specific example of it -- e.g. the skill, the people involved, the place, and the time. Next close your eyes and take a few deep breaths to become as relaxed as you can (use your relaxation skills). Put aside all other thoughts for a moment. Keep your eyes closed for about one minute as you try to imagine the situation as vividly as you can. There are, of course, no right or wrong images. Use your imagery skills to develop as vivid and clear image of the general situation described as possible. Your accurate appraisal of your images will help you to determine which exercises you will want to emphasise in the sports imagery training programme to follow. After you have completed imagining the situation described, please rate the four dimensions of imagery by circling the number that best describes the image you had.

1 = Very clear and provide image
2 = Moderately clear and vivid image
3 = Not clear or vivid but a recognisable image
4 = Vague image
5 = No image present

Practising alone

First select one specific skill or activity in your sport such as shooting free throws, doing a parallel bar routine, executing a takedown, growing a pass, hitting a ball, or swimming the butterfly. Now imagine yourself doing this activity at the place where you normally practice this activity (gymnasium, pool, rink, field, and court) without any one else present. Now close your eyes for about 1 minute and try to see yourself at this place, hear the sounds, feel your body do the movements, and be aware of your state of mind or mood.

	Very clear and vivid image	Moderately clear and vivid image	Not clear or vivid but a recognisable image	Vague image	No image present
a. Rate how well you saw yourself doing the activity	1	2	3	4	5
b. Rate how well you heard the sounds of doing the activity	1	2	3	4	5
c. Rate how well you felt yourself making the movements	1	2	3	4	5
d. Rate how well you were aware of your mood	1	2	3	4	5

Practising with others

You are doing the same activity but now you are practising the skill with coach and your teammates present. This time, however, you make a mistake, which everyone notices. Now close your eyes for about one minute to imagine making the error and the situation immediately afterwards as vividly as you can.

	Very clear and vivid image	Moderately clear and vivid image	Not clear or vivid but a recognisable image	Vague image	No image present
a. Rate how well you saw yourself in this situation	1	2	3	4	5
b. Rate how well you heard the sounds in this situation	1	2	3	4	5
c. Rate how well you felt yourself making the movements	1	2	3	4	5
d. Rate how well you felt the emotions of this situation	1	2	3	4	5

Watching a teammate

Think of a teammate or acquaintance performing a specific activity unsuccessfully in a contest such as missing a 20-ft. basket, being passed by other runners, falling from the rings, missing a field goal, etc.

Now close your eyes for about one minute to imagine watching your teammate performing this activity unsuccessfully in a critical part of the contest as vividly and realistically as possible.

	Very clear and vivid image	Moderately clear and vivid image	Not clear or vivid but a recognisable image	Vague image	No image present
a. Rate how well you saw your teammate in this situation	1	2	3	4	5
b. Rate how well you heard the sounds in this situation	1	2	3	4	5
c. Rate how well you felt your own physical presence or movement in this situation	1	2	3	4	5
d. Rate how well you felt the emotions of this situation	1	2	3	4	5

Playing in a contest

Imagine yourself doing the same or a similar activity in a contest, but imagine yourself doing the activity very skilfully and the spectators and teammates showing their appreciation. Now close your eyes for about one minute to imagine this situation as vividly as possible.

	Very clear and vivid image	Moderately clear and vivid image	Not clear or vivid but a recognisable image	Vague image	No image present
a. Rate how well you saw yourself in this situation	1	2	3	4	5
b. Rate how well you heard the sounds in this situation	1	2	3	4	5
c. Rate how well you felt yourself making the movements	1	2	3	4	5
d. Rate how well you felt the emotions of this situation	1	2	3	4	5

Instructions

The effects of highly competitive sports can be powerful and very different among athletes. The inventory you are about to complete measures how you generally feel about competition because this is undesirable. Actually, these feelings are quite common, and to help us understand them we want you to share your feelings with us candidly. If you are worried about the competition or have butterflies or other feelings that you know rare signs of anxiety, please indicate these feelings accurately on the inventory. Similarly, if you feel calm and relaxed, indicate these feelings as accurately as you can. Your answers will not be shared with anyone. We will be looking only at group responses.

Below are some statements about how persons feel when they are competing in sports and games. Read each statement and decide if you HARDLY EVER, or SOMETIMES, or OFTEN feel this way when you compete in sports and games. If your choice is HARDLY EVER, mark with an X the square labelled A, if your choice is SOMETIMES, mark with an X the square labelled B, and if your choice is OFTEN, mark with an X the block labelled C. There are no right and wrong answers. Do not spend too much time on any one statement. Remember to choose the word that describes how you usually feel when competing in sports and games.

		Hardly Ever	Sometimes	Often
1	Competing against others is socially enjoyable	A	B	C
2	Before I compete I feel uneasy	A	B	C
3	Before I compete I worry about not performing well	A	B	C
4	I am a good sport when I compete	A	B	C
5	When I compete I worry about making mistakes	A	B	C
6	Before I compete I am calm	A	B	C
7	Setting a goal is important when competing	A	B	C
8	Before I compete I get a queasy feeling in my stomach	A	B	C
9	Just before competing I notice my heart beats faster than usual	A	B	C
10	I like to compete in games that demand considerable physical energy	A	B	C
11	Before I compete I feel relaxed	A	B	C
12	Before I compete I am nervous	A	B	C
13	Team sports are more exciting than individual sports	A	B	C
14	I get nervous wanting to start the game	A	B	C
15	Before I compete I usually get uptight	A	B	C

CSAI-2 (Weinberg & Gould, 1995, p.95)

Instructions

The effects of highly competitive sports can be powerful and very different among athletes. The inventory you are about to complete measures how you generally feel about this competition at the moment you are responding. Please complete the inventory as honestly as you can. Sometimes athletes' feel they should not admit to any nervousness, anxiety or worry they experience before competition because this is undesirable. Actually, these feelings are quite common, and to help us understand them we want you to share your feelings with us candidly. If you are worried about the competition or have butterflies or other feelings that you know are signs of anxiety, please indicate these feelings accurately on the inventory. Equally, if you feel calm and relaxed, indicate these feelings as accurately as you can. Your answers will not be shared with anyone. We will be looking only at group responses.

A number of statements that athletes have used to describe their feelings before competition are given below. Read each statement and the mark the appropriate block with an X to indicate how you feel right now - at this moment. There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer, which describes your feelings right now.

		Not at all	Somewhat	Moderately So	Very Much So
1	I am concerned about this competition	1	2	3	4
2	I feel nervous	1	2	3	4
3	I feel at ease	1	2	3	4
4	I have self-doubts	1	2	3	4
5	I feel jittery	1	2	3	4
6	I feel comfortable	1	2	3	4
7	I am concerned that I may not do as well in this competition as I could	1	2	3	4
8	My body feels tense	1	2	3	4
9	I feel self-confident	1	2	3	4
10	I am concerned about losing	1	2	3	4
11	I feel tense in my stomach	1	2	3	4
12	I feel secure	1	2	3	4
13	I am concerned about choking under pressure	1	2	3	4
14	My body feels relaxed	1	2	3	4
15	I'm confident I can meet the challenge	1	2	3	4
16	I'm concerned about performing poorly	1	2	3	4
17	My heart is racing	1	2	3	4
18	I'm confident about performing well	1	2	3	4
19	I'm concerned about reaching my goal	1	2	3	4
20	I feel my stomach sinking	1	2	3	4
21	I feel mentally relaxed	1	2	3	4
22	I'm concerned that others will be disappointed with my performance	1	2	3	4
23	My hands are clammy	1	2	3	4
24	I'm confident because I mentally picture myself reaching my goal	1	2	3	4
25	I'm concerned I won't be able to concentrate	1	2	3	4
26	My body feels tight	1	2	3	4
27	I'm confident of coming through under pressure	1	2	3	4

SCI (Weinberg & Gould, 1995, p.322)

Read each question carefully and thin about your confidence with regard to each item as you competed over the last year or season. For each item indicate the percent of time you feel you had too little, too much, or just the right degree of confidence. Below is an example to give you some confidence in filing out the inventory correctly.

	Underconfident (%)	Confident (%)	Overconfident (%)
You are a pole vaulter: How confident are you each time you attempt to clear 17ft?	20	70	10

The three answers should always add up to 100%. You may distribute this 100% any way you think is appropriate. You may assign all 100% to one category, split it between two categories, or as in the example, divide it among all three categories.

How confident are you with respect to ...		Underconfident (%)	Confident (%)	Overconfident (%)
1	Your ability to execute the skills of your sport or exercise?			
2	Your ability to make critical decisions during the race?			
3	Your ability to concentrate?			
4	Your ability to perform under pressure?			
5	Your ability to execute successful strategy?			
6	Your ability to put forth the effort needed succeed?			
7	Your ability to control your emotions during competition?			
8	Your physical conditioning or training?			
9	Your ability to relate successfully with your coach(es)?			
10	Your ability to come back when behind?			

CPPQ (Nideffer, 1994)

To what extent does this statement accurately describe you? Assign each statement a score out of 100.

	%
1. I am aware of my surroundings and react quickly to the feelings and moves of those around me.	
2. I am likely to make mistakes because I get distracted by outside events.	
3. I can analyse a set of facts and use them to guess what will happen next, predict trends and develop new insights and plans for the future.	
4. I make mistakes because my own thoughts and feelings have distracted or overwhelmed me.	
5. I can concentrate on one or two things, shut out distractions, and work my best under pressure.	
6. I am disciplined – willing to spend whatever time I need to do a job well, and sacrifice other parts of my life in order to be the best.	
7. At times I make mistakes because I get caught up in my thoughts and fail to pay attention to what's going on around me without taking the time to think before acting.	
8. I have a lot of energy and need it all to keep up with the many demands on my time at work, at school, and at home.	
9. I live by my own rules and "do my own thing". I would call myself a maverick or impulsive.	
10. I easily lose control over my feelings and actions, and do or say something that hurts others.	
11. I like to be a leader. I accept responsibility gladly.	
12. I can handle anything; I have great confidence in my ability to tackle any challenge that comes my way.	
13. I know I am a good person whether I succeed in life or not.	
14. I am competitive. I like to challenge myself and compete with others, whether playing a game or solving a problem.	
15. I do not agonise over choices. When it comes to making decisions, whether large or small, I spend very little time thinking or worrying about them.	
16. I am an extrovert, outgoing and friendly, and frequently seek out the company of other people.	
17. I enjoy spending lots of time alone and need plenty of personal space.	
18. I talk in public easily. I am willing to ask questions and speak my mind, even in big crowds.	
19. I am ready to speak up against others: I am willing to challenge someone on what I see as a wrong opinion or bad behaviour.	
20. I am willing to use physical strength, both to back up my own actions and to set limits on others.	
21. When it comes to supporting others, I will almost always encourage them, offer a good word, and give them the benefit of the doubt.	
22. I am likely to show my good feelings by touching someone, even by putting my arm around them.	
23. Right now I am depressed and unhappy with my life.	

STAGE 3
ACQUISITION

When I retire from running what things would I like to have achieved?

	Not at all important	Very little importance	Interesting, but not really motivating	Would be nice	Fairly important	Important enough to work hard		Very motivating and exciting		Inspiring, most important life goal
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10

Note. Adapted from *Sport Psych* (4th ed.) (p. 10) by G. Winter and C. Martin, 1993, Adelaide: Hyde Park Press. Copyright 1993 by the South Australian Sports Institute.

Most Important Long-Term Goals

Goal _____

Time-frame _____

Process goals
1. _____
2. _____
3. _____
4. _____
5. _____

Goal _____

Time-frame _____

Process goals
1. _____
2. _____
3. _____
4. _____
5. _____

Goal _____

Time-frame _____

Process goals
1. _____
2. _____
3. _____
4. _____
5. _____

(Winter & Martin, 1993)

Most Important Short-Term Goals

Goal _____

Time-frame _____

Process goals
1. _____
2. _____
3. _____
4. _____
5. _____

Goal _____

Time-frame _____

Process goals
1. _____
2. _____
3. _____
4. _____
5. _____

Goal _____

Time-frame _____

Process goals
1. _____
2. _____
3. _____
4. _____
5. _____

(Winter & Martin, 1993)

OPTIMAL AROUSAL LEVEL

Write down your feelings, thoughts and behaviours when you are psyched up to perform well

FEELINGS

THOUGHTS

BEHAVIOURS

(Winter & Martin, 1993)

Write down the signs that indicate your arousal/anxiety/stress level is too low or too high

	TOO LOW	TOO HIGH
FEELINGS		
THOUGHTS		
BEHAVIOUR		

Note. Adapted from *Sport Psych* (4th ed.) (p. 18) by G. Winter and C. Martin, 1993, Adelaide: Hyde Park Press. Copyright 1993 by the South Australian Sports Institute.

RELAXATION TRAINING RECORD

TRAINING SESSION	Tense		Fairly Relaxed			Very Relaxed	
DAY 1 Comments:	1	2	3	4	5	6	7
DAY 2 Comments:	1	2	3	4	5	6	7
DAY 3 Comments:	1	2	3	4	5	6	7
DAY 4 Comments:	1	2	3	4	5	6	7
DAY 5 Comments:	1	2	3	4	5	6	7
DAY 6 Comments:	1	2	3	4	5	6	7
DAY 7 Comments:	1	2	3	4	5	6	7
DAY 8 Comments:	1	2	3	4	5	6	7
DAY 9 Comments:	1	2	3	4	5	6	7
DAY 10 Comments:	1	2	3	4	5	6	7

Note. Adapted from *Sport Psych* (4th ed.) (p. 20) by G. Winter and C. Martin, 1993, Adelaide: Hyde Park Press. Copyright 1993 by the South Australian Sports Institute.

FOCUSING YOUR CONCENTRATION

Write down the things that you need to focus on in your running

IDEAL FOCUS

Note. Adapted from *Sport Psych* (4th ed.) (p. 23) by G. Winter and C. Martin, 1993, Adelaide: Hyde Park Press. Copyright 1993 by the South Australian Sports Institute.

List the things that may disrupt your focus during competition

POTENTIAL DISTRACTIONS	

Note. Adapted from *Sport Psych* (4th ed.) (p. 23) by G. Winter and C. Martin, 1993, Adelaide: Hyde Park Press. Copyright 1993 by the South Australian Sports Institute.

Event

Draw a diagram to show how you segment a race

SEGMENT	FOCUS

Note. Adapted from *Sport Psych* (4th ed.) (p. 26) by G. Winter and C. Martin, 1993, Adelaide: Hyde Park Press. Copyright 1993 by the South Australian Sports Institute.

TASK CONFIDENCE

List the situations in your life, in which you feel you have "task confidence". Be as specific as you need to.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____

(Winter & Martin, 1993)

SITUATION		THOUGHTS	FEELINGS	GENERAL REACTION	POSITIVE AFFIRMATION
Training					
Training					
Training					
Competition					
Competition					
Competition					

Note. Adapted from *Sport Psych* (4th ed.) (p. 30) by G. Winter and C. Martin, 1993, Adelaide: Hyde Park Press. Copyright 1993 by the South Australian Sports Institute.

TRAINING DIARY						
Date	Training Plan	Goals for this session			Review of session	Things to work on next session
		Technical	Psychological	Physical		

Note. Adapted from *Sport Psych* (4th ed.) (p. 15) by G. Winter and C. Martin, 1993, Adelaide: Hyde Park Press. Copyright 1993 by the South Australian Sports Institute.

VISUALISATION TRAINING RECORD											
SITUATION		**SITUATION THAT I PLAN TO IMAGINE**	**OVERALL VIVIDNESS RATING**							**THINGS TO IMPROVE NEXT TIME**
			Poor		Average		Excellent			
			1	**2**	**3**	**4**	**5**	**6**	**7**	
1	Training									
	Competition									
2	Training									
	Competition									
3	Training									
	Competition									
4	Training									
	Competition									
5	Training									
	Competition									
6	Training									
	Competition									

Note. Adapted from *Sport Psych* (4th ed.) (p. 35) by G. Winter and C. Martin, 1993, Adelaide: Hyde Park Press. Copyright 1993 by the South Australian Sports Institute.

PREPARING FOR COMPETITION

1. Logistical considerations

Travel arrangements

_____

Event times

_____

Check in times

_____

2. When and what will I eat?

_____

_____

_____

_____

_____

_____

3. When will I develop my competition plan _____

What will it include?

_____

_____

_____

_____

4. Will I do relaxation exercises? Yes ☐ No ☐

When? _____

4. **What will I do in the half-hour before the event?**

_____

_____

_____

_____

_____

_____

_____

_____

5. **What concentration cue words will I use before and during the competition to create the right feel and focus?**

_____

_____

6. **Are there any special aspects of this event which I need to consider?**

_____

_____

CUE SHEET		
Segment	**Physical Focus**	**Cue Word**

Note. Adapted from *Sport Psych* (4th ed.) (p. 44) by G. Winter and C. Martin, 1993, Adelaide: Hyde Park Press. Copyright 1993 by the South Australian Sports Institute.

MENTAL REHEARSAL

1. What aspects of the environment should I include in my visualisation?

Crowd ☐ _____

Conditions ☐ _____

Distractions ☐ _____

Cues ☐ _____

Thoughts about the venue ☐ _____

Competitors ☐ _____

2. **What do I want to focus on during the training session or competition?**

_____

_____

_____

_____

_____

_____

_____

3. **What aspects of the performance do I want to rehearse?**

_____

_____

_____

_____

_____

_____

_____

(Winter & Martin, 1993)

PERFORMANCE REVIEW

Date: _____

Competition: _____

Conditions: _____

EVENT	**TIME**
_____	_____
_____	_____
_____	_____

Comments

Arousal level

_____

_____

_____

Concentration

_____

_____

_____

Confidence and recovery

_____

_____

_____

(Winter & Martin, 1993)