SELF CONCEPT AND TEMPERAMENT
CHARACTERISTICS OF COMPETITIVE SWIMMERS

by

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Dedicated to my parents and Bill, all of whom have attempted to foster a positive self within me, and taught me to strive for continued academic and swimming excellence.
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SUMMARY

A survey of the literature which concerns this study, indicated the tremendous confusion which exists in the field of Sport Psychology. Many researchers investigated various divergent factors and drew conclusions without attempting to formulate links with existing research. The lack of specific cultural research in South Africa, served as motivation for undertaking this research project.

The aim of this study was to compare three groups of successful swimmers (Olympic swimmers, successful and unsuccessful provincial swimmers) in relation to certain temperament traits. The research hypothesis suggested that such traits might be the causing factors for differential success levels in swimming. These traits included: Sensation Seeking, Nervous System Type, Introversion-Extraversion, and General Anxiety Competitive anxiety. Self concept was also investigated.

The sample consisted of 58 competitive swimmers drawn from the 1992 South African Olympic Swimming Team, and the Eastern Transvaal and Transvaal Provincial Swimming Teams. The Olympic Team comprised the most successful group, while the remainder of the sample was subdivided into two groups (Successful and Unsuccessful Groups). The distinction was based on whether the individual swimmers had won medals and made the final of their respective races at the South African National Championships, or
A series of pen-and-pencil questionnaires, including the IPAT Anxiety Scale, the Sport Competition Anxiety Test (SCAT), the Adolescent Self Concept Scale (ASCS), the Pavlovian Temperament Survey (PTS), the Sensation Seeking Scale (SSS), and an Introversion-Extraversion Questionnaire were administered to all the subjects.

Statistical techniques employed to analyse the data included Multiple Analysis of Variance (MANOVA), Analysis of Variance (ANOVA), and the Scheffe test.

The results indicated that the Olympic Group differed statistically significant from the Unsuccessful Group on the IPAT A subscale (Unconscious Anxiety). The former group had lower unconscious anxiety levels than their unsuccessful counterparts. There were no statistically significant differences between the three groups with reference to the other temperament dimensions or self concept. The implications of the findings are discussed. Possible limitations of the study and recommendations for future research are presented.
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1.1 Orientation

In most Western and European Societies, sport has come to play an increasingly important role in both the individual's and the greater society's existence. This is evident from the tremendous growth of the Olympic Games movement over the last 20 years. With the growth of sport, has come the development of a "new" orientation within the field of psychology, that of Sport Psychology.

Great interest was generated in this field especially with the publication of La Place's (1954) and Booth's (1958) investigation of the possible personality differences between athletes and nonathletes. These early studies created much controversy and research, resulting in a large volume of literature. Unfortunately there are many contradiction in the findings of the past 30 or 40 years, which are only now being addressed and investigated by inter alia Eysenck, Nias and Cox (1982).
The investigation into particular personality characteristic necessary for involvement in sport has developed along with the investigation into personality changes through participation in physical training over a period of time (Bakker, Whiting & van der Brug, 1990). Alderman (1974) notes that little evidence existed at the time for the latter of the two arguments and hence most literature has focused on differentiating personality traits of athletes and nonathletes. This field of research has since been broadened to included the possible personality differences between individual and group orientated sport participants, investigating personality differences specific to female participants, and differentiating between successful and unsuccessful athletes in terms of personality traits.

Cox (1985) notes that empirical studies have not succeeded in successfully distinguishing between successful and unsuccessful athletes in a particular sport using personality traits, except for the highly acknowledged "Iceberg Profile" (Morgan, 1980). Three studies were carried out by Morgan between 1972 and 1976, using the Profile of Mood States (POMS), utilizing three different sports groups. A specific profile of the successful athlete was created, which has since become known as the "Iceberg Profile".

Sport psychology in the Eastern European Communist countries has progressed one step further than that presently being investigated in the Western World. The USSR's phenomenal achievements at the Olympic Games have shown that Sport Psychologists are able to utilize the findings of research on
personality differences between athletes and nonathletes, and are able to "discover" potential athletes from the general population. A series of personality questionnaires were developed so that coaches and psychologists were constantly in touch with the athletes' "psychological standing" and emotional strength or weaknesses.

1.2. Motivation

1.2.1. General Motivation

The general motivation for this study comes from the fact that due to sport isolation resulting from the political era of Apartheid, very little research or development of Sport Psychology has occurred in South Africa. The Psychological Association of South Africa and many of the Psychology Departments at universities have yet to recognize Sport Psychology as a valid and acceptable field of psychology. Despite the fact that the Western World has progressed beyond the exploratory investigation of the personality characteristics of sportsmen and women, South Africa needs to develop its own unique brand of sport psychology based on its own unique culture and communities. The present study hopes to serve this purpose and also serve to provide replicative supportive research to aspects of the existing literature.

1.2.2. Specific Motivation
The specific motivation for the present study stems from Morgan's (1980) research on the "Iceberg Profile", which has been able to successfully distinguish between successful and unsuccessful athletes, where many other studies have failed. South Africa's isolation has not only resulted in a lack of development with regard to sport psychology, but coaches and team managers have also not made optimal use of the positive support that psychologists could provide athletes. Since few athletes have used what may be regarded as limited South African sport psychology, the question remains, as to why certain athletes have been able to achieve over and above other athletes. This study investigates whether these possible differences in success, are related to various personality and temperament traits.

1.3. Aims of the Study

The aim of the present study is to investigate the possible personality and temperament differences between successful and unsuccessful athletes. The athletes will be drawn from the sport of swimming, due to the author's personal interest and involvement in this particular sport.

The research question can be defined as follows:

Are there personality and self concept differences between three groups of swimmers at differential success levels?

This research question can be operationally explicated as follows. Are there statistically significant differences in:
1. Self concept, measured by the Adolescent Self Concept Scale (ASCS).
2. Sensation-seeking, measured by the Sensation Seeking Scale (SSS).
3. Strength of the nervous system, measured by the Pavlovian Temperament Survey (PTS).
4. Anxiety levels measured by the IPAT Anxiety Scale and the Sport Competition Test (SCAT).
5. and Introversion-Extraversion, measured by the Introversion-Extraversion Questionnaire,

between three groups of swimmers who had attained various success levels, namely:

a. The 1992 South African Olympic Swimming Team,
b. Eastern Transvaal and Transvaal Provincial Swimmers who had won medals and had achieved places in the finals at the South African National Championships,
c. and Eastern Transvaal and Transvaal Provincial Swimmers who did not win medals and were only able to achieve places in the consolation finals or who were unable to make in past the first round of competition.

Based on contradictory research findings reported in the literature, two-tailed hypotheses will be formulated.

A secondary aim of the present study is to contribute towards a psychological based approach to training in various sports and to verify or disprove existing theories on the role of personality factors in attainment of success in sport.
1.4. Overview of the Proposed Study

Chapter One outlines the objectives, motivation and aims of the present research study. The theoretical framework for the five personality and temperament traits which are under investigation in the study are viewed and outlined in Chapter Two. These theories form the basis of the six questionnaires used in the empirical investigation. In Chapter Three, relevant research concerning temperament within various sports is explicated. Chapter Four reviews research specific to the present study, namely that of swimming, and of successful versus unsuccessful sport participants. Chapter Five deals with the experimental investigation and how it was executed. This includes the description of the subjects, method of investigation, measuring instruments, hypotheses tested, and the statistical analyses applied. The research results are presented in Chapter Six. Chapter Seven discusses the results presented in the previous chapter. Conclusions are drawn and certain research recommendations are made.
CHAPTER 2

THEORETICAL BACKGROUND:

SPORT RELATED TEMPERAMENT TRAITS

AND THEIR CONCOMITANT THEORIES

"The few theories adopted by sport psychologists have tended to be bad theories. They have been bad in the sense that they were not intended for use in sport psychology."

(Morgan, 1980, p 72, in Zuckerman, 1983).

This study attempts to differentiate successful swimmers on the basis of various temperament traits. To understand the implications of possible differences, the theories behind the traits are investigated. The chapter begins with a view of Martens' Competitive Anxiety Theory, a relatively new theory and concept in relation to sport personology research in South Africa. Self or concept of the Self is usually seen as a core aspect of the personality, which forms a foundation for the development of the other traits. In the present study, Self concept is categorized as a personality dimension, to facilitate
classification and fluent reading. The distinction needs to be kept in mind however. Two theoretical approaches to self concept are explicated, namely those of Rogers and Jung. This is followed by Zuckerman’s Sensation Seeking Theory and the theory of Strength of the Nervous System developed by Pavlov and followed by the Polish psychologist Jan Strelau. Finally the chapter views Eysenck’s well established theory of Introversion-Extraversion.

2.1. Competitive Anxiety

2.1.1. Historical Overview

It is generally agreed that Sigmund Freud was the first to present a comprehensive view of the nature of anxiety (Lamb, 1978; Spielberger, 1972b). In 1894, Freud had already conceptualized anxiety neurosis as a discrete clinical syndrome which is to be differentiated from neurasthenia. He subsequently came to regard anxiety as the basis of all neurotic symptom formations (Spielberger, 1972b). In Freud’s 1923 book "The Problem of Anxiety", he distinguished anxiety as an unpleasant, universally experienced emotional state, resulting in some motor discharge (in Lamb, 1978). Freud initially believed anxiety to result from the inability of the ego to repress impulses, but later held the view that anxiety was a signal to the organism of an impending danger. This danger may be external but is most often the result of the ego’s anticipation of overwhelming sexual and/or aggressive impulses (Lamb, 1978).
During the period 1960-1970, research focused on differentiating the emotional state of anxiety from other affects and arousal states. In this period, various theorists proposed definitions and theories of anxiety. The most acknowledged of these was C.D. Spielberger’s Trait-State Anxiety Theory. As a result of the numerous emerging theories, various measuring instruments were developed. The first was the Trait-State Anxiety Inventory (STAI) produced by Spielberger et al. (1970, in Lamb, 1978). Other standard A-trait measures such as the IPAT Anxiety Scale, the Taylor Manifest Anxiety Scale and the Zuckerman Affect Adjective Checklist were to follow.

Martens, Vealey and Burton (1990) chose to develop their own independent model of competitive anxiety, but one which borrows terminology from both Spielberger and J.E. McGrath. Spielberger (1966) is credited with formalizing the Trait-State theory. Some of the ideas and principles which guided the Martens et al. (1990) theory of competitive anxiety will now be discussed, including McGrath’s (1970) description of stress, and Spielberger’s theoretical approach, which contributed to the Marten et al. (1990) theory.

2.1.2. The concept of "stress" (McGrath).

Martens et al. (1990) note that much confusion has been created by defining stress as a stimulus, an intervenor and as a response variable by various researchers. McGrath (1970) however conceptualized stress as a process, which clarified the apparent confusion. McGrath (1970) notes four events which need to be
considered when conceptualizing stress: firstly, the physical or social environment which may place some kind of objective demand on the individual; secondly, the individual's perception of this demand and the decision how to respond to the demand; thirdly, the individual's actual response to the demand; and lastly, the possible consequences which could result from the individual's response. These four events resulted in McGrath defining stress as "an imbalance between the perceived environmental demand and the perceived response capability of the organism" (in Martens et. al., 1990, p 7).

2.1.3. Spielberger's approach

2.1.3.1. Stress, threat and anxiety

Spielberger (1972b) defined stress in a different manner to McGrath (1970). He described stress in terms of the objective stimulus properties in an overall anxiety provoking process or situation. Hence the term stress was used in a limited capacity, "denoting environmental conditions or circumstances that are
characterized by some degree of objective physical or psychological danger" (p. 488). The danger was defined by the experimenter and validated by two or more observers. The above mentioned physical or psychological danger is part of the individual idiosyncratic perceptions of the situation and was defined by Spielberger (1972a) as "threat". For him the term anxiety or rather, State Anxiety (A-State) was then the result of a situation where the evoked emotional reactions from these personally threatening situations, competed.

**Figure 2.2.** Spielberger's (1972b) process of anxiety

[Figure showing the process of anxiety]

(Martens et. al., 1990, p 8)

2.1.3.2. Anxiety as a state versus a trait

Spielberger (1972a) developed an adequate theory of anxiety which distinguishes both operationally and conceptually between anxiety as a transitory state and the relatively stable personality trait. These conditions were named State Anxiety (A-State) and Trait Anxiety (A-Trait) respectively. Spielberger (1972a) conceptualized A-State as the transitory emotional state of the human being which may vary in intensity and which fluctuates over a period of time. This condition is said to be characterized by the unpleasant, consciously perceived feelings of tension and apprehension, which activates the autonomic nervous system. On
the other hand, the A-Trait is conceptualized as relatively stable individual differences in anxiety proneness or a predisposition to regard a situation as threatening. Hence an individual with a high A-trait score would perceive a greater number of situations as dangerous or threatening and would respond to these with varying levels of A-state reactions. Spielberger (1972a) maintains that the arousal of the anxiety state is a result of a process of temporally ordered events which are initiated by internal or external stimuli and perceived by the individual as dangerous or threatening to him personally. Once the stimulus situation has been regarded as threatening, it is assumed that an A-state reaction is evoked and that the intensity of this particular reaction would be proportional to the amount of threat perceived by the individual. The duration of the evoked A-state is then dependant on the continued presence of the evoking stimulus and is also influenced by the individual’s previous experiences in dealing with similar such threatening circumstances.

2.1.3.3. Anxiety stressors

A distinction is drawn by Spielberger (1972a) with regard to the stressor, as it may have different implications when evoking A-state in different individuals who differ in A-trait. The first distinction is that those individuals who have high A-traits, appear to judge those situations or circumstances which evaluate the individual’s personal adequacy, as threatening. Secondly, those situations or circumstances which characterize physical danger for the individual are not interpreted differently by the
high and low A-trait individuals.

Spielberger (1966b) defined Trait-anxiety as follows:

"Trait anxiety, however, is a motive or acquired behavioral disposition that predisposes an individual to perceive a wide range of objectively nondangerous circumstances as threatening and to respond to these with state anxiety reactions disproportionate in intensity to the magnitude of the objective danger"

(p 17).

2.1.4. Martens' (1990) approach: Competitive Anxiety

2.1.4.1. Terminology

In the theory of competitive anxiety developed by Martens et. al. (1990), the authors preferred to use McGrath's conceptualization of stress. "Thus, Stress here will refer to the overall process that is associated with the occurrence of state anxiety, not only the objective stimulus event that elicits the perception of threat" (Martens et. al., 1990, p 9). McGrath's term "objective demand" was also retained while Spielberger's definition of threat was used to label the "perception of imbalance between perceived environmental demand and response capability ..." (Martens et. al., 1990, p 9). Spielberger's term of state anxiety reaction is used as a definition for the equation. The new equation stands as follows:
2.1.4.2. The concept "competition".

In discussing the need for a theory, Martens (1976) notes that due to other anxiety theories' failure to guide research on competition, the concept of competition has been inadequately defined. He states that the most frequently used definition for competition is that of the reward approach. Hereby competition is seen as a social situation in which the rewards are distributed unequally to the individuals, on the basis of performance in a specific activity (Martens et. al., 1990). Critical of this definition, Myers (1961, in Martens, 1976) suggests that the "distribution of rewards" definition does not account for an individual's motivation to enter into the competitive situation. He also suggests that for this definition to be satisfactory, consensus must be obtained on the criteria for the distribution of these rewards, the subjective value of these rewards and the goal which must be achieved.

Festinger's (1954, in Martens, 1976) Social Comparison Theory is
based on the premise that a drive exists in man to evaluate his own opinions and abilities, and that in the absence of non-social means for making such comparisons, the individual will compare himself to others.

In developing his own definition, Martens (1976) suggests that the term "drive" in Festinger's theory has too many connotations. Martens rather refers to "an acquired motive to learn about oneself" (Martens, 1976, p 13). While Myer (1961, in Martens, 1976) restricted the term "social" to a narrow concept of direct social interaction only, Martens (1976) prefers a broader definition of the term "social". This would allow for a broader definition of competition which includes unilateral comparison under certain conditions. These social situations not only include those allowing direct interaction, but also those where no direct interaction occurs. Therefore, "competition is a process in which the comparison of an individual's performance is made with some standard in the presence of at least one other person who is aware of the criterion for comparison and can evaluate the comparison process" (Martens, 1982, p 30).

2.1.4.3. The OCS-Model (Objective Competition Situation)

For Martens et. al. (1990), Competitive trait anxiety is a situation-specific modification of the more general A-trait construction of Spielberger. The specific situation referred to, is the tendency to perceive competitive situations as threatening
and to respond to these with A-state. Martens (1975a) outlined a model that views competition as a process. This model applies a cognitive paradigm to competition.

**Figure 2.4. The competitive process**

(Martens et. al., 1990, p 16)

The initial element of this model is the Objective Competition Situation (OCS), which defines all of the objective stimuli in the competitive process. This refers to the type of task, the difficulty level of the opponents, ability, playing conditions or rules and the available extrinsic rewards. Hence, the OCS specifies the environmental or objective demand. It is within these environmental demands, that the physical or social
environment may pose as a threat since the competitive process is an evaluative situation.

The second element is the Subjective Competition Situation (SCS), which relates to how the person perceives, accepts, and appraises the OCS. The SCS is mediated by such factors as the individual's personality disposition, attitudes and abilities, and other intrapersonal factors. Due to the internal nature of this element, it cannot be measured directly but can be inferred from other behavioural indices.

The Response of the individual to the OCS is largely determined by the above mentioned SCS. Martens (1975b) notes that these responses can take place on three various levels: behavioural responses (such as performing well), physical responses (increased palm sweating), and psychological responses (increased A-state).

The fourth and final element discussed by Martens (1975b) is the positive or negative Consequences of the competition. The former of these two is seen as success in the competitive situation while the latter is seen as failure.

Martens (1990) integrates the above four elements (known as the Competitive Process) in his theory of Competitive Anxiety.

Figure 2.5. Competitive A-trait as a mediator between competitive stimulus and response

(the diagram follows on the next page)
The literature concerning anxiety is vast and intricate, with each theorist providing his own explanation of the stimulus which results in the response known as anxiety. Martens' (1990) model of the competitive process is based on the general theories and explanations provided by Spielberger and McGrath. Uniquely, Martens (1990) views anxiety in a specific environment, namely the competitive situation. To provide an adequate overview of the circumstances which result in anxiety, Martens (1990) incorporates both the objective and subjective competitive situations.

2.2. Self-Concept

2.2.1. Introduction

Purkey (1970) describes self-concept as follows:
"The self-concept as a frame of reference, as a basis of evaluation and as a method of associating with others underlines the attitudinal aspect, namely its inclination towards stable patterns of action and behaviour" (p 12).

Another definition is provided by Maslow (1955, in Vrey & Venter, 1983) who points out that a lack of self-acceptance is associated with a low self-esteem which will handicap the individual with a negative or low self-concept during his process of self-actualization.

Vrey (1974) defined self-concept as "... the configuration of convictions about myself and to attitudes towards myself which are dynamic and of which I am or may become conscious" (p 95 - translation).

Shavelson, Hubner and Stanton (1976, in Waite, Ganseder & Rotella, 1990) defined Self concept as "an individuals perception of himself" (p 265) while Shepard (1979, in Waite et. al., 1990) suggests that the concept of self-acceptance "is one of several self-concept variables which corresponds to the evaluative component of the self-concept" (p 265). Waite et. al. (1990) mention that much methodological confusion exists in the literature on Self concept because terms such as self-acceptance, self-esteem, self-worth, etc. are used interchangeably. They also believe that one of the most important aspects of self-concept namely self-acceptance, a construct widely associated with Rogers, has not received enough attention in recent literature.
Maddi (1989) investigates the approaches of various theories by leading psychologists and theorists concerning self-concept. Each of these has an unique concept of self integrated within the broader beliefs of the theorist. Hence it is difficult and nearly impossible for each of these to be investigated within the confines of the present study and only two traditional approaches will be briefly viewed, followed by a more sport specific and thus possibly more relevant theoretical approach to Self, namely Vealeys model of Sport confidence.

2.2.2. Jung’s Concept of Self

2.2.2.1. Introduction

"At great risk of oversimplification, I venture to say that the overall directionality in his theory is the tendency towards attainment of selfhood."

(Maddi, 1989, p 80).

C.G. Jung bases his theory on the assumption that all that is human, and everything in the universe, exists, changes and thrives due to conflict and opposition. The conscious processes are constantly and inevitably in opposition and conflict with the unconscious. Jung distinguishes between two levels of unconscious namely the personal unconscious and the collective unconscious. The former consists of all those experiences which were part of the consciousness but due to the defence mechanisms such as repression, had been forced out. He believed in an alternative to this defensiveness and believed that by shifting the focus of
attention, the unconscious can again become conscious (Maddi, 1989). More relevant to the present study is the concept of collective unconscious. Jung believed that Freud’s view of the unconscious was too narrow and hence his concept included of all those memories traceable from the past generations and not simply those from early youth (Rosenhan & Seligman, 1989). This accumulated experience takes the form of archetypes, sometimes called "dominants" or "mythological images" (Maddi, 1989).

2.2.2.2. The Archetypes

The archetypes take an universal form and are the inherited, predisposition to characteristic thoughts and feelings. They may also determine or influence the manner in which the individual perceives his/her experiences. Samuels (1985) notes that it is reasonable to argue that content cannot be inherited but that form and pattern can. Hence he notes that the concept of the archetype can be seen as a skeletal concept which is then fleshed out with the individual’s imagery, ideas, motifs etc. The content is thus variable and is subject to environmental and historical changes (Samuels, 1985). Numerous archetypes were developed by Jung and includes the Mother, the Shadow, Anima and Animus, Persona, the Wise old man, God, the Child, Death, etc. Persona for example is seen as the mask which the individual develops in response to the demands of social convention and tradition. Its purpose is to make a good impression on both oneself and society. On the other hand anima and animus provided for Jung the basis of bisexuality. It allows for both femininity and masculinity in both biological sexes. The relevant archetype for the present
2.2.2.3. The Self as archetype

Dry (1961) states that the final stage of the developmental process is that of individuation, from which the archetype of the Self emerges. Dry notes that despite the symbolic descriptions given by Jung, Jung had himself stated "Every life is, at bottom, the realization of a whole, that is, of a self, so that the realization can also be called individuation" (Dry, 1985, p 103). Samuels (1985) describes this Self or Individuation as the pursuit of the meaning and purpose in life. Jung defines the Self as:

"the potential for integration of the total personality. This would include all psychological and mental processes, physiology and biology, all positive and negative, realised or unrealised potentials, and the spiritual dimension. The self contains the seeds of the individual's destiny and looks back to phylogeny as well. The definition stresses integration because the self functions as a container for all these disparate elements"

(Samuels, 1985, p 91).

Hence it can be seen that Jung defined the Self not only as the centre of the personality but also as the whole circumference, the wholeness. Samuels (1985) suggests that by allowing the Self to be the centre of personality, Jung allowed for the Self to create a pattern, balance or order, preventing any cessation of
the dynamics of the psyche. Endemic to Jung's work is the belief that bipolarity is of essence, that no entity or process can be defined without an opposite. Samuels (1985) notes that the general index of Jung's "Collected Works" describes the opposite of the Self as being the Ego. With this understanding, one can see why individuation is a process rather than a state, a movement towards wholeness by integrating the conscious and the unconscious. Although Samuels (1985) suggests that death may be regarded as the ultimate goal of this process, he stresses Jung's belief that individuation is never achieved and always remains an idealistic concept.

As already mentioned, conflict is inevitable and exists between all the core characteristics that Jung hypothesized. Despite this, he believes that this conflict is not to be defended against, but is valuable. The individual should actively concern himself with regaining the richness of his past by converting the unconscious into the conscious. The tension, pain, and difficulty which result are seen to be what life is made of. If the individual can work through this and align the unconscious into a dynamic balance, then Self is achieved. Hence the archetype of Unity underlies the archetype of the Self. The core tendency within Jung's theory is that of attaining selfhood which represents a balance which has been achieved between the above mentioned conscious and unconscious processes.

2.2.3. Carl Rogers' Concept of Self

One of the most popular psychological theories that involves the
Self, is the theory of C.R. Rogers. Rogers' (1951) client-centered therapy has drawn on most of the current streams of clinical, scientific, and philosophical thought, which is available in the Western world. Rogers argues that this approach is not to be viewed as static or as a rigid system, but that it should rather be seen as "one of fluid changes in a general approach to problems of human relationships, rather than a situation in which some relatively rigid technique is more or less mechanically applied" (1951, p 6).

Rogers (1951) developed his theory of personality and behaviour based on 19 propositions. This theory has developed out of observing changes in psychotherapy, which called for explanation and allowed for the development of hypotheses about future experiences. The first proposition which had evolved from this process is "Every individual exists in a continually changing world of experience of which he is the centre". The organism reacts to the field as it is experienced and as an organized whole. It has but one basic tendency, which is to actualize, maintain and enhance itself (Rogers, 1951). Behaviour is explained as being that goal-directed attempt of the individual or organism to satisfy its needs as experienced from interaction with the environment and especially as a result of the evaluation experienced. The structure of the Self is formed through this process. Rogers (1951) notes this as

"an organized, fluid, but consistent conceptual pattern of perceptions of characteristics and relationships of the 'I' or the 'me', together with the values attached to these concepts" (p 498).
Rogers (1951) suggests that most behaviour patterns are adopted because they are consistent with the individual's concept of the Self. Where he denies significant sensory and/or visceral experiences as part of the Self, a psychological maladjustment develops. Such inconsistent experiences would generally be regarded as a threat. Under certain circumstances or conditions whereby the individual perceives the experience to be of no threat to the Self structure, these experiences will be re-examined and possibly assimilated into the Self. When this happens, the individual becomes more understanding and more accepting of others as individuals in their own right.

Rogers (in Maddi, 1989) indicates that the tendency of self-actualization is the pressure on the individual to behave, develop, and experience himself in a manner which is consistent with his own conscious view of what he is. From this tendency it was theorized that humans have a need for both positive regard and positive self-regard. The former is explained by the individual's satisfaction in receiving approval from others and frustration at receiving disapproval. The latter is seen as the internalized version of the positive regard, in that it refers to personal satisfaction at receiving approval, and dissatisfaction at receiving disapproval of oneself. Through this process the individual develops a conscious sense of who he is, called Self concept.

Rogers (1961, in Maddi, 1989) stresses that while these inherent potentialities are genetically determined, a person's self
concept is very much socially determined. Discrepancies may exist between these core characteristics when society has failed the individual, but this need not necessarily be the case as society is not inevitably antagonistic towards the person. He calls the nature of societies' failure, conditional positive regard. Here only some of the person's actions, thoughts, and feelings receive approval. The self concept that develops, will only be seen in context with those actions which received approval. The self concept is then based on conditions of worth, namely, standards for discerning what is valuable about oneself, and that which is not. Once these conditions of worth have been established certain thoughts, feelings, and actions which the individual has, will now result in guilt and in turn will result in a process of defence. Two general kinds of defence mechanisms were postulated by Rogers: denial and distortion.

For a broader and deeper Self-concept to develop, the individual is required to grow up in an atmosphere of unconditional positive regard, where there are no conditions of worth and no defence processes. Flexibility and openness to new experiences (which are constantly incorporated into the Self-concept) create a state of congruence in which the individual can embrace more or less all of his potentialities.

As indicated in section 2.2.2., Jung's approach to Self focuses on individuation, wholeness and integration of the total personality, including physiological, psychological and spiritual dimensions. Roger's approach to Self or Self concept (2.2.3.) focuses on social determinants. A healthy self concept develops
when meaningful others provide unconditional positive regard to
the individual, which corresponds to a realistic positive
self-regard. The relevance of these theoretical approaches to
self-concept in sport and the possible influence of self-concept
on sport achievement can only be surmised. It is possible that in
Jungian terms, the most successful athlete is the person with the
most integrated personality at physiological, psychological and
spiritual levels. In Rogerian terms the successful athlete is
possibly the person with belief in himself, based on realistic
external and internal expectations. These theories have not been
empirically tested in a sporting milieu and could provide
interesting future research possibilities. Much more relevant to
the present study is Vealey’s view of self-confidence in sport.
This approach is discussed in section 2.2.4.

2.2.4. Vealey’s model of sport confidence

Vealey (1986) notes that in the past, sport psychologists have
used three approaches in their study of self-confidence in sport:
Bandura’s Self-Efficacy Theory; the Conceptual Models of
Perceived Competence developed by Harter and Nicholls; and the
use of expectancies to operationalize self-confidence. Hence, for
Vealey (1986), it seemed appropriate to develop a model of self
confidence which is based on the interactional paradigm, is sport
specific, distinguishes between personality traits and states,
and recognizes the reciprocity of individual differences and
behaviour. Sport confidence was defined as: "the belief or degree
of certainty individuals possess about their ability to be
successful in sport" (Vealey, 1986, p 222).
Vealey's model, as illustrated below, is based on the trait-state distinction. Sport confidence was separated into two constructs namely Trait Sport-confidence (SC-trait) which is regarded as the dispositional construct and a state construct termed state Sport-confidence (SC-state). The former is explained as the belief or degree of certainty the individual usually has regarding his ability to be successful in his sport. For Self confidence to be conceived as a state, the time reference is altered to "right now". Therefore SC-state is defined as the individual's belief or degree of certainty about his ability to be successful in his sport at one moment in time.

The model of Sport confidence, as illustrated in Figure 2.6., is based on the interactional paradigm in which SC-trait and competitive orientation interact with the objective sport situation to produce SC-state. The reciprocal relationship between sport confidence, competitive orientation and behaviour is noted in the model by the Subjective Outcome construct. This construct is predicted to influence and to be influenced by both SC-trait and competitive orientation. Positive subjective outcomes such as perceptions of success, feelings of competence, pride, and satisfaction are expected to enhance the SC-trait. The negative subjective outcomes such as perceptions of failure, feelings of inadequacy, shame, and dissatisfaction are expected to undermine the SC-trait by making the individual uncertain as to his ability to be able to succeed in his particular sport.
2.2.5. Conclusion

The literature on the Self is immensely vast, as each theorist has incorporated a section of his theory to an explanation of the development of the Self. Three theories were overviewed in the above section, the Archetypal theory of Jung and Roger's theory of the Self were briefly overviewed to provide a theoretical basis for the concept. The Sport specific theory of Vealey, although not well known, provides a possible explanation as to how the various theories of Self can be applied to the competitive process.

2.3. Sensation Seeking
2.3.1. Orientation

Zuckerman (1979) defined sensation seeking as "a trait defined by the need for varied, novel, and complex sensations and experiences and the willingness to take physical and social risks for the sake of such experiences" (p 10).

He justifies his use of the word "sensation" rather than "stimulation" because of the importance of the sensory effect of the experience which acts as the primary reinforcement. The term is also expressed in an active mode via the use of the seeker, as the individual is rarely the victim of lack of opportunity. Zuckerman also differentiates sensation seeking on the basis of trait and state, the former being referred to as the tendency to seek novel and stimulating situations and exploring them. State is defined as "the arousal of an affect or motive at a particular point in time or for a delimited period of time" (Zuckerman, 1979, p 14).

The high sensation seeker is seen as someone who is oriented towards bodily sensations, is extraverted, thrill-seeking, active, impulsive, antisocial or nonconformist, and low in anxiety. He may be seen as eccentric but is less likely to be psychiatrically disturbed than the low sensation seeker (Zuckerman & Link, 1968). Added to this the high sensation seeker is more likely to volunteer for activities or experiments which may include meditation training, sensory deprivation and hypnosis. The high sensation seeker will be more eager if the
experiment offers new kinds of internal sensations rather than external ones (Zuckerman, 1985).

2.3.2. Neurological bases of Sensation Seeking

Zuckerman formulated his first theory in 1969, attempting to apply Donald O. Hebb's theory of optimal levels of arousal, to explain the results obtained from sensory deprivation experiments (Zubek, 1969, in Zuckerman, Buchsbaum and Murphy, 1980). One of the postulates of the theory hypothesizes that each individual has characteristic optimal levels of stimulation (OLS) and arousal (OLA), used for cognitive and motor activity, and for positive affective tone. Based on this postulate, a questionnaire, the Sensation Seeking Scale (SSS), was constructed.

Zuckerman, Murtaugh and Siegel (1974, in Zuckerman, 1979) followed Eysenck's example by suggesting that not only extraversion but also sensation seeking was dependant on the cortico-recticular feedback arousal system. This first theory linked the trait of sensation seeking to the evolution of the neocortex.

"While the site of the other primary drives may lie in the limbic system, the site of the sensation seeking motive is postulated to be the cortex, and its source is the optimal level of arousal"

(Zuckerman, 1979, p 356).

As the theory developed, Zuckerman realised that the arousal
theories had total lack of specificity and that factor analyses of subjective emotional reactions differentiates between fear arousal, anger arousal and positive feeling arousal. Such distinction needed incorporation into the sensation seeking theory, as sensation seeking individuals generally seek pleasurable arousal. Although danger and fear may be an element in the risks that they undertake, Zuckerman did not believe that this fear arousal was the starting point for their actions. In support of this hypothesis that positive and fear arousal are different, Routtenberg's (1968, in Zuckerman, 1979) theory postulates that there are two arousal systems in the brain which maintain the ongoing behaviour. The first is the reticular activating system (RAS), and the second is the reward system of the limbic area.

The limbic reward system involves the lateral septal area, the medial forebrain bundle (MFB), the lateral hypothalamus, and parts of the amygdala and hippocampus (Olds and Milner, 1954, in Zuckerman, 1979). It was Gray (1973, in Zuckerman, 1979) who suggested that the orbital frontal cortex, medial septal area, and hippocampus formed part of the negative feedback circuit according to Routtenberg's second arousal system (Zuckerman, 1979).

2.3.3. Sensation Seeking and Neurotransmitters

The current model of sensation seeking goes beyond the "optimal level of arousal", in an attempt to incorporate the various neurochemical correlates of sensation seeking that have been
discovered in the past 10 years (Zuckerman, 1985).

Stein (1978, in Zuckerman, 1979) hypothesizes that dopamine circuits provide the general approach incentive, and that the norepinephrine (NE) pathways control the expectancies of positive reinforcement. When sensation seeking is in its active form, it depends on both of these systems. While the high levels of dopamine would result in both high activity and a tendency to explore new situations, the high levels of norepinephrine (NE) provides the motivation for taking those physical and social risks, due to the expected positive reinforcement from persons and/or situations. Zuckerman points out that a special alertness and responsiveness to novel stimuli which has resulted from the high levels of activity in the reward systems affecting the cortex, is related to the trait of sensory curiosity which is different from cognitive curiosity. Serotonin possibly causes the suppression of cortical reactivity to high-intensity stimulation (Lukas and Siegel, 1977, in Zuckerman, 1979).

Zuckerman (1979) synthesizes the various biological correlations of sensation seeking as follows:

"All these characteristics of the CNS of sensation seekers may predispose them to seek the particular phenomenal expression of the trait that are provided by a particular culture. Conversely, the low sensation seekers will 'burrow into' whatever forms of security and stability are provided by the social order. Since most social structures are built on impulse inhibition, there are usually more opportunities for low-sensation
seekers to find a satisfactory way of life than there are for highs" (p 375).

2.3.4. Behavioural correlations of Sensation Seeking

Having looked at Zuckerman's theory and a brief description of what a sensation seeker is, some behavioural correlations of sensation seeking will be presented. Zuckerman, Buchsbaum and Murphy (1980) provide a summary of some of the findings from studies carried out on sensation seekers. In a study using college students as subjects, it was shown that high sensation seekers of both sexes engage in a greater variety of heterosexual activities and with more partners, than do the low sensation seekers (Zuckerman et. al., 1972, in Zuckerman et. al., 1980). In viewing the drug use amongst a college population, sensation seeking correlated with multidrug usage, but particularly the use of marijuana, hashish, amphetamines, and LSD (Zuckerman et. al., 1980). Although alcohol showed a more restricted pattern amongst the college students, high SS were more likely to score high on the Disinhibition Scale of the SSS (Zuckerman et. al., 1972, in Zuckerman et. al., 1980). Zuckerman and various authors (Zuckerman et. al., 1980) showed that cigarette smoking is related to sensation seeking. As mentioned earlier, high sensation seekers are more likely to volunteer for experiments and studies in sensory deprivation, hypnosis and drug studies. They were not interested if the studies involved learning or sleeping (Zuckerman et. al., 1980).

Most relevant to the present study is research on the sport
activities of sensation seekers. High sensation seekers show a
greater interest in sport which includes an element of danger
such as parachuting, motorcycle riding, scuba salvage diving, or
fire fighting than low sensation seekers. The low sensation
seekers appeared to show a phobic reaction to mildly threatening
situations or stimuli, such as snakes, heights or darkness
(Zuckerman et. al., 1980).

The SSS Form IV, showed significantly higher scores on all
subscales and especially on the Disinhibition (Dis) scale for
males than for females (Zuckerman et. al., 1978). Later studies
using the new SSS Form V in both England and America, also showed
sex differences in sensation seeking. Sensation seeking is
negatively correlated with age (Zuckerman et. al., 1978).

2.3.5. Conclusion

Sensation seeking has proved to be a robust temperament trait
with firmly established neurological and behavioural correlates.
The trait is indicated in athletes who seek participation in
sport which generally regarded as dangerous. Traditionally
competitive swimming is not usually described as risk taking
behaviour. However, the arousal that is experienced during
championships and Olympic participation could be viewed as
sensation seeking. It is therefore a reasonable hypotheses that
swimmers for whom success is important, are sensation seekers.

In recent years, there has been a movement towards integration of
Western and Soviet approaches to temperament. Extraverts and
sensation seekers are often described as having "strong" nervous systems. This latter school of thought is described in section 2.4.

2.4. Nervous System Types

2.4.1. Orientation

Pavlov's research on nervous system types was based on his concept on "neivism", according to which any behaviour was governed by the Central Nervous System (CNS) (Strelau, 1983b). In researching the properties of the Nervous System (NS), Pavlov noted the strength of the nervous processes of excitation and inhibition, and the equilibrium between these two properties. In the 1930's the idea of mobility of nervous system processes was added. The primary property of strength of excitation refers to the work capacity of cortical cells. Strength of inhibition plays a secondary role. Little information was provided in Pavlov's publications as to its meaning. Mobility refers to "the rapidity with which one excitation would give way to the next, in response to changing environmental conditions" (Strelau & Gorynska, 1979, p 200). Teplov (1956, in Strelau & Gorynska, 1979) saw mobility of the nervous processes as a term which comprises all properties of the nervous system pertaining to speed, rate or time.

Strelau (1983b) mentions that his own work on temperament was greatly influenced by Pavlov. After 12 years of researching under the Teplov-Nebylitsyn School, Strelau moved away from the
Pavlovian thinking for four reasons: (1) The nervous system properties, though treated as the physiological bases of temperament, are in fact explanatory notions. (2) Strelau, wished to develop a psychological concept of temperament founded on the core of human behaviour while Pavlov's typology should be seen as physiological concepts. (3) Pavlov's concept that the type of Nervous System is equated with temperament in humans and is thus a genotype, is criticised by the evidence suggesting the environment can influence any psychological and physiological human trait, including various temperament dimensions. (4) Strelau wished to develop a theory of temperament, which incorporated several relations that exist between temperament and other psychological dimensions (Strelau, 1983b).

2.4.2. Temperament versus Personality

Strelau (1983a) provides a useful differentiation between personality and temperament. He views personality as a product of socio-historical conditions whereas temperament is seen as a result of biological evolution. Temperament is peculiar to both animals and people, while personality is specifically a human aspect. Temperament is founded on innate anatomical-physiological structures; personality depends on activity between humans and their social environment. Temperament includes formal behavioural traits which are manifested in all reactions and actions despite content, while personality provides primarily for the content of behaviour. Lastly, personality can be evaluated by comparison with moral values and standards, temperament is not subject to evaluation (Strelau, 1983a and 1983b).
2.4.3. Strelau's concept of Nervous System Types

According to Strelau (1983a, 1983b) two basic temperament features are distinguishable namely behavioural energy levels and reaction time characteristics. The property of behavioural energy level, is responsible for the energy level of the organism, specifically for the accumulation and release of stored energy (Strelau, 1974). This physiological concept of the energy level of behaviour, is very much at the centre of Strelau's theory of nervous system types. The physiological mechanisms involved are the endocrine system, autonomic nervous system, nervous systems in the brain stem, and the neocortex which are collectively responsible for the accumulation, release and transmission of energy in the brain (Strelau, 1983b). In relation to this energy level, two temperament features are identified, namely Reactivity and Activity.

2.4.3.1. Behavioural Energy Levels

2.4.3.1.1. Reactivity

Reactivity is defined as

"a property responsible for a relatively stable intensity of response to stimuli; this is estimated on a comparative basis, comparing each individual against a data set derived from a group, expressing the magnitude of the individual's response in relation to
According to the law of strength, the magnitude of the reaction is a function of the strength of the stimulus and is manifested as a dimension of sensitivity. The concept of reactivity can be seen as identical to the concept of nervous system strength (NSS) (Strelau, 1974). The latter term has been replaced by the concept of reactivity for various reasons. Strelau sought a concept of temperament emphasising behavioural aspects while NSS and especially the strength of nervous processes, excitation and inhibition, are physiological concepts. Secondly the physiological mechanism behind the NSS concept is limited to the cortex while Strelau has explained reactivity as involving several subsystems. Thirdly, the concept of the strength of excitation processes which has been used to characterise NSS is ambiguous and a source of misunderstanding. Lastly, the concept of NSS, mobility and equilibrium of nervous processes are heavily burdened in typological tradition of Pavlov's work. Strelau felt that since Pavlov's theory cannot be verified, such a stand would be unproductive (Strelau, 1974; 1969).

2.4.3.1.2. Activity

Activity, the second behavioural energy factor, is "conceived as a property determining the amount and range of actions undertaken which have a given stimulatory value. Individual differences in activity are relatively constant" (Strelau, 1983b, p 307). Individuals vary in the frequency and the intensity of actions
they engage in (Strelau, 1974). The trait is based on D.O. Hebb's 1965 theory of optimal level of activation (Strelau, 1974). According to Hebb's theory, the individual supplies himself with stimulation until he attains an optimal level of arousal. Should this level be exceeded, the individual begins to act to reduce the arousal back to the optimal level. The stimulation mentioned can be any type of situation, task, surroundings, or changes either inside or outside of the individual, which evokes excitation (Strelau, 1974). Eliasz (1974, in Strelau, 1983b) argued that the optimal level of activation, like reactivity, forms a part within the whole system of the regulation of stimulation. He suggested that individuals in the same situation and under equal psychological conditions, differ in the amount of stimulation needed to maintain their specific optimal level of activation. Reactive individuals are equipped with a physiological mechanism which reinforces stimulation and hence they have a lower need for activity to maintain their optimal level of arousal. Low reactive individuals are equipped with suppression mechanisms and typically have a greater need for activity (Strelau, 1983a).

2.4.3.2. Temporal features of Temperament

The Temporal features of behaviour characterise the temporal course of reactions. Five traits have been distinguished by Strelau; speed of reaction, mobility, durability of reaction, tempo, and rhythmicity (Strelau, 1974; 1983b).

The first, speed of reaction, is traditionally measured as
reaction time. Most of this work has been conducted by Soviet psychologists (see for example Teplov 1961; Nebylitsyn 1966). The second, mobility, is described as the mobility to shift from one activity to another. This trait is also known as elasticity or plasticity, which is "measured by the smallest interval of time between two different kinds of stimuli required for an adequate response to those stimuli" (Strelau, 1974, p 125). Strelau notes that the converse of elasticity is inertia, which is the inability to react to the rapidly changing situations. This mobility is different from the term used by Pavlov and Teplov.

The third temporal feature is that of durability of reaction, which is measured as the continuation or preservation of a response after the stimulus has ended. In other words, it is the continuance of a given activity after the conditions which evoked it and the need for the activity have been removed. The fourth feature is reaction tempo which is defined as the number of homogenous reactions or movements per time unit. The reaction can be for example, the maximum number of words within a time unit. This trait, together with rhythmicity, formed part of Kretschmer's (1944, in Strelau, 1983b) general concept of mental tempo. Rhythmicity is characterised by the regularity of intervals between the homogenous reactions. Hence, the more regular the intervals, the greater the rhythmicity (Strelau, 1983b; 1974).

Strelau and his co-workers have published a number of articles in which research on the behavioural correlates of energy levels and temporal features of behaviour are reported. These are briefly discussed in 2.4.4.
2.4.4.4. Behavioural correlates of nervous systems types

2.4.4.1. Activity styles of high and low reactives

Style of action develops under environmental influences on the basis of the temperament endowment. Strelau (1975; 1983b) proposed that an individual's activity style can be subdivided into basic and auxiliary actions. The former allows the individual direct goal attainment. The latter affects the course of the former by creating the favourable conditions for their attainment. Strelau showed that low reactive individuals are dominated by basic actions whereas high reactive individuals are dominated by auxiliary actions (1975; 1983b).

2.4.4.2. Temporal features of high and low reactives

High reactive persons have been shown to have low endurance, they are susceptible to fatigue and organize their days to allow for rest periods. This was found to hold true in the study on taxi drivers and foundrymen (Strelau, 1975). No relationship could be demonstrated between reactivity and work efficacy. However high reactive persons do have a predominance of interrupted actions over continued actions. On the other hand, low reactive persons appear to have an equilibrium between the two kinds of actions or due to their high endurance, continued actions may even predominate (Strelau, 1983b).

2.4.4.3. Behavioural strategies of high and low reactives
Przymuninski and Strelau (1986) examined individual strategies of behaviour pertaining to reactivity and activity. In accordance with the theory, high reactive individuals should be inclined to develop unstimulating strategies of behaviour while the opposite would be true for low reactive individuals. In relation to this, it is hypothesized that risky situations evoke emotional tension and that high reactive individuals would avoid such situations. Przymuninski and Strelau (1986) hypothesized that those individuals who prefer risk over probability in decision making situations, (ie. risk-takers), would be characterized by temperament traits preferring high stimulation demand. The risk-avoiders, individuals preferring probability over risk, would have temperament traits which express a lower need of stimulation. Some evidence was found in the study which indicated that there was a dominance of risk-avoiders in both the high-reactive and high-neurotic groups.

2.4.5. Conclusion

In terms of the relevance of the Soviet-Polish school of thought on temperament for sport, research has indicated that:

a. High reactives suffer from fatigue more quickly than low reactives (Strelau, 1975).

b. Low reactives have greater perseverance than high reactives and thus succeed in practicing for long periods of time (Strelau, 1975).

c. High reactives are slower at decision making under conditions of stress and the quality of the decisions are lower than that of low reactives. Stressful
situations include time limits and social threats (Strelau, 1983a).

d. Low reactives improve their performance more quickly under highly competitive situations than high reactives (Strelau, 1983a).

e. High reactives often do not participate in any sport. High reactives prefer dangerous or risky sports (Strelau, 1983).

2.5. Introversion-Extraversion

The temperament trait of introversion-extraversion is relevant to the present study. A number of theoretical approaches to this dimension exist (for example those of Jung, Eysenck, Gray and Zuckerman). One of the most comprehensive is that of Eysenck. This approach will suffice for the present study, explaining the theoretical background to introversion-extraversion.

2.5.1. Introduction

Eysenck (1947) defined personality as the sum total of the actual or potential behaviour-patterns of the organism or individual, which is determined by both environment and heredity. It develops through four main sectors, into which these behavioural patterns are organised, namely the cognitive sector (intelligence), the conative sector (character), the affective sector (temperament) and the somatic sector (constitution).
Eysenck’s theory is based on a trait-type approach to personality. Eysenck and Eysenck (1985) note that "type" in modern personality theory refers to a concept superordinate to that of the trait. Traits are seen as intercorrelated and these intercorrelations give rise to "type". Thus types such as Extraversion-Introversion and Neuroticism-Stability consist of numerous traits that have been found to be correlated and which gave rise to a higher order concept.

Since his first observations whilst working in Mill Hill Emergency Hospital between 1942 and 1946, Eysenck has theoretically developed three personality dimensions: extraversion, neuroticism, and psychoticism. As noted by Wilson (1978) the three personality dimensions are to be seen as independent from one another and are believed to provide a good summary of all the varieties of both normal and abnormal behaviour in individuals. Only introversion-extraversion will be viewed in this study.

2.5.2. Extraverted versus Introverted Behaviour

The typical extravert is defined as sociable, likes parties, has many friends, needs people to talk to and does not like reading or studying by himself. He craves excitement, takes chances, often sticks his neck out, acts on the spur of the moment, and is generally impulsive. The extravert is also carefree, easy going, optimistic, tends to be aggressive and loses his temper quickly, and is not regarded as a reliable person (Mischel, 1986; Wilson, 1978). Mischel provides a definition for the introvert, who on
the other hand, is a quiet, retiring sort of person, introspective, fond of books rather than people, is reserved and distant except with a few intimate friends. He often plans ahead, 'looks before he leaps', mistrusts the impulse of the moment, and likes a well ordered mode of life. He keeps his feelings under control, does not loose his temper, is reliable, pessimistic, and places great value on ethical standards. This long list can be summed up as the extravert being characterised by sociability, friendliness, enjoyment of excitement, impulsiveness, cheerfulness, activity and spontaneity while the introvert is aloof and inhibited (Kline, 1981).

2.5.3. Eysenck's 1957 and 1967 Theories

Eysenck has lead much of the research on personality and is one of the best known British psychologists. He has over the years developed two theories. His 1957 theory refers to physiological processes without implicating any specific part of the physiological system. His later theory, 1967, went one step further and specifies actual physiological processes. The 1957 theory is often referred to as the Inhibition theory. As a result of evidence that this theory was inadequate in some respects, Eysenck (1976a) suggested a modified theoretical conceptualization. This is referred to as the arousal theory (Eysenck & Eysenck, 1985). Both of these theories will be viewed briefly.

2.5.3.1. Inhibition Theory
The inhibition theory provides a theoretical understanding of the differences between introverts and extraverts. The general relationship between personality and inhibition was put forward by Eysenck in two different postulates. The first of these was known as the postulate of individual differences and stated the following:

"Human beings differ with respect to the speed with which excitation and inhibition are produced, the strength of the excitation and inhibition produced and the speed with which inhibition is dissipated. These differences are properties of the physical structures involved in making stimulus-response connections"

(Eysenck, 1967, p 79).

The second postulate is known as the typological postulate and provides an explanation of extraversion which is contained in the following:

"Individuals in whom excitatory potentials is generated slowly and in whom excitatory potentials so generated are relatively weak, are thereby predisposed to develop extraverted patterns of behaviour and to develop hysterical-psychopathic disorders in cases of neurotic breakdown; individuals in whom excitatory potential is generated quickly and in whom excitatory potentials so generated are strong, are thereby predisposed to develop introverted patterns of behaviour and to develop dysthymic disorders in case of neurotic breakdown. Similarly, individuals in whom reactive inhibition is developed quickly, in whom strong
reactive inhibitions are generated, and in whom reactive inhibition is dissipated slowly, are thereby predisposed to develop extraverted patterns of behaviour and to develop hysterical-psychopathic disorders in cases of neurotic breakdown; conversely, individuals in whom reactive inhibition is developed slowly, in whom weak reactive inhibitions are generated, and in whom reactive inhibition is dissipated quickly, are thereby predisposed to develop introverted patterns of behaviour and to develop dysthymic disorders in case of neurotic breakdown".

(Eysenck & Eysenck, 1985, p 193).

Eysenck (1967) notes that there are four aspects that need to be pointed out with regard to the postulates which form part of his 1957 theory. The first is that they bear some superficial similarity to those concepts put forward by Pavlov. Secondly he accepts that he refers to an excitation-inhibition balance and that ideally he would like to measure each excitation and inhibition's potential separately. The third point is that the scientific status of the concepts are suspect because they do not have any specific physiological structure. Lastly, it was Eysenck's intention to identify a particular concept in the experimental field. The concept in both the experimental and theoretical psychology which corresponds to the personality dimension of Introversion-Extraversion, was discovered to be fatigue.

The balance between Introversion and Extraversion, is a
unidimensional construct. Individuals who generate excitatory potentials with difficulty can generate inhibitory potentials with ease and vice versa. Hence it is often easy then to view the behavioural differences between introversion and extraversion by either the greater inhibition or the greater excitation (Eysenck & Eysenck, 1985). They stress that the inhibition referred to here, is a central process, with unknown physiological origin, and not to be confused with the inhibition of behaviour. In relation to the latter term, it was Eysenck’s notion that activity sustained for long periods would result in mental fatigue. Should it accumulate to a high level, it results in a block or an involuntary rest period or pause in the performance of the individual involved, allowing for some dissipation to occur. It was predicted that extraverts will be subject to this type of satiation and would thus have more frequent and longer rest periods, than the introverts (Eysenck, 1967).

Problematic with this 1957 Inhibition theory was that empirical evidence did not support the theory’s principles. Eysenck and Eysenck (1985) note that under controlled laboratory experiments, no manipulation of the excitation-inhibition balance was possible.

2.5.3.2. Arousal Theory

Eysenck’s 1967 Arousal theory developed out of the previous theory’s inability to integrate the research findings. The new theory was also able to specify physiological systems underlying the individual differences in both extraversion and neuroticism.
The basic physiological assumptions of the arousal theory is that if parts of the ascending reticular activating system (ARAS) are electrically stimulated, the ARAS elicits a general activation pattern in the cortical EEG. "What happens is that collaterals from the ascending sensory pathways produce activity in the ARAS, which subsequently relays the excitation to numerous sites in the cerebral cortex" (Eysenck & Eysenck, 1985, p 197). The visceral brain (limbic system), which is interconnected with the ARAS, is physiologically founded in the hippocampus, amygdala, cingulum, septum, and hypothalamus and is largely concerned with emotions (neuroticism). Cortical arousal can be produced by activity in the limbic system, which reaches the reticular formation via the collaterals. Such activity produces autonomic arousal which Eysenck referred to as activation.

According to Eysenck's arousal theory, the extraversion dimension is identified mainly by the differences in the levels of activity in the cortical-coreticular loop. The introverts, who are characterized by higher levels of activity than extraverts, are more chronically cortically aroused than the extraverts. Eysenck and Eysenck (1985) stress that this approach is an extension of the inhibition theory rather than a new approach. While the inhibition theory describes introverts as having high excitation and low inhibition, the arousal theory describes them as having high arousal levels. The opposite holds true for extraverts.

2.5.4. Conclusion

Eysenck is one of the most prolific authors in psychology to
date. His research and theories on Introversion-Extraversion, Neuroticism and Psychoticism is well documented and known. Only the first of the three traits of personality, namely introversion-extraversion, is of relevance in the present study. The above section provides a definition of the trait and shows the evolvement of the theory as more research was obtained and uncovered. This is viewed as the 1957 and 1967 theories. As with the theory of Sensation seeking, Introversion-Extraversion has a specific biological foundation. The possible relevance of this trait in the attainment of success in sport is not clearly explicated in the literature. However, Eysenck (1985) states that fatigue is more prevalent in the extraverted and it is thus reasonable to hypothesize, strong introverted characteristics in successful athletes.

2.6. Chapter Summary

The above chapter has dealt with the five theories relevant to this particular research investigation.

Firstly the chapter introduced a "new" theory to South Africa, namely that of Martens' Competitive Anxiety. Much literature exists concerning the manifestations and the biological foundations of anxiety. This body of literature mostly concerns the general everyday manifestations of anxiety. The anxiety experienced in sport and the competitive situation is caused by different stimuli, and these are investigated by Martens. It is a reasonable assumption that the anxiety experienced in competitive
circumstances is a manifestation of the sportsmen's or women's self concept and the confidence which they have in themselves and their ability. The chapter hence continued with the explanation of two classical Self theories namely those of Jung and Rogers. This is followed by the theory of Self-Confidence developed by Vealey, which is sport specific. The Self which the sports person develops, is specific to the sporting environment and involves the positive or negative reinforcement which he or she receives from the competitive situation. Such concepts are incorporated into Vealey's model.

Three other temperament traits were investigated in this study. The theories of Sensation seeking, Nervous system types and Introversion-Extraversion are specifically biological based temperament traits. These theories appear more concerned with reasons why certain people compete in a particular sport, whereas Anxiety and the Self concept can be regarded as products of the competitive process.

The possible relevance of these traits to success in sport was discussed. To be successful one expects that the sports person's anxiety level will be low, and his self concept will be high. Due to the nature of the sport, swimmers will be expected to be low in sensation seeking, high in nervous system strength, and more introverted.

The following chapter presents an overview of general research in sport psychology, which investigates the personality profile of world class athletes, literature on the personality differences
between male and female athletes, sport participants and nonparticipants, international versus local studies and the role of certain temperament traits in sport.
Research on Temperament Within Various Sports

"We know there are athletes in any given sport who perform brilliantly even while exhibiting less inherent talent or physical capability than other competitors. Such people overcome their inadequacies with drive, persistence, determination, and other intangible psychological qualities. Conversely, some athletes have all the talent and the physical powers needed, but they do not always succeed." (Morgan, 1980, p 93).

This chapter investigates research in sport personality psychology within the broad spectrum of personality and temperament traits. The "Iceberg Profile" is viewed as a starting point because it presents a possible ideal personality for a sportsman or woman. This is followed by various research articles covering different topics including comparisons between athletes and nonathletes. Recent literature concerning studies on sport and personality is then presented within the South Africa context. Most studies over the past decades have concentrated on sportsmen, hence the following section deals with research
specific to women. The chapter concludes with sections concerning literature on specific personality and temperament traits in the sporting milieu, namely that of sensation seeking and self concept.

3.1. The "Iceberg Profile"

According to Morgan (1980) the successful athlete or sportsperson possesses superior mental and emotional health. By this the author means that the elite sportsmen and -women display fewer signs of psychopathology and lower levels of anxiety, neuroticism, and depression when compared to less successful athletes and to the general population.

Morgan (1980) has administered many standard tests such as the Minnesota Multiphasic Personality Inventory (MMPI), the Eysenck Personality Inventory, the Somatic Perception Questionnaire etc., to sportspeople. These are all tests in which the respondents rate their own traits or moods on various scales. He has found that the Profile of Mood States (POMS) was the best predictor of athletic success.

Working as a consultant to the U.S. Olympic Wrestling Teams in 1972 and 1976, and using the POMS, Morgan developed an athletic personality profile which has subsequently become known as the "Iceberg Profile". Morgan tested 56 candidates for the 1976 Olympic team. As can be seen in Figure 3.1., the eight candidates who did not make the team displayed a profile close to the
average test score of 50 for the general population, whilst differing significantly from those wrestlers who were selected.

Figure 3.1. The profile of wrestlers who made the Olympic team

Morgan (1980) highlights that the successful wrestlers consistently scored below the average on tension, depression, fatigue, and confusion, while well above the average on the vigour variable. This constellation of traits became known as the "Iceberg Profile" because of its appearance, with most of the scores bulking below the average or "water surface", and only the one score jutting well above the surface.

Morgan used this information when invited to help select the U.S. National Heavyweight Rowing crew in 1974. He was allowed to test the candidates in the training camp but only with the understanding that it would not be used in selection. Looking for
the profile found before, Morgan and his colleagues compared their predictions based on the POMS scores, to the actual team selected and found that they had successfully identified 10 of the 16 finalists and 30 of those who had been left out of the team. This represented a success rate of 70%. Two years later, he achieved similar results in the study of possible candidates for the 1976 U.S. Olympic Rowing Team.

In a third investigation in 1974, Morgan used the POMS on 24 of the country's top marathon and middle-distance runners. Again the author indicated that the elite runners, like the wrestlers and rowers, generally scored "below the surface" on the tension, depression, fatigue, and confusion variables, but significantly differed with an above the surface score on the vigour variable. The success rate regarding selection of the athletes was 90%.

Figure 3.2. shows a comparison between the POMS mean scores for the world-class athletes in three sports: 24 top marathon and mile runners tested in 1974; the 9 members of the 1972 U.S. Olympic Wrestling team; and the 16 oarsmen of the 1974 U.S Heavyweight Rowing team. All three sports groups show the "Iceberg Profile".

Figure 3.2. is presented on the following page.

Morgan (1980) warns against complacency when using psychometric tests:

"Nevertheless, I still do not feel that POMS or any other psychological test should be used alone for
selection purposes. Many of the athletes in our studies have not had classic iceberg profiles and yet have earned berths on Olympic teams. Some have been anxious, confused, and mentally fatigued - with inverted iceberg profiles. Yet, somehow, their physiological assets have been great enough to overcome their psychological characteristics."

(Morgan, 1980, p 102).

Figure 3.2. The "Iceberg Profile".

Morgan (1980) stresses that the most valuable use for psychological profiles would be in training. He feels that by testing athletes at regular periods during their training would allow the psychologist to spot mood swings that could signal a level of anxiety or depression in the athlete that could impair his or her performance, and hence require counselling or psychotherapy. Morgan notes that the most common problem encountered in athletes is staleness, which may be the result of
overtraining or holding a peak level of performance for too long a period of time. Regular testing would allow this condition or situation to be easily identified at the earliest convenience whilst still in the warning stages.

3.2. Research studies related to temperament and various sport activities

Research articles presented under each of the subsections, are organized according to dates of publication.

3.2.1. International Studies

La Place (1954) compared 49 major league players to 64 minor league players using the Minnesota Multiphasic Personality Inventory (MMPI) and a biographical data sheet. The former group was classified as the "success" group while the latter was the "non-success" group. The findings indicated that major league players have a strong "drive" which is expressed as ambitiousness, aggressiveness, and vigorousness — those characteristics believed to be necessary to attain success. It was also found that the major league players were more successful in getting along with other people, since their occupation was dependant on team work and having team harmony. The success group were more prone to worry, while also being more sensitive. La Place (1954) found that some minor league players possessed a similar strong "drive" but due to the lack of self-discipline, were unable to adjust to occupations requiring initiative and
social contact and hence had not been able to achieve the same success as the major league players.

Booth (1958) administered the Minnesota Multiphasic Personality Inventory (MMPI) to a group of college students with the intention of comparing various groups of subjects: (1) freshman and upper-class athletes versus nonathletes; (2) freshman and university athletes who participated in only team athletics, versus only individually, versus team as well as individual sports; (3) athletes who were rated as poor versus good competitors. The subjects, all male, were enrolled at Grinnell College during the academic year of 1955-56.

In summarizing the conclusions, Booth (1958) notes nine findings. 1) Nonathletes scored significantly higher on the interest variable than the athletes, while university athletes scored significantly lower than all freshman athletes, freshman nonathletes and upper-class nonathletes on the anxiety subtest. 3) On dominance, both university athletes and upper class nonathletes scored significantly higher than the freshman athletes and nonathletes. 4) The upper-class nonathletes scored significantly higher on social responsibility in comparison to the freshman athletes and nonathletes, and the university athletes. 5) No significant differences manifested in the comparison of mean scores for any of the variables of freshman participants in individual, team, and in individual-team sports. 6) University athletes in individual sports, scored significantly higher on depression than those in team sports. 7) The former group also scored higher than the group involved in individual-
team sports on depression and psychasthenia. 8) On dominance, both the good and poor university competitors scored significantly higher than the freshman poor competitors. 9) Lastly, of the 550 items of the MMPI, only 22 items discriminated significantly between poor and good competitors.

In summary Booth (1958) found personality differences between athletes and nonathletes, and between participants in individual sports, team sports and team-individual sports. Evidence was also provided which discriminated between poor and good competitors.

In comparing outstanding football athletes, non-outstanding football athletes, and nonathletes (n=30 per group) on the California Psychological Inventory (CPI), Berger and Littlefield (1969) were unable to find any significant differences. This was true for all 18 items of the CPI at the 0.01 level of significance. The authors noted that "because of the multitudinous factors affecting personality, which were not accounted for in this study, it is difficult to assess the effects of sport participation alone on personality" (pg. 665).

Brunner (1969) administered the Adjective Check List and a questionnaire to 60 adult male Caucasians. The sample was equally divided into participants (exercising regularly, at least three times a week) and nonparticipants (had spasmodic physical activity, exercising less than three times a week). The results indicated that the sport participants scored higher on 6 scales: Intraception, Number of Favourable Adjectives Checked, Defensiveness, Achievement, Dominance, and Self Confidence.
Brunner (1969) subsequently gave a description of the two groups. The participants were described as follows:

"He is reflective and serious, as would be expected; he is also capable, conscientious, and knowledgeable. His intellectual talents are excellent and he derives pleasure from their exercise. He is motivated by a strong desire to do well and to impress others, but always by virtue of hard work and conventional endeavour.

He is apt to be self-controlled and resolute in both attitudes and behavior, and insistent and even stubborn in seeking his objectives. His persistence is more admirable than attractive.

His motives are internal and goal-centered rather than competitive, and in his dealings with others he may actually be unduly trusting and optimistic.

He is a forceful, strong-willed, and persevering individual. He is confident of his ability to do what he wishes, and direct and forthright in his behavior.

He is assertive, affiliative, outgoing, persistent, an actionist. He wants to get things done, and is impatient with people or things standing in his way. He is concerned about creating a good impression, and is not above cutting a few corners to achieve this objective."

(Brunner, 1969, p 468).

Compared to the extraverted personality of the participant, the nonparticipant, who scored higher on Succorance and Counselling
Readiness, Brunner (1969) provided the following description:

He is trusting, guileless, and even naive in his faith in the integrity and benevolence of others. He is dependent on other, seeks support, and expects to find it. He is predominantly worried about himself and ambivalent about his status. He feels left out of things, unable to enjoy life to the full, and unduly anxious. He tends to be preoccupied with his problems and pessimistic about his ability to resolve them constructively.

(Brunner, 1969, p 468-9).

In conclusion Brunner (1969) found that the participants had more extraverted traits, and the nonparticipants more introverted traits. In addition to motivation for regular participation, the participants had the desire to keep physically fit and had the associated feeling of well-being. The nonparticipants reported time constraints due to business as their reasons for not having participated in exercise regularly.

In an unique study by Singer (1969), a comparison is made between two sports, namely baseball and tennis, and within the groups themselves. A sample of 69 athletes from Ohio State University completed the Edwards Personal Preference Schedule (EPPS). No distinction was found using a multiple discriminant analyses comparison. The author subsequently made a comparison using normative data. On achievement the tennis group scored significantly higher than both the baseball and norm group while
the norm and tennis groups in turn scored higher on intraception than the baseball group. On dominance, the tennis group again scored higher than the baseball group. The norm group scored significantly higher than the baseball group on autonomy while on abasement the baseball group attained higher scores. With reference to aggression the norm group scored lower than did the tennis group. Singer (1969) concludes that the study produced four variables which differentiated between the two groups. These were achievement, intraception, dominance and abasement, the first three favouring the tennis group and the last variable favouring the baseball group.

The data on within group comparisons of the tennis and baseball groups (Singer, 1969) are discussed in Chapter 4, section 4.2 (Successful versus unsuccessful sport participation).

Johnson (1972) investigated the personality traits of superior skilled women athletes involved in basketball (n=66), bowling (n=21), field hockey (n=79), and golf (n=24). The total sample completed the California Psychological Inventory (CPI), which consists of 18 subscales. The results showed that the basketball group scored lower than the three other groups on 12 variables (significant at the 0.05% level): dominance, capacity for status, sociability, social presence, self-acceptance, responsibility, self-control, tolerance, achievement via conformance, achievement via independence, intellectual efficiency, and psychological-mindedness. Using the Scheffe'-test, Johnson found that the bowlers, field hockey players, and golfers were more alike and hence these three sports groups were combined into one "sports
group”. The basketball players continually scored lower in most of the CPI scales. The basketball group was seen as inhibited, somewhat shy, with awkward social behaviour, and immature intellectual and social behaviour. No differences between the groups were found on the measurements of socialization, sense of well-being, good-impression, communality, flexibility, and femininity.

Morgan (1972, in Butt, 1987) tested the entire freshman class of the University of Wisconsin using the Minnesota Multiphasic Personality Inventory (MMPI). He and his colleagues then followed the athletes and sport participation of the students over the next four years. It was concluded that the athletes were generally more extraverted and vigorous. When compared to the general student population, the athletes had lower levels of tension, depression, and fatigue.

In a study at the Panjab University, a sample (n=25) was used for each of the four categories of sportsmen, nonsportsmen, sportswomen, and nonsportswomen. Using the Bell’s Adjustment Inventory, the groups were compared in terms of home, social, and emotional adjustment (Bhullar, 1974). It was found that nonsportswomen had better home adjustment than the sportswomen, while no differences were noted between the male groups. The sports groups, males as well as females, were more aggressive in their social adjustment compared to their nonsports counterparts. These latter two groups appeared to be more emotionally stable than the two athletic groups. The most notable difference was in health adjustment. As expected, both the sportsmen and the
sportswomen groups were better adjusted.

Dowd and Innes (1981), using Cattell's 16PF, collected data from 93 sportsmen and sportswomen involved in team and individual sports, volleyball and squash. The level of competition these athletes were involved in were at a state and average level. The authors found that the volleyball players were less shrewd, more forthright, and less anxious compared to the squash players. Dowd and Innes (1981) then examined the differences between sports only at the high level of competition, using the state players. Here, many more personality differences became apparent. The minor differences of forthrightness and anxiety became more prominent than in the total sample, while the volleyball or team players appeared more assertive, intelligent, controlled, venturesome,imaginative,stable, reserved, and less anxious. In summary, compared to the squash players, the volleyball players tended to be more forthright, more natural and spontaneous within their relationship with others, which added to their lower anxiety. A more complex picture thus emerges when the data from state level players only is utilized. The state level volleyball players were more intelligent, more assertive, and independant-minded than the squash players.

The analyses of the level of achievement in the Dowd and Innes (1981) study is viewed in Chapter 4.

Smith (1983) examined the competitive trait anxiety of 80 boy and 79 girl athletes on the basis of their age, race, sex, and playing status (all-star athletes versus playing substitutes).
The Martens' Sport Competition Anxiety Test for Children was used. The only difference which was uncovered was between the status groups, showing that the all-star athletes had lower anxiety scores than those of the playing substitutes. The evidence agrees with the concept that sport participants in team sports of higher status are generally less threatened by competitive situations, than those athletes of lower status ability. Smith (1983) suggests that this phenomenon may be either the result of the higher status players having more skill and experience, or because the athletes with lower anxiety levels are more likely to succeed.

Both male and female athletes in competitive team sports, competitive individual sports and nonathletes were compared on the three scales of the Eysenck Personality Questionnaire, the Bem Sex Role Inventory, the Rotter I-E Scale and the Sport Competition Anxiety Test (SCAT) in the study conducted by Colley, Roberts and Chipps (1985). No significant interactions were found in the analyses of the Rotter I-E and SCAT scores. With reference to the sex roles, male athletes scored higher on masculinity than females while female athletes scored higher on femininity than males, when opposite sex groups were being compared. Non-athletes had significantly lower scores on all scales than both the team and individual sport participants on the Bem SRI. The latter two groups did not differ. For the females, the non-participant group attained high scores in feminine sex-role identity, the individual sport group were predominantly feminine and undifferentiated subjects while the team sport group had a predominance of feminine and androgenous subjects. For the males,
the subjects did not differ significantly in relation to the four different sex types (masculine, feminine, androgenous, and undifferentiated).

Regarding extraversion, Colley et al. (1985) found that team and individual sport groups did not differ but that both groups had significantly higher scores than the non-participant group. They verified research which had found that sport participants scored higher on masculinity and on extraversion, compared to non-participants. They were unable to demonstrate temperament differences between team and individual sports people.

Salokun and Toriola (1985) conducted an investigation to measure and comparatively assess the personality traits of college athletes and nonathletes in Nigeria. A self-report questionnaire and Cattell's 16 PF were used to compare the 39 athletes in four sports namely sprinting, basketball, soccer, and field hockey players, to nonathletes. The results showed significant personality differences on aggression, realism, apprehension, radicalism, and control amongst the athletes. The athletes were more aggressive and more self-assured. Salokun and Tariola (1985) also found that the hockey players were more open to experimentation and were more realistic than the other athletes, in particular the basketball players. As noted by the authors, this provides continued support for the findings of Kroll (1967), Bunner (1969), and Schendel (1970) who all found athletes to have high sense of personal worth and high self concept scores, which promotes a healthy psychological adjustment.
Much research has indicated that sportsmen and women involved in individual sports, especially distance running, tend to be more introverted than team sport participants (Cratty, 1983, in Frazier, 1987). Extraversion has traditionally been labelled a characteristic of contact sports (Hatfield, 1986, in Frazier, 1987). In his research on marathon runners, Frazier (1987) compared 25 female and 73 male runners, to the population norms on Introversion-Extraversion, hypothesising that the long distance marathon runner would be more introverted. Frazier’s (1987) results indicated that the subjects’ scores were very similar to those of the population norms.

3.2.1.1. Synopsis
A summarization of the International studies is presented in table form, in Synopsis 1 (see following two pages).

The complexity of the subject matter under investigation, is noticed when viewing the Synopsis. There is little similarity in the studies on either the selection of subjects or on the use of measuring instruments employed. Some studies correspond with one another in their choice of male and female subjects, or athletes and nonathletes. Unfortunately the results are even more diverse.

Booth (1958), Bhullar (1974), and Colley et. al. (1985) were able to show differences between athletes and nonathletes, although on various factors. This finding is contradicted by Berger and Littlefield’s (1969) study. Some consensus is reached, in that some studies indicate that athletes are more extraverted, while two studies suggest that athletes, whether male or female, are
more aggressive than their nonactive counterparts.

A synopsis of the research quoted, is presented on the following pages.
## SYNOPSIS 3.1: International Studies Research

<table>
<thead>
<tr>
<th>AUTHOR</th>
<th>SAMPLE/SUBJECTS</th>
<th>TEST</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>La Place</td>
<td>Major and Minor League Male Baseball Players</td>
<td>MMPI</td>
<td>* Major league players are better able to apply strong &quot;drive&quot;, exercise self discipline, to get along with people &amp; exercise initiative</td>
</tr>
<tr>
<td>Booth (1958)</td>
<td>Male College Athletes and Nonathletes</td>
<td>MMPI</td>
<td>* various factors differentiated between athletes and nonathletes, varsity and freshman groupings</td>
</tr>
<tr>
<td>Berger and Littlefield (1969)</td>
<td>Football Athletes and Nonathletes</td>
<td>CPI</td>
<td>* 22 items of the MMPI discriminated between good and poor competitors</td>
</tr>
<tr>
<td>Brunner (1969)</td>
<td>Male Participants and Nonparticipants, university baseball and Tennis players</td>
<td>Adjective Check List (ACL)</td>
<td>* No significant differences at 0.01 level between any of the CPI’s 18 items</td>
</tr>
<tr>
<td>Singer (1969)</td>
<td>University baseball and Tennis players</td>
<td>EPPS</td>
<td>* 8 scales differentiated between the two groups</td>
</tr>
<tr>
<td>Johnson (1972)</td>
<td>Skilled female athletes Basketball, Hockey Golf players, Bowlers</td>
<td>CPI</td>
<td>* No difference between baseball and tennis, between highest and lowest 20 ranked baseball players</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Few scales showed between- and within group comparisons to normative data</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* ANOVA disclosed significant differences on 12 variables among the 4 groups</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Basketball significantly lower than other 3 groups, who were shown to be alike</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Basketball group were inhibited, shy, awkward social behaviour</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Methodology</td>
<td>Instruments</td>
<td>Findings</td>
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<tr>
<td>-------------------</td>
<td>------------------------------------------------------------------------------</td>
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</tbody>
</table>
| Morgan (1972)     | Long term University sport participation observation                         | MMPI       | * Athletes were more extraverted and vigorous  
                  |                                                                | Bell's Adjustment Inventory | * Athletes had lower levels of tension, depression and fatigue than general student population  
| Bhullar (1974)    | Male and female sports-participants and non-participants                     | Cattell's 16PF | * Nonsportswomen better home adjustment than sportswomen, no differentiation for male  
                  |                                                                |                          | * Sportsmen and women are more aggressive than nonsports groups  
|                   | Male and female All-Star Athletes and playing substitutes                    | SCAT for children | * Nonsportsmen and women are more emotionally than sports groups  
|                   | Male and female team and individual sport competitors and nonparticipants    | EPS, Bem Sex Role Inventory, Rotter I-E Scale, SCAT | * Notable difference in health orientation  
| Diverse Authors   | High level and average individual and team sportsmen and women               |             | * Significant differences between Squash and Volleyball players, between high- and average-level competitors  
|                   |                                                                |             | * More personality dimensions differentiate when only State (high) level competitors were investigated  
| Smith (1983)      | Male and female All-Star Athletes and playing substitutes                    |             | * All-Star athletes had lower anxiety scores than their playing substitutes  
| Colley, Roberts and Chipps (1985) | Male and female team and individual sport competitors and nonparticipants |             | * Sport participants were higher on extraversion, and masculinity than nonparticipants  
|                   |                                                                |             | * Female noncompetitive individual sport participants were lower on extraversion than competitive participants  
|                   |                                                                |             | * Higher portion of female sport participants than nonparticipants were not sextyped  
|                   |                                                                |             | * Team participants were androgenous, individual were undifferentiated  
|                   |                                                                |             | * More masculine nature of team sports  

**Notes:**
- MMPI: Minnesota Multiphase Personality Inventory
- Bell's Adjustment Inventory
- Cattell's 16PF
- SCAT for children
- EPS, Bem Sex Role Inventory, Rotter I-E Scale, SCAT
<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
<th>Measure</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salokun and Toriola (1985)</td>
<td>Male athletes (sprinting basketball, soccer, hockey) and non-athletes</td>
<td>Cattell's 16PF</td>
<td>* Significant differences on 4 scales between 2 groups</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Athletes more aggressive and self assured</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Hockey players more experimental and realistic than other athletes, in particular basketball players</td>
</tr>
<tr>
<td>Frazier (1987)</td>
<td>Male and female Marathon runners</td>
<td>-</td>
<td>* Athletes' introversion-extraversion scores were very similar to those of the population norms</td>
</tr>
</tbody>
</table>
3.2.2. South African Studies

A few South African studies have viewed the possible personality differences in athletes.

Bester (1984) compared 134 sport participants to 35 non sport participants, drawn from a random sample of 1000 male first year students, using the Personal, Home, Social and Formal Relations Questionnaire (PHSF). The results suggested that the sport participants had better personal, home, social, and formal relations than those who were not sport participants. The former group also had significantly higher scores on self-confidence, self-esteem, self-control, and absence of nervousness. The non participants, in contrast, were less preoccupied with their physical conditions and believed their behaviour to be in accordance with the norms set by society. Bester’s (1984) results on self-confidence support Kane (1968), Cooper (1969), and Schendel (1970). These authors believed that through sport participation the athlete has an increased body concept which, if positive, is supportive of a positive self concept and self confidence. The findings on nervousness, support Kane (1970, in Bester, 1984) and Cooper (1969).

The Sport Competition Anxiety Test (SCAT) and Test of Attentional and Interpersonal Style (TAIS) were used by Dippenaar and Potgieter (1986) in their study of 85 cricketers. First league cricketers were classified according to their speciality of batsmen, bowlers, seam and spin bowlers. Each classification was subdivided according to achievements of the season (successful or
unsuccessful). The results of the SCAT which showed no significant differences either in or between groups, suggest that anxiety may not be a discriminating factor in first league cricket. Only one significant difference was noted within a group, which showed that elite batsmen become more overwhelmed by surrounding environmental factors compared to the unsuccessful batsmen. No differences were noted amongst the fast bowlers, while seam bowlers differed on three scales. The more successful seam bowlers had higher introversion scores, an over expression of negative emotions and fewer positive emotions. Compared to spin bowlers, the weaker bowlers gave more attention to internal thoughts. Numerous differences were noted when comparing the group of top bowlers with one another (refer to Dippenaar & Potgieter, 1986).

In another South African study, Potgieter and Schooling (1986) compared two groups of squash players, 9 junior players and 11 international male players. This study again used the Sport Competition Anxiety Test (SCAT) and the Test of Attentional and Interpersonal Style (TAIS). The authors found no significant differences in the SCAT scores of the international and junior players while significant differences were obtained on the TAIS. These were found on three of the six attentional subscales: broad internal attentional focus (BIT), narrow attentional focus (NAR), and reduced attentional style (RED). This finding was in accordance with expectations, as elite players should be able to analyse and plan the game strategy while ignoring their distractions and narrowing their focus to the ball and their opponents' movements only. Ideally the player should prevent his
focus from becoming too narrow, as seems to be the case with the junior players who had higher mean scores on RED.

A study which specifically looked at anxiety and attentional styles in women's hockey teams, was conducted by Slogrove, Buys and Foxcroft (1989). Eleven S.A. University women's field hockey teams (n=92) completed the Sport Competition Anxiety Test (SCAT) and a Test of Attentional and Interpersonal Style (TAIS). The sample was further divided into a successful (n=52) and an unsuccessful group (n=40). The results indicated a significantly higher SCAT score for the successful hockey group. Slogrove et al. (1989) suggested that this moderate level of anxiety is therefore beneficial to hockey achievement. The authors note that despite the significant differences obtained in the study, both the means fell within the average range of scores. With regard to the TAIS, no significant differences were found. The authors speculate that a field hockey-specific measure of attentional styles would possibly be more sensitive to the differences between the groups. In integrating the findings and possible relationship between anxiety and attentional styles, Slogrove et al. (1989) show that small but significant correlations exist between the SCAT and external overload of attention (OET), internal overload of attention (OIT), and reduced attention (RED). These findings suggest that the high anxiety scores are detrimental to appropriate attention.
3.2.2.1. Synopsis

Four South African studies were discussed. Great similarity is noted amongst these studies, not only in their findings, but also in the use of measuring instruments, as three of the four studies employed the SCAT and TAIS. Dippenaar and Potgieter (1986) and Potgieter and Schooling (1986) came to the same conclusion namely that anxiety levels did not differentiate between their sample groups. Slogrove et al. (1989) however, found contradictory results regarding anxiety levels. With regard to attentional styles, no differences were found. Both other studies, noted above, were able to indicate positive results regarding attentional styles.

All three of the studies noted above, had compared successful athletes to unsuccessful athletes. The fourth and last South African study, Bester (1984), compared athletes to nonathletes. Bester was able to uncover various factor on the PHSF, which were able to distinguish between the two sample groups.

A synopsis of the four studies follows.
<table>
<thead>
<tr>
<th>AUTHOR</th>
<th>SAMPLE/SUBJECTS</th>
<th>TEST</th>
<th>RESULTS</th>
</tr>
</thead>
</table>
| Bester (1984)        | University Male Sport and Non-sport participants      | PHSF               | * Sport participants have better personal, home, social and formal relations than nonparticipants *
|                      |                                                      |                    | * Participants have higher self-confidence, self-esteem, self-control and absence of nervousness *
|                      |                                                      |                    | * Family factors influence participants                                  |
| Dippenaar & Potgieter (1986) | First League batsmen, fast bowlers, seam and spin bowlers; divided in 2 groups on success | SCAT & TAIS        | * No differences between anxiety levels within or between groups *
|                      |                                                      |                    | * Significant differences between and within groups on attentional & interpersonal styles *
| Potgieter & Schooling (1986) | Junior Provincial and International Squash Players | SCAT, TAIS, POMS, and OMS | * Significant differences on attentional style between international and junior squash players *
|                      |                                                      |                    | * No difference found on anxiety levels *
|                      |                                                      |                    | * Relationship between performance and mood state supported inverted U-hypothesis *
| Slogrove, Buys and Foxcroft (1989) | Successful and Successful SAU Field Hockey Teams (Women) | SCAT & TAIS        | * Successful group scored significantly higher on anxiety measure than unsuccessful groups *
|                      |                                                      |                    | * No differences regarding attentional styles *
|                      |                                                      |                    | * Significant positive relationship between anxiety, external overload of attention, internal overload, and reduced attention *
3.2.3. Studies on Women

A large body of literature is being established, which draws distinctions between athletes based on gender differences.

A study conducted by Thorpe (1958, in Butt, 1987) used female physical education instructors and students at Florida State University. The instructors scored higher than the norm on the need preferences of defence, order, dominance, and personal endurance, and lower on autonomy, succorance, nurturance, heterosexuality and aggression.

Neal (1959, in Dayfries & Grimm, 1970) found that women athletes competing in the 1959 Pan-American Games, scored higher on achievement, autonomy and nurturance on the Edwards Personal Preference Scale (EPPS), compared to a control group of nonathletes. Dayfries and Grimm (1970) subsequently administered the EPPS to 21 female intercollegiate athletes, and a control group of nonathletes. The women athletes scored higher on achievement, exhibition, autonomy, affiliation, intraception, dominance, nurturance, heterosexuality and aggression. They scored significantly higher on the intraception factor and significantly lower on the order factor. The authors noted that no particular personality profile emerged from the data and that is was therefore possible and expected that a great variety of personalities would exist and compete in intercollegiate athletics.

Peterson, Weber and Trousdale (1967) using the 16PF Form A,
tested 156 women highly successful female athletes, some from the 1964 United States Olympic Team. The individual sports participated in were the following: swimming, diving, riding, fencing, canoeing, gymnastics, and track and field. Volleyball and basketball comprised the team sports. The results suggested that female athletes who engaged in individual sports scored higher than the group sports on dominance, self-sufficiency, impulsiveness, adventurousness, sensitivity, introversion, and radicalism. The authors suggest that these women enjoy making their own decisions and may express dissatisfaction in group situations. They are more independent-minded, introverted, and self-absorbed compared to the team sports women. They are also more self-assured, artistic, more radical in their thinking and less inhibited.

The team sports female athletes were shown to be self-sufficient but not as self-absorbed or introverted. They were steady, practical, dependable, and interested in immediate issues. Both groups were a little more serious than the average population and less likely to express themselves freely. They were both intellectually brighter, more conscientious, aggressive, and persevering than the norm. No differences were found on sociability, stability, conscientiousness, suspiciousness, guilt-proneness, high self-sentiment or high ergic tension.

Malumphy (1968) investigated the personality and background of women participating in intercollegiate sports and compared them to nonparticipants. The subjects were 15 individual sports competitors, 16 subjectively judged sports competitors, 28 team
sports competitors, 18 team-individual sports competitors and 42 nonparticipants. They were selected from the five largest Ohio State Universities and they all completed the 16PF. The sports from which they were drawn were the following: individual sports were tennis, golf, fencing, competitive swimming, and archery; subjectively-judged sport was synchronized swimming and gymnastics; basketball, fieldhockey, and softball formed the team sports; the combination team was involved in the above mentioned team and individual sports as well as volleyball, badminton and bowling.

The results showed the groups were similar on 14 dimensions of personality and significantly different on 9 dimensions of the 16PF (reserved-outgoing, expedient-conscientious, shy-venturesome, tough minded-tender minded, practical-imaginative, anxiety, introversion-extraversion, tough poise, and leadership).

The individual sports group was less anxious, more venturesome and more extraverted than the team sports group. Team-individual groups were more tough-minded and more "tough poised" than the nonparticipants; scored higher on leadership than the team, team-individual and nonparticipants group; were more tough-minded than the nonparticipants but no more tough-minded than the other sports participants group.

The subjectively-judged sports group appeared less anxious than the team sports group and were more conscientious than both the team-individual and nonparticipant groups. The subjectively-
judged group was also more tough minded and tough poised than the nonparticipants; more adventuresome and more extraverted than both the team and team-individual groups; and lastly, had more leadership qualities than all the groups to which it was compared.

The team sports group was less adventuresome and less extraverted than all the individual, subjectively-judged, and nonparticipants groups. They showed less leadership and more anxiety than the individual and subjectively-judged groups. They were more reserved than the team-individual and nonparticipants; and were more tough minded than the nonparticipants but no more than the other groups.

The team-individual sports group was less conscientious than the subjectively-judged group; less venturesome and less extraverted than all the individual, subjectively-judged, and nonparticipants groups; showed less leadership than both the individual and subjectively-judged groups; were less imaginative than the nonparticipants; and lastly, were more outgoing than the team group.

The last group of subjects to be compared were the nonparticipants. They were less conscientious than the subjectively-judged groups; less tough minded, less tough poised, had less leadership than both the individual and subjectively-judged groups. They were more outgoing than the team group; and lastly, more imaginative, more extraverted, and more venturesome than the team-individual group.
In drawing the extensive above mentioned findings together, Malumphy (1968) concludes that the individual and subjectively-judged sports groups are more alike and also more similar to the nonparticipants than either of the other two groups. On the other hand, the team and team-individual groups tended to be more alike and more dissimilar to the other three groups. Malumphy (1968) cautions the reader that her sample was small, regional, and contained only one highly-specialized athlete, and hence, the results should be interpreted as indications and possibilities rather than absolutes. Importantly, there were more similarities than differences between the groups.

In a comparative study of male and female athletes, Ogilvie, Johnsgard and Tutko (1971, in Butt, 1987) found the male sample to be emotionally healthy and tending towards extraversion. They were further described as tough-minded, self-assertive, and self-confident, with the high capacity to endure stress and low levels of anxiety. The female sample was described as having a personality similar to the male personality profile with the exception of lower extraversion and higher emotional stability levels. The women were more tough-minded and independent and better equipped to handle stress, than the male sample.

Kane (1972, in Butt, 1987) found that male athletes were characterized by extraversion and emotional stability. This meant that they scored highly on the traits of dominance, social aggression, leadership, tough-mindedness, stability, and confidence. When comparing these findings to the female sample, Kane (1972, in Butt, 1987) revealed a similar profile with the
exception that women tended to score lower on the emotional
stability or emotional control trait.

O'Connor and Webb (1976) compared four groups of intercollegiate
female athletes to a group of noncompetitors. The competitors
were drawn from basketball, gymnastics, tennis, and swimming. The
total sample of 55 women were tested on both the Form A and B of
the 16PF. The results showed that the five groups were similar on
12 personality traits and only differed significantly on four:
namely intelligence, radicalism, self-sufficiency, and control.
Except for the basketball group, all other sport groups scored
well above the norm in the intelligence subtest. The swimming,
tennis and control groups were more experimenting than the
basketball group while the control group scored significantly
higher than the gymnastics group. The tennis group scored
significantly lower on self-sufficiency than the basketball,
swimming and the control groups. Both basketball and swimming
groups scored significantly higher than either the gymnastics or
tennis group on the control subtest. The authors concluded that
in viewing the sport group as a whole, they did not differ much.
The majority of differences were not statistically significant.

Using the Edwards Personal Preference Scale (EPPS), Stoner and
Brandy (1977) compared intercollegiate women competitive in
individual sport (n=30), women competitive in team sports (n=30),
and female non-participants (n=30). The authors found no
significant differences in the scores for the groups involved in
individual and team sports on any of the 15 scales. Four of the
scales showed significant differences between participants and
non-participants. Those in team sport needed greater deference than the non-participants while the latter scored higher in intraception, change, and heterosexuality than the sport participants. The non-participants scored higher than the individual sport members in intraception and change.

Huddelston and Gill (1981) tested 19 female athletes from a highly competitive university track and field athletics team. Eight of these athletes qualified for National Championships while the remaining 11 did not. Using the Competitive State Anxiety Inventory (CSAI), Huddelston and Gill (1981) confirmed their hypothesis that A-state anxiety increases as the time for competition draws nearer. No differences between the qualifiers and non-qualifiers were found. The authors suggest that the skill differences may not have been as great as reported by Mahoney and Avener (1977, in Huddelston & Gill, 1981). Mahoney and Avener (1977, in Huddelston & Gill, 1981) working on Olympic gymnastic qualifiers, found that the qualifiers reported slightly more anxiety prior to competition compared to the non-qualifiers. This latter group however reported greater anxiety during the actual performance. Huddelston and Gill (1981) note that some of their qualifying group were younger and less experienced. These factors may easily influence the study's findings.

Ho and Walker (1982) investigated the female athlete. Three aspects were studied: (1) the self perceptions of femininity and body image of female athletes and nonathletes; (2) personality trait differences between female athletes and nonathletes and possible correlations between years of participation and
personality characteristics; (3) personality differences between females involved in individual versus team sports. The authors used a student sample of n=80, with equal numbers of intercollegiate athletes and nonathletes, drawn from a private college in New York State. The athletic population consisted of individual sports (golf, gymnastics, tennis, swimming, track and field) (n=20) and team sports (basketball, field hockey, softball, volleyball) (n=20). Ho and Walker (1982) used the Gough Adjective Check List (ACL) to assess 6 personality variables.

The results showed that female athletes have a more positive body image compared to the female nonathlete. No significant differences were found between the groups with regard to perceived femininity. With regard to the personality differences between female athletes and nonathletes, four variables (self confidence, achievement, dominance, and aggression) showed significant statistical differences, while the other two variables (autonomy and deference) although in the expected direction failed to be statistically significant. The authors concluded that both groups characterize themselves as being "self willed" and acting independently of others, while seeking and sustaining subordinate roles in relationships with others. With reference to personality differences between females who participate in individual versus team sports, no statistically significant differences manifested, this was surprising, since dominance is usually expected in the individual sports. The study produced almost identical means on the dominance factor for the two groups. There were also no significant differences between the two groups regarding autonomy and deference.
3.2.3.1. Synopsis

In the past much research has focused on either the male sport participant or on the athlete in general. The latter group would comprise both male and female athletes. However, there is now acceptance that male and female athletes differ in their scores on the same factors investigated, although both groups differ in the same direction, when compared to nonathletes.

Most of the studies presented in this study indicate differences between the female athlete and her nonactive counterpart. These studies present a personality profile of an aggressive, dominant, self-confident, intelligent and tough-minded athlete. Stoner and Brandy (1977) and Ho and Walker (1982) failed to uncover differences between the female athletes participating in individual and team orientated sports. Ogilvie et al. (1971) suggest that the personality profile of the female athlete is similar to that of the male athlete, except for the female athlete's higher score on emotional stability. Kane (1972) however challenges this finding, as his study found that female athletes have lower emotional stability scores than their male counterparts.

A synopsis of the research quoted, is presented on the following pages.
## SYNOPSIS 3.3: Studies on Women

<table>
<thead>
<tr>
<th>AUTHOR</th>
<th>SAMPLE/SUBJECTS</th>
<th>TEST</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thorpe (1958)</td>
<td>Female Physical Education instructors &amp; university students</td>
<td>–</td>
<td>* Instructors scored higher than norm on need preferences of defense, order, dominance, and personal endurance. Lower on autonomy, succorance, nurturance, heterosexuality, and aggression</td>
</tr>
<tr>
<td>Neal (1959)</td>
<td>Female Pan-American athletes and nonathletes</td>
<td>EPPS</td>
<td>* Athletes scored higher on achievement, autonomy, and nurturance than control group of nonathletes</td>
</tr>
<tr>
<td>Peterson, Weber and Trousdale (1967)</td>
<td>Highly successful female athletes in team and individual sports</td>
<td>16PF</td>
<td>* Individual sports women rated higher on dominance, adventurousness, sensitivity, introversion, radicalism, and self-sufficiency</td>
</tr>
<tr>
<td>Malumphy (1968)</td>
<td>Senior and junior women athletes in 4 groups and non-participants</td>
<td>16PF</td>
<td>* Lower on sophistication</td>
</tr>
<tr>
<td>Dayries &amp; Grimm (1970)</td>
<td>Female intercollege athletes and nonathletes</td>
<td>EPPS</td>
<td>* Results indicated groups similar on 14 dimensions, and different on 9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Individual and subjectively-judged sports groups were more alike, also more similar to the nonparticipants, then to the other sports groups</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Team and team-individual sports groups were more similar, &amp; dissimilar to the other 3 groups</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Women athletes higher on achievement, exhibition, autonomy, affiliation, intraception, dominance, nurturance, heterosexuality, and aggression. Significantly higher on intraception significantly lower on order</td>
</tr>
<tr>
<td>Study</td>
<td>Sample Description</td>
<td>Measure</td>
<td>Findings</td>
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<td>-------------------------------</td>
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</tr>
</tbody>
</table>
| Ogilvie, Johnsgard, & Tutko (1971) | Male and female athletes                                                              | -        | * Female sample similar to male personality profile with exception of lower extraversion and higher emotional stability  
* Were tough-minded, self-assertive, and self-confident, with capacity to endure stress and lower levels of anxiety |
| Kane (1972)                    | Male and female athletes                                                              | -        | * Female athletes similar to males on high dominance, social aggression, leadership, toughness, mindedness, stability, and confidence  
* Scored lower on emotional stability |
| O’Connor & Webb (1976)         | Female college athletes (basketball, gymnastics, tennis, swimming) and non-competitors | 16PF     | * 5 groups were similar on 12 factors and significantly different on 4; intelligence, radicalism, self-sufficiency, & control  
* All groups except basketball were above norm on intelligence  
* The 4 sports groups differed on various factors |
| Stoner & Brandy (1977)         | Female college athletes (team & individual sports) and nonathletes                     | EPPS     | * No difference on any of 15 scales between team and individual sports athletes  
* 4 scales showed difference between participants and nonparticipants |
| Huddelston & Gill (1981)       | Successful and Unsuccessful female university track & athletes                          | Competitive State Anxiety Inventory (CSAI) | * A-state anxiety increases as the time for competition draws nearer  
* No difference between qualifiers and nonqualifiers was found |
<table>
<thead>
<tr>
<th>Ho and Walker (1982)</th>
<th>Female college athletes (team and individual sports) and nonathletes</th>
<th>Adjective Check List (ACL)</th>
<th>* Female athletes more positive body image than female nonathlete, no significant difference in perceived femininity between athletes and nonathletes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>* Significant differences between athletes and nonathletes on 4 of 6 variables</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>* No differences between individual and team sports athletes</td>
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</tbody>
</table>
3.2.4. Studies on specific temperament traits

The following two sections deal with research studies on specific temperaments traits, which are relevant to this study.

3.2.4.1. Sensation Seeking Studies

Hymbaugh and Garrett (1974) administered the Sensation Seeking Scale (Form II) to 21 skydivers and an equal number of nonskydivers, who were matched with regard to age, socio-economic, and occupational factors. The former group scored significantly higher than the control group, thus providing discriminant validity for the scale.

Stirling (1977, in Zuckerman, 1983) compared 14 males who participated in contact sport such as rugby, boxing, wrestling and football, with 11 males participating in non-body contact sports, namely racquet games, golf, swimming and track sports. A third group consisted of 11 non-athletes. The subjects were selected from staff and students at the University of York. While the three groups did not differ significantly on the General SSS, it was noted that the non-contact athletes scored higher than non-athletes on this scale. Significant results were obtained for both Thrill and Adventure Seeking (TAS) and Disinhibition (Dis) scales. The body contact athletes and nonathletes consistently proved to have extreme SSS scores. The non-contact athletes had intermediate mean scores.

Heyman and Rose (1980, in Zuckerman, 1983) compared the sensation
seeking trait in students in the university scuba club with other students. They also examined the correlations between sensation seeking and the time length and depth of the first free dive of scuba divers. Only the total score of the Sensation Seeking Scale (SSS) (Form V) was used in comparisons. Both male and female divers scored higher than the controls. Heyman and Rose (1980) found that there was a positive correlation between the time length of the first free dive and the SSS scores. The correlation with the depth of the dive was negative however. In explaining this apparent contradiction, the authors suggested that the high sensation seeker would probably prefer to spend more time exploring novel experiences in the surroundings of the underwater, while the low sensation seeker would prefer to spend less time underwater and might perceive the depth of the dive as the goal of the experiment. It was concluded that the high sensation seeker does not take risk for the sake of risk alone, but rather that there is some reward from it.

Mccutcheon (1980, in Zuckerman, 1983) compared 62 runners participating in races with a group of non-runners, matched both for age and sex. It was found that the male runners did not differ significantly from the non-runners on any of the Sensation Seeking Scale (SSS) (Form V) scales, except for a borderline significant difference on the Disinhibition (Dis) scale, where male runners scored lower than the non-runners. The female runners, on the other hand, scored borderline significantly lower on the Total SSS score, and significantly lower on the Thrill and Adventure Scale (TAS) scale. Mccutcheon (1980) found no correlation between SSS scores and the order of finish in their
races for either sexes. Zuckerman (1983) concludes that sensation seeking is less relevant in this low-risk sport than in the high-risk sports. He points out that the finding that female runners scored lower on Total SSS and TAS, should be interpreted cautiously because of the control groups’ higher than expected scoring for persons of their age group.

In comparing skiers which included ski instructors, with non-skiers, Connolly (1981, in Zuckerman, 1983) found that the skiers scored higher on both the Total and Thrill and Adventure Scale (TAS) scales of the Sensation Seeking Scale (SSS) (Form V) used in the study, compared to the control. The ski instructors scored higher on the Total, TAS, and Experience Seeking (ES) subscales. In comparing all skiers who had reported injuries, with those who had reported no injuries, Connolly (1981) found the former group scored significantly higher on the Total, TAS and Dis subscales. The author concludes that the level of sensation seeking can influence the degree of risk taking within the group of high sensation seekers, assuming that the more injured skiers had taken more risks, rather than being less competent skiers. More than three quarters of those who had reported injuries or accidents, were male, which was consistent with the findings of higher scores on Total SSS and TAS scales.

Straub's (1982) study attempted to validate the Sensation Seeking Scale (SSS) (Form V) by comparing male hang gliders (n=33), automobile racers (n=22), and intercollegiate bowlers (n=25) on the sensation seeking trait. The hypothesis was that the high risk athletes, namely hang gliders and automobile racers, would
score significantly higher on all four subscales as well as the total of the SSS, compared to the low risk bowlers. The results supported the Form V of SSS as a measure of sensation seeking in male athletes. Hence Straub (1982) showed that sport participants were high in sensation seeking, with the highest scores in those sports that involved risk, namely automobile racing and hang gliding.

Much of the research involving sensation seeking and sport has focused on the differences in sensation seeking with regard to various sports and the participation in risky sports. Rowland, Franken and Harrison (1986) studied sport participants and found that high sensation seekers tended to participate in various sports, but that this finding was not as evident in the females as it was in the males of the sample. The latter not only engaged in more activities, but also for shorter periods.

Gundersheim (1987) compared (a) male versus female university team members and (b) athletes versus nonathletes with regard to the sensation seeking trait. The male athletes were drawn from baseball, gymnastics, lacrosse, track and field athletes, and wrestling while the female athletes were sampled from basketball, gymnastics, swimming and track athletes. Using the Sensation Seeking Scale (SSS) (Form IV), Gundersheim (1987) found that the male athletes of only one of the non-contact sports, baseball, differed from the male athletes in the contact sports of lacrosse and wrestling in terms of the sensation seeking trait. The study found a higher sensation seeking need in the female athletes compared to the nonathletes, but failed to show any differences
in sensation seeking in the male athletes and nonathletes. In support of Zuckerman (1979), the study found that in all comparisons between males and females, the males consistently scored significantly higher on the SSS than the females.

Babbitt, Rowland and Franken (1990) hypothesised that aerobic exercise classes would consist of a majority of low sensation seekers. While high sensation seekers may enrol in these classes as a new activity, they would be more likely to move onto something new after a short period of time. Babbitt et. al. (1993) found that only 15 of the 177 female volunteers were not low sensation seekers. The remainder consistently scored lower than all normative groups with which they were compared. Consistent with Rowland et. al. (1986), it was found that low sensation seekers were involved in few types of sports but were committed to those few and for longer periods of time. In conclusion, the authors suggest that this data indicates that the choice of sports and the participation in sports characterised by repetition, is mediated by the personality trait of sensation seeking.

Potgieter and Bisschof (1990) suggested that athletics may be used as an alternative to alcohol use, drug use, or any other forms of nonconforming behaviour (these behaviours have all been found to correlate with sensation seeking in other research). Potgieter and Bisschoff (1990), investigated the possible differences between medium-risk and low-risk sports. They hypothesized that individuals with a strong tendency to seek sensation will be attracted to high risk sports and vice versa.
The authors chose rugby (n=35) as the medium-risk sport in accordance with Zuckerman's (1983) classification that serious injury was possible but not fatal (rugby is similar to Zuckerman's choice of football). Marathon running (n=32) was used as the low-risk sport. Although injuries occur, the probability of fatalities are remote. Potgieter and Bisschoff (1990) found that the rugby players' perception of physical danger and risk in their own sport was lower than the marathon runner's perception of risk in rugby. 54% of rugby players and 75% of the runners had a perception of rugby as a high-risk sport. The authors admit that their subjects had not been provided with a definition of risk.

The results of the study, using the Sensation Seeking Scale (SSS) (Form V), showed that rugby players scored significantly higher on the Total SSS as well as on the Thrill and Adventure Seeking (TAS) scale, compared to the marathon runners. The other scales failed to show differences between the two groups, although the authors are of the belief that this could be the result of the process of sport socialization.

In a comparative study of university mountain climbers (n=20) and control volunteers (n=20), Cronin (1991) attempted to replicate earlier findings (Hymbaugh & Garret, 1974; Straub, 1982; etc.) that a positive relationship exists between high risk sport and the sensation seeking trait. It was predicted that the mountain climbers would score higher on the Thrill and Adventure Seeking (TAS), Experience Seeking (ES), and Total scales of the SSS. It was found that the trait of sensation seeking plays an important
role in mountain climbing, a high risk sport. The author notes that since the mountain climbers scored higher than the controls on both TAS and ES subscales, it is not the item content that accounts for the differences between the groups but rather the broad underlying trait. Interestingly, it was noted that the mountain climbers were involved in the sport for an average of four years. Hence the involvement was not a result of the tendency, noted by Rowland et. al. (1986), that high sensation seekers temporarily participate in numerous sports. Cronin (1991) suggests that future research should investigate why some high sensation seekers choose socially acceptable ways of meeting their sensation needs, rather than antisocial means such as drugs and criminality (Zuckerman, 1983). Cronin (1991) supports Zuckerman's (1978) suggestion that socially acceptable sensation seeking behaviour is related to Extraversion while antisocial sensation seeking behaviour is related to Psychoticism.

Hartman and Rawson (1992) investigated the differences in the sensation seeking trait in both male and female athletes and nonathletes, using a sample of 159 volunteers. Athletes were categorised as those currently members of a university sport in season or currently practising for a university sport out of season. Nonathletes were those who did not meet either of the conditions. The researchers developed three hypotheses; (a) that athletes would score higher than nonathletes in sensation seeking, regardless of gender; (b) that males would score higher than females in sensation seeking, regardless of their athletic status; and (c) no interaction effects would be found between male and female athletes and nonathletes in relation to sensation
seeking. Support was found for all three hypotheses in the study. Consistent with Zuckerman's (1983) findings, Hartman and Rawson (1992) agreed that high sensation seekers engage in athletics. It was also shown that athletes scored higher on Disinhibition (Dis) scale and not the TAS scale, suggesting that athletes were more frequent users of alcohol and drugs. In contrast to this finding, most researchers suggested that athletes seek stimulation through their sport activities. The study also found significant differences between athletes and nonathletes on the Total score. It is possible that due to the athletes' popularity, they might be invited to more parties, associating with other high sensation seekers and hence feel greater peer pressure to drink, use drugs, and pursue sexual encounters.

Hartman and Rawson (1992), using the Sensation Seeking Scale (SSS) (Form VI), found that severity of the athletes injury was negatively correlated with Intentions-Thrill and Adventure-Seeking (I-TAS) scale in male athletes whereas no correlations were uncovered for the female athletes. It is noted that this study did not differentiate between sports groups. The authors were unable to find as strong a correlation between injury severity and sensation seeking as expected. This may be a result of the fact that only one contact sport, football, was included into the study and it is in this group along with risky (high-risk) sports (hang-gliding, auto-racing) where most injuries are expected.

Hartman and Rawson (1992) admit that the study has shortcomings as only a few broad relationships were investigated. The biggest
limitation was that the SSS VI scores did not differentiate between the various sports whereas previous studies, including Gundersheim (1987) and Straub (1982), showed SSS scores vary between types of sports, namely contact and noncontact sports. Potgieter (1990) was able to differentiate between medium-risk and low-risk sports. As noted, Hartman and Rawson (1992) included only one contact, medium-risk sport, football, in their study.

In conclusion, Hartman and Rawson (1992) found that males score higher than females on sensation seeking regardless of their athletic participation, and that athletes consistently scored higher than nonathletes, regardless of the gender of either groups compared. Finally no interactive effects between gender and athletic participation were found in the present study.

Campbell, Tyrrell and Zingero (1993) investigated the levels and correlations of sensation seeking among 54 members (34 males and 20 female) of two canoe clubs. The members of the clubs frequently engaged in whitewater paddling and were thus eager to take physical risks to obtain intense and dangerous stimulation. The authors focused their predictions on the Thrill and Adventure Seeking (TAS) subscale rather than the overall sensation seeking scale. They hypothesized that both male and female paddlers would be characterised by significantly elevated TAS scores. The research made a second prediction that TAS scores would correlate negatively with self-reported anxiety prior to entry into the water or "put-in". A positive correlation was expected between the TAS scores and the highest difficulty level of the river that the paddlers said they would like to attempt. Based on previous
research, Campbell et. al. (1993) expected the sample to have elevated Experience Seeking (ES) scores while a final prediction was made that most of the ES items would act as predictors of preference for risky activities such as whitewater paddling.

As predicted by Campbell et. al. (1993), the mean TAS score for both gender groups was significantly higher than the comparable mean scores reported by Zuckerman et. al. (1978, in Zuckerman, 1983). The male mean score on the TAS scale was higher than that of the females. Although not predicted, Campbell et. al. (1993) did not find it surprising that the male paddlers had lower BS scores. The paddlers, both male and female, also scored marginally higher than the corresponding norms on the ES scales. The research found support for the prediction that a negative correlation exists between TAS scores and self-reported anxiety prior to "put-in". The correlations between anxiety and the other subscales did not approach significance. There was no correlation between the Total SSS scores and anxiety. The correlation between TAS and the difficulty level that the paddlers would like to attempt approached significance. The Dis subscale also proved to be a good indicator of this phenomenon.

Although the connection between TAS and participation in risky sports has been well documented, the results provided by Campbell, Tyrrell and Zingaro (1993) provide the first indication of the relationship between TAS and anxiety levels during risky sport participation. This finding needs to be verified by further research.
Horvath and Zuckerman (1993) investigated the relationship between sensation seeking, risk appraisal, and risky behaviour. Four hypotheses were formulated; (1) that sensation seeking would be negatively related to risk appraisal and positively related to risky behaviour in all areas of risk taking; (2) that impulsivity would be related in the same manner as sensation seeking; (3) risk appraisal would be negatively related to risky behaviour; and (4) risk appraisal would mediate the relationship between sensation seeking, and impulsivity, and risky behaviours. Risk appraisal and behaviour was viewed in terms of inter alia crime, financial and social violations, sports, and the risk of AIDS from sexual activity. The conclusions showed that perceived peer behaviour and sensation seeking were the strong predictors of risky behaviour, especially in the areas of criminal behaviour and social violations. Personal risk appraisal was negatively related to the risky behaviour for all the above mentioned areas, except for AIDS which was positively related to risky sexual behaviour for men. In contrast to the hypotheses, risk appraisal was found to be the mediating value between sensation seeking and risky behaviour but that rather risk appraisal is the consequence or result of risky behaviour.

3.2.4.1.1. Synopsis

A synopsis of research concerning Sensation Seeking and sport, is presented in Synopsis 4 (see following three pages).

In the fourteen studies presented in this study, none of samples corresponded with one another. All studies provide validity for
the existence of the trait of Sensation Seeking. Both male and female athletes consistently scored higher on Sensation Seeking than the nonathletes, although differences were evident between gender groups. This is consistent with Zuckerman's findings.
<table>
<thead>
<tr>
<th>AUTHOR</th>
<th>SAMPLE/SUBJECTS</th>
<th>TEST</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hymbaugh &amp; Garrett (1974)</td>
<td>Skydivers and nonskydivers</td>
<td>SSS</td>
<td>* Skydivers scored significantly higher than nonskydivers on sensation seeking</td>
</tr>
<tr>
<td>Stirling (1977)</td>
<td>Contact (rugby, boxing, wrestling, football) and noncontact (golf, track, swimming) athletes</td>
<td>SSS</td>
<td>* 3 groups did not differ significantly on General SSS, although noncontact athletes scored higher than nonathletes</td>
</tr>
<tr>
<td>Heyman &amp; Rose (1980)</td>
<td>Male and female scuba students and control group</td>
<td>SSS Form V</td>
<td>* Only Total SSS used, showed male and female divers were higher than control group</td>
</tr>
<tr>
<td>McCutcheon (1980)</td>
<td>Male and female runners and nonrunners</td>
<td>SSS Form V</td>
<td>* Male runners did not significantly differ from non-runners on any SSS scale, except for borderline difference on Dis scale, being lower</td>
</tr>
<tr>
<td>Connolly (1981)</td>
<td>Male and female skiers, ski instructors, and non skiers</td>
<td>SSS Form V</td>
<td>* Skiers scored higher on Total and TAS, than control (nonskiers). Ski instructors higher on Total, TAS and ES subscales</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>* All skiers who reported injuries, scored significantly higher on Total, TAS and Dis than those without injuries</td>
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<td></td>
<td></td>
<td></td>
<td>* Three quarters of injuries reported were by males</td>
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<tr>
<td>Study</td>
<td>Sample Description</td>
<td>Measure</td>
<td>Findings</td>
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</table>
| Straub (1982) | High risk (male hang gliders, automobile racers) & low risk (college bowlers) sport participants | SSS Form V | * High risk athletes were significantly higher than low risk on Total, ES and BS, but not on TAS and Dis  
* Found support for SSS as measure of sensation seeking among male athletes |
| Rowland & Franken (1986) | Canadian sample (male and female) | SSS Form V | * Study provided additional evidence for the cross-sex and cross-cultural generality of the 4-dimensional model of sensation seeking  
* SSS failed to discriminate among the 4 female athletic teams  
* Of the 10 paired comparisons among the 5 male athletic teams, only baseball differed from lacrosse and wrestling  
* Female athletes scored higher than female nonathletes, but SSS failed to discriminate between male athletes and male nonathletes  
* Males had significantly higher sensation seeking need than females |
<p>| Gundersheim (1987) | Male (baseball, gymnastics, lacrosse, track &amp; field, wrestling) and female (basketball, gymnastics, swimming, track) students and nonathletes | SSS Form IV | |
| Babbitt, Rowland, &amp; Franken (1990) | Female aerobic class | SSS Form V | * Aerobic exercise participants were found to score lower on sensation seeking than did individuals of comparable age groups of Australian and Canadian students |
| Pogister &amp; Bisschoff (1990) | Medium risk (rugby) and low risk (marathon runners) male part. | SSS Form V | * Rugby players scored significantly higher overall on sensation seeking |
| Cronin (1991) | Male and female university mountain climbers and volunteer control group | SSS Form V | * Mountain climbers scored higher on Total, ES, and TAS subscales |</p>
<table>
<thead>
<tr>
<th>Study Authors</th>
<th>Study Group</th>
<th>Measure</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Hartman & Rawson (1992) | Male and female varsity & nonvarsity athletes (basketball, volleyball, golf, track & field, tennis, swimming, football) & nonathletes | SSS Form V | * Male scored higher than female, regardless of athletic ability  
* Athletes scored higher than nonathletes, regardless of gender  
* No interactive effects between gender and athletic ability  
* Age related to one subscale |
| Campbell, Tyrrell, & Zingaro (1993) | Male and female canoe club members | SSS Form V | * Male and female paddlers had higher TAS scores than comparable norms  
* TAS correlated negatively with anxiety levels  
* The correlation with the difficulty level of rivers, paddlers would like to attempt, approached significance |
| Horvath & Zuckerman (1993) | Male and female university students | SSS Form V | * Relationship between SS & impulsivity, appraisal of risk in several areas including crime, financial, social violations, sport and risk of AIDS from sexual activity, and risky behaviour in the same areas  
* Perceived peer behaviour and SS, are strong predictors of risky behaviour particularly in crime and social violations  
* Personal risk appraisal was negatively related to risky behaviour except in AIDS risk, where it was positively related for men |
3.2.4.2. Self Concept Studies

Zion (1965) studied 200 freshman women enrolled in Humboldt State College, in relation to self-concept and body concept. The author defined self concept as all possible self-regarding attitudes which constituted four primary facets: self-description, self-acceptance, ideal self, and self-description-ideal discrepancy. She used the Index of Adjustment and Values to measure these facets. Body-concept was defined by Zion (1965) as all possible body-regarding attitudes consisting of four primary facets: body description, body acceptance, ideal body, and body description-ideal discrepancy. The author used a test developed by herself, using 5 different Guttman scales to measure the first three facets while the fourth was determined by the difference between the first and the third.

Zion (1965) concluded that a significant linear relationship existed between self-description and body description, between ideal self and ideal body, and between self-description-ideal discrepancy and body description-ideal discrepancy. An ambiguous relationship between self-acceptance and body acceptance was found.

In viewing the self-actualizing and self concept traits of athletes, Ibrahim and Morrison (1976) compared 100 male and female high school and college athletes with a group of 100 nonathletes. The results indicated that in general, the athletes had an average self-actualizing trait and less than average self concept. In relation to gender differences, the male high school
athletes differed marginally from the nonathletes on both self-actualizing and self concept, while the female college athletes differed from the nonathletes only on self-actualization. Male college athletes and female high school athletes did not differ from their corresponding nonathletic groups.

Vincent (1976) administered the Tennessee Self Concept Scale to 460 college women athletes, nonathletes, physical education majors, general college students, and both the participants and non-participants in high school competitive programs. She found that both the physical education majors and the participants in a high school competitive athletic program scored significantly higher on self concept than all other groups. In support of the work of Malumphy (1968), who found no differences in self concept between women aquatic athletes and non-participants, college women athletes did not differ significantly from non-athletes. Only one other significant difference was found, namely that nonathletes scored higher than athletes in the category of family self.

Joesting and Clance (1979) administered the Secourd-Jourard Body-Cathexis and Self-Cathexis Scale to 56 male and 24 female runners, and 14 male and 31 female non-runners. The difference between the means for the female runners and non-runners was not statistically significant. While no significant differences were found between sexes, the male runners had both a better self concept and body concept than the non-runners.
Joesting (1981) maintains that regular participation in physical activities such as running, swimming, cycling, etc., enhances mental health. Her study compared community college students, participating in five or more hours of physical activity per week, with students reporting no regular activity. The 66 students, comprising of 37 sport participants and 29 non-sport participants, completed the Body-Cathexis and Self-Cathexis Scale. The high score on the Body Scale suggested that those who participated in physical activity had a better view of their bodies as well as a higher self concept as measured by the Self-Cathexis Scale. This finding is in line with the findings by Joesting and Clance (1979), who reported that runners had significantly higher scores on both scales, when compared to non-runners.

In studying the effects of a seven week distance running program on self concept on 5th and 6th grade pupils in public elementary school, Percy, Dziuban and Marin (1981), found a marked increase in their self concept.

Salokun and Toriola (1985), using Cattell’s 16PF in a Nigerian study, found that athletes in basketball, soccer, sprinting, and hockey were more self assured than the nonathletes. The findings provided support for Kroll (1967), Brunner (1969), and Schendel (1970, in Salokun & Toriola) who provided evidence that athletes had higher senses of personal worth as well as high self-concepts.

Brustad and Weiss (1987) undertook a study which used Harter’s
1978 theory of competence motivation. The theory proposes that individuals possess an inherent desire to feel and to express their personal competence and control in various achievement situations. Hence the competitive motive would be enhanced by the positive self-related affective feelings which accompany the successful mastery of experiences. The theory also suggests that affective experiences such as anxiety which are experienced in sport, are directly related to the individual's underlying perceptions of self-worth, personal ability, and internal control over the outcomes in a given achievement domain. Brustal and Weiss (1987) used a sample of 55 boy baseball players and 58 girl softball players who completed the SCAT and six other measures, used to measure competence and self-esteem.

The results showed that the high competitive trait-anxious (CTA) boys manifested lower self-esteem levels than the low-CTA boys, but did not express as great a frequency of evaluation worry by others as expected. For the girl sample, no significant relationship emerged between the CTA levels and perception of self or frequency of worry.

In a doctoral thesis by Smit (1988), the relationship between the self concept and a variety of variables within a sport context which may contribute to the development of the individuals' self system was studied. The subjects completed a standardised battery of questions used to test sport self concept of high school boys (adolescents). The sample comprised 3,246 standard 6-10 males attending Transvaal Afrikaans Schools, whose mother language was Afrikaans. The subjects completed the Adolescent Self Concept
Scale and a biographical questionnaire compiled by the author.

Nine important findings resulted: (1) that participation in sport, motor competence and leadership opportunities within sport all positively contribute towards the development of self concept; (2) in developing a self image during the high school period, socio-economic status, age, and birth order are of little importance; (3) positively related to the global self concept is that of academic achievement; (4) encouragement, acknowledgement and interest in the subjects' passive or active sports participation, by significant others (namely teachers, family, friends, parents, and peer-group) contribute positively towards the development of the self; (5) whether the participation is active or passive in sport, it provides a positive relationship with the global self concept while the most consistent positive relationship is viewed in relation to the social, physical, personal and family dimensions; (6) the sport self concept which includes all other variables identified from the sporting context, contribute to the development of the self concept; (7) the high school boy views his self through a definite social and personal component; (8) due to the fact that sport participation has a distinctive social connotation, it is believed that it should be utilised in the development of the high school boys' view of being a social competent individual; and (9) the prime contributor towards the formation of self attitudes is the perception of success in sport rather than the actual success. In conclusion, it is the belief of Smit (1988) that since the sport self is a significant dimension of the self structure, it should be utilised and exploited in an attempt to improve the positive
global self concept of high school boys, through the purposeful involvement in sport.

Smit and Scholtz (1989) reported that involvement in sport and the individual’s sport-self, are to be considered as significant dimensions of the global self of the individual. The study focused on adolescent school boys with Afrikaans as home language. The authors concluded that the sport self-concept factor can be an indication of other attitudes towards the individual’s involvement in sports. His sport-self can also serve as a predictor of his global self concept.

Based on further research on adolescent school boys, Smit (1990) suggests that sport is a social institution which contributes to the socialising process. As a result of his social involvement, which includes sport, the individual’s self concept is influenced by his perception of sport-related social influences. Interestingly, Smit (1990) found that the subjects’ perception of their own success in sport, the involvement of their teachers, their self-worth, their competence in sport, and their positive involvement of their peer group were below average. This provided a negative rather than a positive contributor for the boys’ positive sport- self and self-concept. Smit (1988) suggests that the manner in which the school boys perceived their successes was a strong indicator and contributor to a positive sport self and global self. Smit (1990), reports that only 17,2% of the boys regarded themselves as very successful, while 44,2% regarded themselves as very unsuccessful in relation to their sport involvement. Smit (1990) recommends further research on the
handling of individuals, especially those with lower physical competence, within the sport context and their development of a positive self-growth.

Jones, Swain and Cale (1991) examined the gender differences in cognitive anxiety, somatic anxiety, and self-confidence in university athletes in precompetition. The sample of 56 subjects (28 males and 28 females) were tested on the Competitive State Anxiety Inventory-2 (CSAI-2) and six antecedent items during the week preceding the competition. With regard to cognitive anxiety, the male sample showed no change and remained stable during the week while the female sample showed a progressive increase in cognitive anxiety as the week proceeded. The greatest significant increase was found on the actual day of the competition. With regard to somatic anxiety, both males and females exhibited the same pattern with an increase on the day of the competition. Both genders showed a decrease in self-confidence as the competition neared although the females decreased to a greater extent.

A section of literature in sport psychology has been specifically directed to the apparent lack of self-confidence in females. As noted by Lirgg (1991), this phenomena has been viewed with concern by researchers in sport psychology. An explanation for this apparent lack of confidence is offered by Lenney (1977, in Lirgg), where she suggests that females display lower confidence than their male counterparts in only three situations: (1) when the task is male oriented; (2) when the task or situation is competitive or involves comparison; and (3) when the feedback after the situation is ambiguous.
In Lirgg's (1991) meta analyses of the existing literature on female self confidence in sport, four criteria were used to select relevant literature. Resulting from this selection procedure, 35 studies were chosen which together yielded 46 separate effect sizes. The findings suggest that the sex-type of the task in the studies viewed contribute to the confidence findings. The more masculine the task is considered, the greater the self-confidence differences between males and females became. Only one study investigated a feminine task, which provided results overwhelmingly in favour of the females' confidence. Lirgg (1991) notes that competition did not appear to play a major part or role in the self-confidence differences. This may be due to few differences found between competitive and individual tasks.

3.2.4.2.1. Synopsis

Synopsis 5 (see following three pages) presents a summary of the Self Concept studies viewed in this study.

The subjects in the various studies are diverse, as are the measuring instruments used in the research studies. Joesting and Clarence (1979), Joesting (1981), Percy et. al. (1981) and Salokun and Toriola (1985) suggest that athletes have better self concepts' than the nonathletes. However Ibrahim and Morrison (1976) found athletes to have below average self concepts. Smit (1990) in a South African study on adolescent school boys, suggests that sport involvement appeared to have a more negative than positive contributing effect on the individual's self
concept. Jones et. al. (1991) notes that as the competition neared, the athletes deteriorated in their level of self concept.

A factor not often taken into consideration when developing the research question, is presented by Lirgg (1991). This concerns the task which the subject is asked to perform. Lirgg (1991) suggests that these tasks are extremely masculine and this may influence the female athlete’s ability to perform on such a task. It is suggested that this factor may be a contributing factor in the discrepancies in self concept between gender groups.
**SYNOPSIS 3.5: Self Concept Studies Research**

<table>
<thead>
<tr>
<th>AUTHOR</th>
<th>SAMPLE/SUBJECTS</th>
<th>TEST</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zion (1965)</td>
<td>Female freshman college students</td>
<td>Index of Adjustment &amp; Values &amp; test for</td>
<td>* Significant linear relationship between self-description and body-description, ideal self and ideal body, and self-description-ideal discrepancy and body description-ideal discrepancy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>body concept</td>
<td>* The relationship between self acceptance and body acceptance was ambiguous</td>
</tr>
<tr>
<td>Ibrahim &amp; Morrison (1976)</td>
<td>High school and college, male and female athletes, and nonathletes</td>
<td>Personal Orientation Inventory</td>
<td>* Athletes were average on self-actualizing and below average in their self concept</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* While high school male athletes differ from nonathletes on both, female college athletes differ from nonathletes only on self-actualizing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Female high school athletes and male college athletes did not differ from their counterparts</td>
</tr>
<tr>
<td>Vincent (1976)</td>
<td>College women athletes and nonathletes, physical education major general college students, and high school part. and nonparticipants</td>
<td>Tennessee Self-Concept Scale</td>
<td>* Women physical education majors and high school participants had significantly higher self concept scores than all the other groups</td>
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<tr>
<td></td>
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<td></td>
<td>* Nonathletes only scores higher on family self than athletes</td>
</tr>
<tr>
<td>Joesting &amp; Clarence (1979)</td>
<td>Male and female runners and nonrunners</td>
<td>Secourd-Jourard Body- &amp; Self-Cathexis Scale</td>
<td>* No significant difference was found on either scale for female runners and nonrunners</td>
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<td></td>
<td></td>
<td></td>
<td>* No significant differences between sexes</td>
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<td></td>
<td></td>
<td></td>
<td>* Male runners had better self concept and body concept than nonrunners</td>
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<tr>
<td>Study</td>
<td>Participants</td>
<td>Measures</td>
<td>Findings</td>
</tr>
<tr>
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</tr>
<tr>
<td>Joesting (1981)</td>
<td>Sport and nonsport active college students</td>
<td>Body- &amp; Self-Cathexis Scale</td>
<td>* Participants in physical activity had better view of their bodies as well as a higher self concept than nonparticipants</td>
</tr>
<tr>
<td>Percy, Dzuiban, &amp; Marin (1981)</td>
<td>5th and 6th Grade elementary school pupils</td>
<td>-</td>
<td>* 2 week distance running program had a marked improved effect on self concept</td>
</tr>
<tr>
<td>Salokun &amp; Toriola (1985)</td>
<td>Athletes (basketball, soccer, sprinters, hockey players) and nonathletes</td>
<td>16PF</td>
<td>* Athletes were more self assured than nonathletes</td>
</tr>
<tr>
<td>Brustad &amp; Weiss (1987)</td>
<td>Boy (baseball) and Girl (softball) athletes, which divided into two groups on anxiety</td>
<td>SCAT</td>
<td>* High competitive trait anxiety (CTA) boys reported lower levels of self-esteem and more frequent worries about their performance. * Girls, no significant relationship was found between levels of CTA and cognitive variables</td>
</tr>
<tr>
<td>Smit (1988)</td>
<td>Std 6-10 secondary school boys</td>
<td>ASCS</td>
<td>* Participation in sport, motor competence and leadership opportunities in sport all contribute to positive self development. * Eight other findings regarding global self were uncovered</td>
</tr>
<tr>
<td>Smit &amp; Scholtz (1989)</td>
<td>Afrikaans secondary school boys</td>
<td>ASCS</td>
<td>* Positive and significant correlation between global self-concept and sport self-concept</td>
</tr>
<tr>
<td>Study</td>
<td>Population</td>
<td>Measure</td>
<td>Findings</td>
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<td>----------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Smit (1990)</td>
<td>Afrikaans secondary school boys</td>
<td>ASCS</td>
<td>* Boys who perceived their families to be average in the way of sport-involvement were accommodated and accepted</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Boys' perception of their success in sport, self worth were below average</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Sport involvement at secondary school level seems more negative than positive contributor towards sport-self and the self-concept</td>
</tr>
<tr>
<td>Jones, Swain &amp; Cole (1991)</td>
<td>Male and female university athletes</td>
<td>Competitive State Anxiety Inventory-2 (CSAI-2)</td>
<td>* Male sample showed no change in cognitive anxiety and remained stable in the week preceding competition, females showed an increase in anxiety</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Male and female showed an increase in somatic anxiety on the day of competition</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Both showed decrease in self-confidence as competition neared</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Females showed a greater increase</td>
</tr>
<tr>
<td>Lirgg (1991)</td>
<td>Meta-analysis of recent studies</td>
<td></td>
<td>* Found that studies using masculine tasks produced a larger effect-size difference than neutral tasks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Only one study employed a feminine task, which resulted in a larger effect size favouring females</td>
</tr>
</tbody>
</table>
Chapter 3 presented research studies concerning sport personology. A great deal of the literature presents a confusing picture, since the various research studies attempted to look at the same issue from different angles and theories. One critique is that few studies are based on personality theories. The studies are also varied in their use of subjects and testing instruments, impending comparative analyses.

A number of research studies could indicate personality differences between athletes and nonathletes. The athlete is often seen as dominant, self-confident, aggressive, intelligent, tough minded and extraverted. It however appears that athletes have low self concepts. Some studies suggest that there are personality differences between male and female athletes. When compared to the nonathlete however, these differences are not significant. Research concerning sensation seeking, is diverse with regards to sport types, as much of the literature has been used to classify sports and to validate the existence of the sensation seeking trait.

Chapter 4 focuses on temperament issues directly pertinent to the present study.
CHAPTER 4

EMPIRICAL BACKGROUND TO ISSUES PERTINENT TO PRESENT

STUDY: (a) THE ROLE OF TEMPERAMENT IN

SWIMMING, (b) SUCCESSFUL VERSUS UNSUCCESSFUL

SPORT PARTICIPANTS

Research concerned with the objectives of this study are investigated in this chapter. Two topics are covered, namely the temperament traits of swimmers, and of successful versus unsuccessful sport participants. The former concerns all those studies related to swimming or those studies which used swimmers as part of their sample group or used swimming in sport comparisons. The latter concerns research which has attempted to find differences amongst successful athletes, all of whom have achieved at varying levels.

4.1. Research on the Temperament Traits of Swimmers

All research studies presented under this section, are ordered according to date of publication.
4.1.1. International Studies

Whiting and Stembridge (1965) categorized non-swimmers attending a swimming teaching class into two groups: (1) those who had previously attended instruction but could not yet swim (persistent nonswimmer); and (2) those who had never received any instruction (nonswimmer). Using the Maudsley Personality Inventory (MPI) on university male students showed that the first category (persistent nonswimmer) had a lower extraversion mean than the second category (nonswimmer) but that this finding was only significant at the 10% level. No differences between the two groups could be demonstrated with regard to the neuroticism subscale of the questionnaire. The authors admit to the possibility of the second group reverting to the first category of persistent non-swimmers.

In the second section of their study, Whiting and Stembridge (1965) tested 11 and 12 year old boys from ten schools using the Junior MPI. The boys were divided into persistent nonswimmers and nonswimmers. The results showed highly significant differences. the nonswimmers were more introverted while highly significant differences in neuroticism were found between the 11 year old and in the 12 year old groups showing the nonswimmers to be more neurotic.

Behrman (1967) investigated whether there were any personality differences between male college freshman swimmers and nonswimmers. He also attempted to determine a possible relationship between these personality traits and the swimming
progress among nonswimmers undergoing a common course of learning how to swim. The hypothesis for the study was that some nonswimmers would have personality traits making learning how to swim exceedingly slow and difficult, if not hopeless. The nonswimmers (n=102), defined as freshman unable to swim 75ft. or one length of the pool, were compared with an equal number of swimmers. The author used various instruments in the comparison; the Maximum Swimming Ability Test, the Guilford-Zimmerman Temperament Survey (GZTS), a biographical data form, and an interview. The results indicated significant personality trait differences between swimmers and nonswimmers, and between learners and nonlearners. In relation to the GZTS, significant group differences were found in mean scores on six scales, although these differences were relatively small. The results also indicated that nonswimmers were behaviourally more restrained and that the greater the degree of swimming competence, the more ascendent and socially bold the individual became. Nonswimmers appeared more shy and seclusive than swimmers. No significant differences manifested between the nonswimmers and swimmers with regard to emotional stability or objectivity. Learners and nonlearners however differed on the emotional stability and the objectivity factors. A low score on the Friendliness scale was found for the swimmers. This can either be viewed as energy or aggressiveness which represents a fighting spirit, or hostility representing antisocial reactions. Behrman (1967) suggests that a high score on the Friendliness subscale represents a lack of aggressiveness and possibly the "will to win", which is a neccessary component of participation in the sport. In conclusion Behrman (1967) notes
that the proficient swimmer is lower on restraint and friendliness, but higher on the sociability scale compared to the nonswimmer.

Rushall (1967), in viewing the dimensions of authoritarianism, found that competitive swimmers possessed the trait of aggression. This finding was supported by Peterson, Weber and Trousdale (1967), who noted that athletes tended to be more aggressive than nonathletes, when the educational background and age factors were held constant and similar. Much the same results were found by Ho and Walker (1982).

Newman (1968) compared swimmers ranked according to swimming ability, in terms of personality traits as measured by the Thurstone Temperament Survey. The subjects comprised 21 male swimmers participating in the university swimming program of College High School at Bartlesville, Oklahoma. The swimmers were timed throughout the season and the rank of each swimmer was calculated and compared to the seven personality traits. The author found that the Dominance trait was positively correlated with the 100-yard freestyle ranking \( (p < 0.05) \). This suggests that these swimmers thought of themselves as leaders, capable of taking initiative and responsibility. The second finding, was a negative correlation between the Sociability trait and the 100-yard breaststokers. A high score would have indicated swimmers who enjoyed the company of others, were able to make friends easily, and were more sympathetic, cooperative and agreeable. The third finding was a negative correlation between the Reflective trait and the 200-yard freestyle. This meant these
swimmers were less meditative, and preferred practical rather than theoretical problems. High ranked breaststokers scored low on both Dominance and Impulsiveness ($p < 0.05$). A high score would have indicated swimmers with a carefree disposition, who made decisions easily, enjoyed competition and were able to change easily from one task to another. No differences between the groups were found with reference to the other subscales of the Thurstone Temperament Survey. They were equally active, vigorous, impulsive, stable, and sociable.

Meredith and Harrison (1969) compared the personality traits of 167 novice female swimmers with 264 females involved in nonswimming activity classes, namely basic movements, tennis and golf. The authors used Cattell's 16PF questionnaire. The results indicated that the female novice swimmers exhibited a general pattern of introversion (the 16PF factors are A-, F-, H- and Q2+). From an interview before their swimming course began, the subjects noted the motivation for volunteering was an attempt to enhance their social lives.

Cattell, Eber and Tatsuoka (1970, in Eysenck, Nias & Cox, 1982) completed a study comparing Olympic athletic champions, football players, and male and female swimmers by using the 16PF. The results showed the Olympic athletes to have high ego strength, dominance, low superego, and an adventurous temperament. The Olympic group also showed a low proneness to guilt feelings and little sense of inadequacy. With regard to the secondaries, their characteristics showed high extraversion, tough poise (cortertia), independence and low anxiety. Cattell et. al. (1970)
Cattell (1970) concludes that "the swimmer and college team football players stand in the same general personality category, but with less extreme scores. The high extraversion is modified in champion swimmers who share their high dominance and surgency, but are otherwise...not so extraverted."

(in Eysenck, Nias & Cox, 1982, p 11).

The football players, had lower intelligence scores, were tough minded (harria), had more practical concerns (praxernia), and group adherence. This provides a profile of an alert, action-oriented, practical personality type who is dominant and group-dependent. There appeared to be a similarity between the swimmers and football players. In general, the impression formed from this study was that the athletes were a stable, extraverted group of men and women.

Mahoney (1974) compared the personality traits of 16 outstanding swimmers to 11 less outstanding swimmers. The selected subjects were swimmers drawn from the Indiana University and Ithaca College. The 16PF was administered to all the swimmers. The results suggested that while the swimmers did not differ from males of similar age, they differed from the normal population on factors A (more reserved, aloof), B (more intelligent), E (more assertive, independent, aggressive), and N (more forthright).
While both the outstanding and less outstanding swimmers differed from the population, the two groups did not differ significantly from one another on any of the 16 factors. The more successful swimmers differed from the population on factors A, B, N and Q3 (more undisciplined, self-conflict), while the less outstanding swimmers differed from the normal population on only one factor, namely E.

Using a total sample of 89 women, Olyster and Arrasmith (1975) investigated the personality differences between three categories of sport participants: competitive swimmers, noncompetitive synchronized swimmers, and nonactive women. The 16 PF indicated that the competitive swimmers were the highest on factors C, E, L, N, Q1, III and IV; representing factors of higher ego strength, dominance, protension, shrewdness, radicalism, alert poise and independence. The synchronized swimmers scored highest on factors B, H, and II; suggesting intelligence, venturesomeness and extraversion. The noncompetitive women scored highest on the remaining factors A, F, G, I, M, Q2, Q3, and Q4; representing factors of warmheartedness, surgency, high superego strength, tender-mindedness, imagination, self-sufficiency, high strength of self-sentiment, and high ergic tension. It was interesting that the noncompetitive group scored highest in the self concept subscale. This supports other findings that competitive athletes do not necessarily have high self-concepts.

O'Connor and Webb (1976) reported that female non-athletes and females involved in swimming and basketball scored higher on the control trait compared to those females involved in either tennis
Anderson (1977) investigated the personality differences between Olympic, National, and Nonnational swimmers. Between 1971 and 1976, volunteer swimmers from universities and swim teams were administered the 16PF, which he combined with his results obtained from testing the 1972 U.S. Olympic Swimming Team. In total a sample of 152 swimmers were then divided into categories according to their success and their stroke classes (namely distance swimmers, middle distance, and multi stroke swimmers). Anderson notes that 6 second order personality factors were found to account for 68.1% of the variance namely security, sociability, leadership, creativity, surgency, and compulsion. The security factor consisted of insecurity, tenseness and suspiciousness while the sociability factor consisted of sociability, adventurousness and tender-mindedness. The leadership factor was formed from radical, dominant and imaginative traits while the imagination factor combined with abstract thinking and sensitivity to establish the creativity factor. The surgency factor was created primarily from the first-order trait of dominance and adventurousness, while lastly, the compulsion factor came from will-power or compulsion, strengthened by persistent inner tension.

Anderson (1977) reports that sociability was the only factor where differences were noted amongst the mean scores of the teams, notably that the National and Nonnational finalists were more sociable than the Olympics swimmers. Variance differences showed the National finalists, and the combined Olympic and
National finalists, more heterogeneous on sociability and leadership when compared to the Nonnational finalists. The Olympians showed greater heterogeneity in leadership than the Nonnational finalists. The last finding indicated the National finalists displaying more heterogeneity on surgency and compulsion than the Olympic swimmers.

Anderson (1977) notes that coaches should be prepared to work with female competitive swimmers who are aloof, cold, jealous and suspicious. Female competitive swimmers tend to be independent, aggressive and pursue their goals in a dominating and emotionally mature method and manner. They are critical, yet reserved, realistic and tough-minded in approaching problems which may confront the athletes. They appear to be average in intelligence, superego strength, spontaneity, imagination, sentimentality, self-concept and tension.

Morris, Vaccaro and Clarke (1979) investigated the locus of control and self esteem of 20 male swimmers ranging in age from 7-17 years. Locus of control was defined as the manner in which the individual perceives the reinforcement they receive. The internally focused person would regard rewards as being due to his own efforts and hard work, while the externally focused individual would regard rewards as resulting from either environmental factors or the efforts of his coach and other persons. The swimmers with high self esteem, were found to have internal locus of control. The results showed a significant difference between these swimmers and their age-mates, since the scores for self esteem were higher than the published norms. The
authors suggest that these young swimmers appeared to have a more realistic view of the world and a more positive self-attitude in comparison to their peers.

Riddick (1984) compared the personality characteristics of 26 female collegiate, university swimming team members with 28 female recreational swimmers and 25 physically inactive peers. These characteristics were measured using the Profile of Mood States (POMS), Levenson's Multi-dimensional Locus of Control (LOC), the California F-Scale, and the Sports Competition Anxiety Test (SCAT). In discussing the results, Riddick notes that the university athletes experienced slightly more tension compared to the two nonathletic groups. On the other hand, the recreational swimmers were slightly lower in levels of depression, anger, and confusion. The competitive- and recreational-swimmers had significantly higher vigour scores than the inactive women, whereas the athletes alone scored significantly higher in their levels of fatigue than both other groups. With regard to the total mood disturbance, the recreational swimmers obtained the lowest scores.

With reference to locus of control, Riddick (1984) notes that in contrast to the theoretically based research hypotheses, no group consistently scored in the same pattern on the three dimensions. However on the authoritarianism scale, the swimming athletes scored significantly higher than either of the other groups. The swimmers appear to be more submissive and aggressive. Riddick (1984) suggests an explanation for the submissive factor, in that competitive swimming requires hard work and dedication while
those who are lazy, either give up or are "coached" out of the sport. Hence these athletes are predisposed towards authority and discipline. She can however, not provide an explanation for the authoritarianism of the swimmers' personalities.

On the SCAT, both university swimmers and inactive athletes experienced pretest precompetitive anxiety. The swimmers reported both calmness and nervousness, and an awareness that their hearts were beating faster than usual. Riddick (1984) is of the opinion that such findings suggest that athletes enter into competition with unflattened emotions.

"The personality characteristics associated with the varsity female athletes described above are markedly different from how other groups of athletes have been described in the literature. Indeed, the 'iceberg profile' appeared to be more characteristic of the recreational pursuer of swimming than the athletic swimmer" (Riddick, 1984, p 166).

In overview, Riddick (1984) suggests that the recreational swimmers appear to have more positive personality characteristics compared to the female competitive swimmers or the inactive peers. She does however suggest that this study needs to be replicated, that studies should focus on comparing female athletes from different sports, and most importantly, whether in fact successful elite competitive female swimmers possess uniquely different personality traits in comparison to their non-elite swim team members. Riddick (1984) suggests that her
findings of the recreational swimmers having the "iceberg profile", could be the result of two possible explanations. Firstly that those college women who engage in recreational swimming have superior personality profiles, or secondly, that with regard to the athletic swimmers, their true precompetitive states rather than their true personality traits have been measured.

A study by Gould, Feltz and Weiss (1985) assessed the participation motives of competitive youth swimmers (8–19 years old) and whether sex, age, ability, and the level of experience influenced their participation objectives. The 30 objectives involved in participation were assessed by the Gill, Gross and Huddelson (1983) Participation Motivation Inventory, amongst 365 youth swimmers. The authors' findings supported previous studies, noting that swimmers rated fun, fitness, skill improvement, team atmosphere and challenge as the motives most important for their continued participation. Importantly, this study found that females were equivalent to the males in their emphasis on achievement-status, yet they placed greater emphasis on friendship and fun.

4.1.1.1. Synopsis

A synopsis of the swimming literature presented in this study, is provided in the following three pages.

Few inferences can be made from the diverse findings of these studies. Whiting and Stenbridge (1965), Meredith and Harrison
(1969) and Cattell et. al. (1970) found swimmers to be more introverted than the other athletic groups or the control group. Rushall (1967), Davis (1978) and Riddick (1984) conclude that swimmers appear more aggressive than other athletes. Oyster and Arrasmith (1975) suggested that the nonactive participants in their study had higher self concept scores than the competitive female swimmers, while Morris et. al. (1979) found male swimmers to have higher self esteem scores than the general population. The contradictory findings may be a result of the gender differences between the sample groups. Other studies suggest that competitive swimmers score higher on dominance, intelligence, assertiveness, protension, shrewdness, and independence when compared to other athletic groups.
<table>
<thead>
<tr>
<th>AUTHOR &amp; YEAR</th>
<th>SAMPLE/SUBJECTS</th>
<th>TEST</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whiting &amp; Stembridge (1965)</td>
<td>Male university non-swimmers at teaching class</td>
<td>MMPI</td>
<td>* Those non-swimmers who had previously received instruction, had lower extraversion means</td>
</tr>
<tr>
<td></td>
<td>11 and 12 year old school boys</td>
<td></td>
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<td></td>
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<td>Junior MMPI</td>
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<tr>
<td>Behrman (1967)</td>
<td>Male university college freshman swimmers and nonswimmers</td>
<td>Guilford-Zimmerman Temperament Survey</td>
<td>* Non-swimmers were more introverted and more neurotic than swimmers of the same age group</td>
</tr>
<tr>
<td>Rushall (1967)</td>
<td>Competitive swimmers</td>
<td>-</td>
<td>* Significant personality trait differences between nonswimmers and swimmers, and between nonlearners and learners</td>
</tr>
<tr>
<td>Newman (1968)</td>
<td>Male high school swimmers ranked on time tests</td>
<td>Thurstone Temperament Survey</td>
<td>* Six scales showed differences, although relatively small</td>
</tr>
<tr>
<td>Meredith &amp; Harrison (1969)</td>
<td>Female novice swimmers &amp; females enrolled in basic movements, tennis, and golf</td>
<td>16PF</td>
<td>* Competitive swimmer possesses the trait of aggression</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>* Dominance trait correlated positively with 100-yard freestyle ranking</td>
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<td></td>
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<td></td>
<td>* Negative correlation was found for Sociable trait and 100-yard breaststroke, and with the Reflective trait and 200-yard freestyle</td>
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<td></td>
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<td></td>
<td>* Group of swimmers exhibited a general pattern of introversion</td>
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<td></td>
<td></td>
<td></td>
<td>* Motivation for swimmers joining swimming class, was to enhance their social lives</td>
</tr>
<tr>
<td>Author</td>
<td>Description</td>
<td>Test(s)</td>
<td>Findings</td>
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</tbody>
</table>
| Cattell, Eber & Tatsuoka (1970) | Olympic athletic champions, football players, and male and female swimmers were compared | 16PF     | * Olympic group showed high extraversion, tough poise, independence, and low anxiety  
* Swimmers and football players are similar to the general personality, with less extremes  
* Swimmers are high in dominance and surgency, but not so extraverted |
| Mahoney (1974)       | Male outstanding swimmers compared to less outstanding swimmers              | 16PF     | * The outstanding and less outstanding swimmers differed from the population, but not from one another  
* Swimmers differed from population on aloof, more intelligent, assertive and forthright |
| Olyster & Arrasmith (1975) | Female competitive swimmers, noncompetitive synchronized swimmers & nonactive people. | 16PF     | * Competitive swimmers scored highest on ego strength, dominance, protension, shrewdness, radicalism, alert poise, and independence  
* Synchronized swimmers scored highest on intelligence, venturesomeness, extraversion.  
* The nonactive individuals scored highest on self concept |
| Anderson (1977)      | Olympic, National and Nonnational swimmers divided on success and stroke     | 16PF     | * Sociability was only factor to differentiate groups, Olympic being less than two other groups  
* Olympians showed greater heterogeneity in leadership than Nonnational finalists  
* National finalists more heterogeneous on surgency and compulsion than Olympic swimmers |
| Davis (1978)         | Teenage competitive swimmers                                                | Rorschach Inkblot Test, HSPQ | * Swimmers compete for social interaction.  
* The more basic needs of abasement and self-punishment are satisfied by the rigid training program  
* All swimmers are threatened by their aggression impulses  
* No striking personality similarities between swimmers, or between swimmers and coach |
<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
<th>Measures</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morris, Vaccaro &amp; Clarke (1979)</td>
<td>Male swimmers</td>
<td>Locus of Control</td>
<td>* The self-esteem scores were higher for the swimmers than the published norms</td>
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<td></td>
<td></td>
<td>POMS, LOC, California F-Scale, &amp; SCAT</td>
<td>* Young swimmers appeared to have more realistic view of the world and more positive self-attitude in comparison to their peers</td>
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<td></td>
<td>Female collegiate, varsity swim team members, recreational swimmers and physically inactive peers</td>
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<td>* Recreational swimmers had lowest total mood disturbance</td>
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<td></td>
<td>* Two swimming groups had more vigor than non-athletes, &amp; varsity swimmers were more fatigued than class mates</td>
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<td></td>
<td></td>
<td></td>
<td>* No differences on LOC Scale</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>* Swimmers particularly more aggressive and submissive</td>
</tr>
<tr>
<td>Riddick (1984)</td>
<td>Competitive swimmers differed in sex, age and level of experience</td>
<td>Gill, Gross &amp; Huddelston Participation Motivation Inventory</td>
<td>* On SCAT, varsity and inactive students experienced greatest pre-competition anxiety</td>
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<td></td>
<td></td>
<td></td>
<td>* Overall results suggest that recreational swimmers had more positive personality characteristics</td>
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<td></td>
<td>* Swimmers rated fun, skill improvement, team atmosphere and challenge as most important</td>
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<td></td>
<td></td>
<td></td>
<td>* A number of sex and age differences in participation were also evident</td>
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<td></td>
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<td></td>
<td>* Females were equivalent to males on achievement emphasis, although higher on Friendship and fun</td>
</tr>
<tr>
<td>Gould, Feltz &amp; Weiss (1985)</td>
<td></td>
<td></td>
<td>* Females were equivalent to males on achievement emphasis, although higher on Friendship and fun</td>
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</tbody>
</table>
4.1.2. A South African Study

In a South African study, Davis (1978) makes a rather complicated psychodynamic study of teenage competitive swimmers. She notes the four aims to the study as follows: (1) what attracts this group of teenagers to competitive swimming (2) the importance of the coach, parent and the swimmer himself, with regard to motivation; (3) whether there are any personality characteristics common to the swimmers, and to the swimmers and their coach; and (4) whether the child's participation in swimming has any detrimental effect on his adjustment.

The study focused on 13 subjects tested in the height of the swimming season. It was made up of four swimmers, aged 11 to 14 years, their parents and their coach. The reason for the three girls and one boy all training with the same coach was to keep his influence constant. All subjects, except the coach, were Afrikaans speaking. Davis (1978) tested all 13 subjects with the Thematic Apperception Test, the Rorschach Inkblot Test, the Hostility and Direction of Hostility Questionnaire, and the 'Prestasie Motivering' Test. The four swimmers completed the New S.A. Individual Scale, High School Personality Questionnaire (or the Children's Personality Questionnaire), Subjective Evaluation of their own personalities, as well as their parents' and coaches' personalities, Draw-a-person Test, Edwards Personal Preference Schedule, and the Multiple Choice Questionnaire. The adults completed the 16PF, Subjective personality evaluations of themselves and the swimmer, and the Multiple Choice Questionnaire (the coach only).
Despite the small sample, Davis (1978) makes numerous conclusions: The main reason for the children competing in swimming was the opportunity to interact with their peers without emotional involvement which was seen as possibly threatening. They placed much emphasis on group social interactions in the squad. The swimmers have a need to be accepted and recognized by their peers, and success in swimming is a means to accomplish this, while attracting their parents' attention and approval. The more basic needs of abasement and self-punishment are satisfied by the swimmers adhering to the rigid training program. All the swimmers are threatened by their aggressive impulses, as overt expression of this aggression may lead to rejection while competitive swimming offered a socially acceptable opportunity to express it.

With regard to motivation, one girl appears to be self-motivated and proves herself through swimming while the other three swimmers want to achieve for their parents' sake. However, the parental motivation appears subtle. During the season, their coach and squad mates are important motivators, since they want to please their coach and squad rivalry. There were no striking similarities in the personalities between the swimmers or between the swimmers and their coach.

With regard to the children's adjustment, Davis (1978) notes that it was difficult to ascertain. It allows the swimmers to satisfy their frustrated needs, it allows for better family and peer interaction and communication. Their self-images were low and competitive swimming allowed them to build up self-confidence.
when they did well.

4.2. Successful Versus Unsuccessful Sport Participation

All research studies presented under this section are ordered according to date of publication.

As mentioned in the previous chapter, La Place (1954), using the MMPI, was able to find distinctions between major league and minor league baseball players. The former group was categorised as having a "strong" drive which La Place (1954) described as being ambitious, aggressive, and vigorous. The major league players also had strong self-discipline, with an ability to adjust to occupations requiring both initiative and social contact. In comparison, the minor league players, some of whom had equal drive to those of the major league players, failed to produce the same results on the field because of other detrimental traits.

In support of La Place (1954) who found temperament differences between good and poor competitors, is Booth (1958) who was able to show that 22 of the MMPI’s 550 items could discriminate between the good and poor athletes. To establish validity for these items, they were combined with 15 items of the L scale and 3 other MMPI items and administered to 21 athletes of the Iowa State University. Using rank order obtained from the coach, Booth (1954) found a coefficient of 0.63 which was significant at the 5% level.
Berger and Littlefield (1969) provided contrary evidence comparing football players who had been differentiated according to outstanding and nonoutstanding athletes, and nonathletes. None of the 18 items of the California Psychological Inventory (CPI) discriminated between the groups (at the 0.01 level).

Using normative data, Singer (1969) compared groups of tennis and baseball players on the Edwards Personal Preference Schedule (EPPS). Both sports coaches were responsible for providing Singer (1969) with a ranking of their respective players at the end of the season. With regard to highest and lowest ranked baseball players, the low rated group scored lower than the norm on Dominance. Both groups scored higher on Abasement than the norm, while on Endurance the low rated group were higher than the norm. With reference to the tennis group, the high rated players scored higher than the norm on Achievement. On Order the low rated tennis group were significantly lower than both the norm and the high rated players.

Highlen and Bennett (1979) tested 39 elite Canadian wrestlers. The questionnaire was adapted from the inventory developed by Mahoney and Avener (1977), and specifically focused on those psychological factors affecting both the wrestlers' training and competition. The sample was classified according to qualifiers (n=24) and nonqualifiers (n=15). The former group was defined as those wrestlers who made one of the three Canadian teams while the latter group were those wrestlers who failed to make any of the teams.
The most significant result was that the qualifiers were more confident than the nonqualifiers. This finding was consistent with Mahoney and Avener's (1977) result for elite gymnasts. The second important factor was that qualifiers reported being closer to their maximum wrestling potential than the nonqualifiers. Highlen and Bennett (1979) note that these two factors, independently and in combination, accounted for the greatest differences between the two wrestling groups. In support of Morgan's (1974, in Highlen and Bennett, 1979) research on elite wrestlers, this study also found that in terms of general anxiety, the qualifiers reported less stress both prior to and during competition. Imagery and Factors Affecting Performance were the only factors which did not discriminate between the groups.

In the study led by Dowd and Innes (1981), 93 sportsmen and women involved in squash and volleyball were compared on two levels namely between types of sport and between levels of competition. The former comparison was reviewed in Chapter 3. With regard to the second comparison, the authors found that State level players were more intelligent and less anxious than the average players. The state level players were also more experimenting, more conscientious and less controlled. The state level players could be described as faster learners, more alert, more sceptical, more tolerant of inconvenience and change, hard-working, but cheerful and active. Dowd and Innes (1981) noted that many of these are second-order factors of Extraversion, although as first-order factors they themselves showed no discrimination. This result supports the finding that high level participation is linked to
extraversion (Ogilvie, 1968; Kane, 1972).

Forty nine collegiate wrestlers participating in the Big Ten Conference Wrestling Championships held at Michigan State University volunteered to participated in a study carried out by Gould, Weiss and Weinberg (1981). The wrestlers completed a psychological skills inventory assessing psychological factors used in training and competition. The results provided support for previous research, suggesting successful athletes differ from less successful athletes with regard to cognitive strategies and skills which the athletes employ. Gould et. al. (1981) note that the more successful wrestlers believed they were closer to achieving their maximum potential as wrestlers; that they were more confident than the less successful wrestlers; and lastly, that they directed their attention to only match related thoughts whilst preparing for competition. It was also found that the wrestlers, as shown before, experienced greater levels of anxiety anticipating the competition than during the actual competition. Despite this the study showed few differences between the successful and less successful wrestlers' levels of anxiety or coping responses to the anxiety.

Corresponding results to that of Power (1982), were obtained by Huddelston and Gill (1981) using the CSAI or Marten’s Competitive State Anxiety Inventory on female track and field athletes who had been differentiated according to skill. No temperament differences between the two groups emerged, but the authors admit that the small sample size of only 19 may have influenced the results.
In the above mentioned study by Power (1982) the SCAT was administered to 65 adult male track and field athletes, had been divided into subgroups representing all ages, events, experience and abilities. Power (1982) concludes that despite the findings that anxiety tends to increase with age, no logical pattern with regard to competitive trait anxiety based on the various designated groupings emerged from the study.

Miller and Miller (1985) note in their introduction that very "little attempt has been made to predict relative levels of performance among elite sportswomen, solely from personality data" (p 290). The authors used five self-report inventories in a field-based setting on 20 elite netballers preparing for the World Tournament, in an attempt to discriminate between the successful and unsuccessful players. The initial squad chosen was divided into 12 successful and eight unsuccessful elite netballers. The five inventories used were: the Sport Competition Anxiety Test (SCAT), both forms of the State-trait Anxiety Inventory, the Profile of Mood States, and the shortened form of the Activation-Deactivation Adjective Check List.

Miller and Miller (1985) were unable to reveal any differences between the successful and unsuccessful netballers. This supported the findings of Power (1982), who had found no differences between track and field athletes with regard to anxiety levels. Smith (1983), on the other hand, found significantly lower anxiety scores for the all-star athletes compared to the playing substitutes. Miller and Miller (1985), in consultation with the netball selectors, suggest that
physiological factors such as speed, strength, and playing experience may have resulted in the eight players being dropped from the team.

Dippenaar and Potgieter (1986) undertook a study on first league cricketers using the SCAT and Test of Attentional and Interpersonal Styles (TAIS). The subjects were classified according to batsmen, fast bowlers, seam and spinbowlers, and each group divided into two categories according to degree of excellence. Dippenaar and Potgieter (1986) were unable to find statistically significant differences between the weaker and top cricket players in terms of competitive anxiety. The TAIS, however, was able to distinguish between groups. The top batsmen appeared to be influenced to a greater degree by environmental stimuli, compared to the weaker batsmen. While no distinction could be drawn between the top and weaker fast bowlers, the seam bowlers differed on three subscales. The top seam bowlers scored higher on introversion, lower scores in relation to expressing their negative emotions, and lower scores on expression of positive emotions. Only one scale distinguished between top and weaker spin bowlers, where the weaker spin bowler was overloaded with his own internal thoughts. Dippenaar and Potgieter (1986) conclude by suggesting that more attention be paid to Attentional and Interpersonal styles of cricket players than anxiety scores, which appear not to be of any influence.

Potgieter and Schooling (1986) used the POMS, SCAT and TAIS to compare junior provincial and international squash players. As with the findings of Dippenaar and Potgieter (1986), Potgieter
and Schooling were unable to distinguish between the international and provincial squash players in terms of anxiety. The study did however find significant differences on three of the six attentional subscales, namely BIT, NAR and RED. The higher score by the international players on Broad Internal Attentional Focus (BIT) means that they are able to analyse and plan their game strategy more effectively than the less experienced player. The international players also scored higher on Ability to Narrow Attentional Focus (NAR) which means that these players are able to ignore any distractions, focus only on the ball and their opponent. The junior players scored higher on Reduced Attentional Style (RED) which suggests that the more inexperienced players allow their focus to become too narrow. Potgieter and Schooling (1986) found the relationship between performance and mood state supported the inverted-U hypothesis.

Frazier (1987) attempted to verify whether long distance runners were more introverted than other athletes and the population norms, in his study of 25 female and 73 male marathon runners. The subjects' scores were similar to that of the population norms for introversion-extraversion, and no significant differences were noticed between successful and unsuccessful performers. A higher score for elite women was reflected with a significant interaction of sex with performance.

4.2.1. Synopsis

Synopsis 4.2, summarizing Successful versus Unsuccessful sport participants, is presented on the following three pages.
La Place (1954), Booth (1958), Highlen and Bennett (1979), Dowd and Innes (1981), and Gould et. al. (1981) were able to find a few distinctions between successful and unsuccessful sport participants, but unfortunately there appears to be no similarity on factors measured in these studies. On the other hand, Singer (1969), Huddelston and Gill (1981), Power (1982), Miller and Miller (1985), and Frazier (1987) were unable to find temperament differences between groups based on success. The two South African studies by Dippenaar and Potgieter (1986) and Potgieter and Schooling (1986) were both unable to find differences between groups in terms of competitive anxiety when using the SCAT, but were however able to find differences between the groups using the TAIS factors of attentional and interpersonal styles. Power (1982) was also unsuccessful in using the SCAT to distinguish international and noninternational track and field athletes.
**SYNOPSIS 4.2: Research Studies on Successful versus Nonsuccessful Sport participation**

<table>
<thead>
<tr>
<th>AUTHOR</th>
<th>SAMPLE/SUBJECTS</th>
<th>TEST</th>
<th>RESULTS</th>
</tr>
</thead>
</table>
| La Place (1954)  | Major and Minor league baseball players  | MMPI    | * Major league players apply their strong "drive" towards a definite objective by exercising self-discipline, expressed as ambition, aggressiveness, and vigorousness  
* Major league players adjust to occupations, eg. professional baseball, which require social contact |
| Booth (1958)     | Freshman and upper-class athletes and non-athletes, rated as poor or good. | MMPI    | * By means of analysis of the 550 items of the MMPI, 22 items discriminated significantly between the poor and good competitors |
| Singer (1969)    | Baseball and tennis/players, rated on ability. | EPPS    | * Comparing high- and low-rated tennis players yielded one of 15 variables as significant; between high- and low-rated baseball players, no differences were noted |
| Highlen & Bennett (1979) | Elite Wrestlers - qualifiers and non-qualifiers | Specific Wrestling Questionnaire | * Qualifiers were more confident and believed that they were closer to their maximum athletic potential, than non-qualifiers.  
* Imagery and Factors Affecting Performance bute to group differences  
* Qualifiers reported less stress prior to and during competition, than non-qualifiers |
| Dowd & Innes (1981) | Volleyball and Squash sportsmen and sportsmen, at high and average level of competition | 16PF    | * State-level players were more intelligent and less anxious than average players  
* They were also more experimenting, more conscientious, and less controlled |
<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
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<th>Findings</th>
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<tbody>
<tr>
<td>Huddelston &amp; Gill (1981)</td>
<td>Female track and field athletes differentiated on skill</td>
<td>CSAI</td>
<td>* No temperament differences distinguished the two groups</td>
</tr>
<tr>
<td>Gould, Weiss &amp; Weinberg (1981)</td>
<td>Collegiate wrestlers - successful and unsuccessful</td>
<td>Specific Wrestling Inventory</td>
<td>* Authors suggest small sample may have influenced the results</td>
</tr>
<tr>
<td>Power (1982)</td>
<td>Male track and field athletes - subgroups representing age, events, experience and abilities</td>
<td>SCAT</td>
<td>* Successful wrestlers differed with regards to cognitive strategies and skills they employ, compared to the unsuccessful wrestlers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Successful wrestlers were more confident</td>
</tr>
<tr>
<td>Miller &amp; Miller (1985)</td>
<td>Elite female netballers - successful and unsuccessful</td>
<td>SCAT, POMS, State-Trait Anxiety Inventory, Activation-Deactivation Adjective Check List</td>
<td>* Scheffe test revealed significant differences existed between Great Britain group and the Major League Athletes, Republic of Ireland and Wales groupings; and between the Minor League Athletes group and the Major League athletes, Republic of Ireland and Wales groupings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* No significant differences for SCAT existed for International and Non-international groupings</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>* No significance was found between novice, experienced and seasoned international performer groupings</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>* An examination of the means for each group on all psychological factors revealed no significant differences</td>
</tr>
<tr>
<td>Study</td>
<td>Sample</td>
<td>Tests</td>
<td>Findings</td>
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| Dippenaar & Potgieter (1986) | First league cricketers - classified on degree of excellence | SCAT & TAIS        | * In relation to competitive anxiety, no differences were found between the top and weaker cricket players  
  * An overload of environmental stimuli distinguished top and weaker batsmen; no factor between successful and weaker fast bowlers, one factor between spin bowlers, and three factors between seam bowlers |
| Potgieter & Schooling (1986) | International and Provincial squash players | SCAT, POMS & TAIS   | * No significant differences between the two groups with respect to anxiety  
  * On TAIS, international players were higher on BIT (broader internal focus of attention), NAR (narrow their focus or attention), and lower RED (less mistakes because of a broader focus of attention) |
| Frazier (1987)               | Male and female marathon runners - successful and unsuccessful | -                   | * The subjects' introversion scores were similar to those of the population norms, and no differences between successful and unsuccessful runners were found |
4.3. Chapter Summary

Synopsis 4.1 suggests that competitive swimmers are introverted (Whiting & Stembridge, 1965; Meredith & Harrison, 1969; Cattell et. al., 1970) while others concluded that swimmers exhibited traits of aggression. There are contradictory findings with reference to self concept, where Olyster and Arrasmith (1975) found the nonactive sport participants as having a higher self concept, while other studies suggest that swimmers have higher self concepts. Other traits found to be high in swimmers were; dominance, intelligence, assertiveness, protension, shrewdness, and independence.

Synopsis 4.2 also succinctly demonstrates the contradictory research findings with reference to successful and unsuccessful sport participants. A specific finding of significance to this study, is that no differences in competitive anxiety could be demonstrated between successful and unsuccessful sport participants (Power, 1982; Dippenaar & Potgieter, 1986; Potgieter & Schooling, 1986). Dowd and Innes (1981) however found that state-level players were less anxious than the average player.
CHAPTER 5

EMPIRICAL INVESTIGATION

In the previous chapters the theoretical foundations for the present study have been laid, out of which the motivation for this study has grown. This chapter deals with the practical aspects of the research project, by firstly looking at the sample which was used, the process of testing and collection of the necessary data. This is followed by a discussion of the six inventories used in the study. The reliability and validity scores of the questionnaires are provided as validation and justification for the use of these inventories. Lastly the hypotheses are listed for this study, followed by the statistical analyses used for analysing the data.

5.1. Motivation

Due to the sport isolation resulting from the political era of Apartheid, very little research or development of Sport Psychology has occurred in South Africa. While the rest of the Western and Eastern World have progressed past the exploratory investigation of the temperament traits of sportsmen and women, South Africa is still to reach this stage of development, while
incorporating its own unique brand of culture to these studies.

The present study addresses this problem by investigating the possible temperament differences between swimmers in South Africa who have attained various success levels. The research question was aimed at finding possible answers to why certain swimmers are able to achieve with greater success than are their fellow competitors.

5.2. Aim

The study aims at investigating the possible personality and temperament differences between successful and unsuccessful athletes. The athletes have been drawn from the sport of swimming, due to the authors personal interest and involvement in this particular sport. The study investigates five temperament traits, namely: (1) Anxiety levels, (2) Self-Concept, (3) Sensation Seeking, (4) Strength of the Nervous System, and (5) Introversion-Extraversion. The sample is divided into three groups, varying in levels of success. The groups are compared to one another in relation to each of the above mentioned traits and certain subtraits.

5.3. Subjects

The sample for this study was drawn from two swimming teams. The first of these was the Transvaal Aquatic Team, the swimmers having represented their province at the National Aquatic
Championships held in Durban 1992. These swimmers are regarded as all being successful in their own right, having achieved the standard qualifying times as set down by the South African Amateur Swimming Association (SAASA). The second team was the South African Team which competed in the Olympic Games held in Barcelona during July and August 1992.

The total sample was divided into three groups according their levels of success. The South African Olympians formed the Elite swimming group. Those provincial swimmers who were either medal winners or finalists at the South African Championships formed the second group namely the Successful group, and the remainder of the provincial team who had neither achieved a consolation finals or failed to make either finals were grouped together as the Unsuccessful group.

The final sample constituted 57 swimmers; 9 elite Olympic swimmers, 24 Successful swimmers, and 24 Unsuccessful swimmers.

Of the original 12 Olympic swimmers, two who are students in America failed to return their forms while the third swimmer’s forms failed to arrive after being posted. Of the nine remaining Olympic swimmers, one respondent is at present a coach in Denmark. Of the 25 Successful swimmers who completed the battery of tests, one set was invalidated due to a questionnaire not having been completed. Of this second group, 21 swimmers were drawn from the Transvaal team, one swimmer from the Vaal Triangle team, and two swimmers from the Eastern Transvaal team. Three members of the Successful groups’ results were obtained from
overseas (America and Germany). All 24 members of the Unsuccessful group were drawn from the Transvaal swimming team.

Each of the groups comprised male and female subjects. The total sample consisted of 28 male and 29 female subjects. The male-female ratio for each group was as follows: Olympic group (3; 6), Successful group (11; 13), and Unsuccessful group (14; 10) respectively.

5.4. Testing Procedure

The Olympic group of swimmers were all corresponded with through the post as three members of the initial 12 swimmers were students in America and Denmark, and the remainder spread across South Africa. Two of the girls chosen to represent South Africa were dropped shortly before the Olympics due to political and financial reasons. Despite not actually having competed at the Olympics, their test scores remained part of the Elite group, since these athletes having been dropped or "cut" from the final team was not based on performance or excellence.

Of the Successful group, three swimmers were studying at overseas universities (America and Germany) and were corresponded with, through the postal service. The remainder of this group and the Unsuccessful group were tested by the researcher himself under controlled circumstances. Due to the fact that the swimmers all train under different coaches within the Transvaal province, the researcher tested the 45 swimmers in 4 groups. Arrangements were
made with each of the four coaches involved to allow the swimmers off a training set to complete the battery of tests. The four "meetings" occurred early in August 1992, which may have contributed to the small sample since not all the swimmers who had represented their province in the previous season had returned to full training.

5.5. Measuring Instruments

5.5.1 Sport Competition Anxiety Test (SCAT) (Appendix A, Examiners’ copies only)

The SCAT is an A-Trait Inventory developed by Martens (1982) as a reliable and valid measure of an individual's predisposition to respond to competitive sport situations with varying levels of A-State. Two Forms were originally developed. Form C is valid for children ranging in age from 10 to 14, while the adult Form (Form A) is for persons 15 years and older. Form A is used in the present study. Both forms of the SCAT are self administered as the "Illinois Competition Questionnaire" and usually takes five minutes to complete, although there is no time limit. Martens, Vealey and Burton (1990) note that the inventory has considerable face validity and hence five spurious statements were included to prevent response bias. All items must be answered according to how the respondent generally feels in competitive situations. The inventory consists of 15 items of which five are not scored.

The reliability of the SCAT was assessed via the test-retest
method and via the analysis of variance (ANOVA) technique. On the retest, SCAT-C's reliability ranged from 0.57 to 0.93, allowing for a mean of 0.77. A mean reliability coefficient of 0.81 was obtained on ANOVA, using a combined sample. An even higher ANOVA reliability coefficient (r=0.85) was obtained in an item analysis of the SCAT-A (Martens, Vealey & Burton, 1990).

The internal consistency of the SCAT is concerned with the homogeneity of the scale items within the inventory. A Kuder-Richardson Formula 20 (KR-20) allowed for coefficients ranging from 0.95 to 0.97 for both Form A and C of the SCAT (Martens et al., 1990). Content and concurrent validity was established for the SCAT inventory. The former refers to the expert judgement on the representativeness of each individual SCAT item measuring competitive A-trait. For the 10 items in SCAT-C, each received a mean content validity of 6.5 or higher. Martens et al. (1990) notes that the one altered item in SCAT-A was not content analysed. Concurrent validity refers to the inventory's ability to be compared to similar established and previously validated scales. Here the SCAT was compared to four general A-trait inventories and five selected personality inventories which allowed for the predictable relationship with A-trait to be demonstrated. The Children's Manifest Anxiety Scale Short Form (CMAS), General Anxiety Scale for Children (GASC), and the Trait Anxiety Inventory for Children (TAIC) were used for the SCAT-C while the Trait Anxiety Inventory for Adults (TAIA) was used for the SCAT-A. The five personality inventories were: Junior-Senior High School Personality Questionnaire (HSPQ), Social Avoidance and Distress Scale (SAD), the Fear of Negative Evaluation Scale
(FNE), the Internal-External Control Scale for Children, and the Mehrabian Achievement Motivation Scale. With only minor exceptions, the accumulated evidence firmly supports the SCAT’s concurrent validity (Martens et. al., 1990).

Martens et. al. (1990) provides normative data for the SCAT for both male and female youths, high school, and college athletes. Normative data and scores are also available for specific sports including baseball, basketball, football, soccer, swimming, tennis, volleyball, and wrestling.

The scoring key for SCAT appears in Appendix B (Examiners’ copy only).

5.5.2. IPAT Anxiety Scale

The IPAT Anxiety Scale is based on and developed out of extensive research, aimed at creating a quick, objective, and standardized method of measuring anxiety. The primary aim of the IPAT is to measure freely manifested anxiety, whether it is caused by environmental factors or not (Cattell, Scheier & Madge, 1986). The questionnaire can be used for persons between the ages of 14-15 years to 18 years and older, presented to either individuals or groups and completed in 5-10 minutes. The scale uses a 3 point answering system.

The South African standardized version of the IPAT comprises 40 questions subdivided into five components or factors which
correspond to the anxiety factors in the 16PF. They are divided according to the significance which each personality factor contributes to the total anxiety level. The five factors are: Q3 = Undisciplined self conflict, C- = Lower ego strength, L = Suspiciousness or protension, O = Apprehension or guilt proneness, and Q4 = Tension or high ergic tension (Cattell, Eber and Tatsuoka, 1970). Cattell et. al. (1978) suggest that the individual factors should not be individually interpreted due to the fact that they are too short and have poor reliability. The scale is divided equally into two subscales; the first 20 items represent the Unconscious Anxiety scale (A-scale) and the second 20 items the Conscious Anxiety scale (B-scale).

The reliability of the IPAT Anxiety Scale was determined via three methods. The first method was the test-retest method over a period of two weeks which provided coefficients ranging from 0.83 to 0.88. The Split-half method provided reliability coefficients of 0.76 to 0.80 while Ferguson’s adaptation of the Kuder-Richardson Formula 20 (KR-20) yielded coefficients of 0.78 to 0.83. Reliability coefficients are provided for both the Unconscious and Conscious anxiety scales using the test-retest method. The former scale provided coefficients ranging 0.76 to 0.84 while the latter scale ranged from 0.76 to 0.84 (Cattell et. al., 1986).

To examine the construct of validity, most authors use the method of comparing the developed scale with other tests measuring similar traits. Cattell et. al. (1978) note however that in this instance no other tests exist. One possibility to provide a
correlation was using the Unadaptability Scale as measured by the NB-Adaptability Questionnaire, developed by the National Buro of Education and Social Research. Correlation coefficients of 0,28 to 0,55 were obtained. A second possible method of determining the validity was to accept that the items all measure one general factor rather than specific factors. The validity can be regarded as the square root of the reliability based on the Split-half method. A score of 0,89 and 0,87 for Afrikaans and English subjects was obtained (Cattell et. al., 1986).

The raw scores obtained on the test are evaluated according to either stanine, sten, or percentile rank norm tables, as provided in the IPAT Anxiety Scale Handbook (Cattell et. al., 1986).

Both the inventory and the marking sheet are available at the HSRC.

5.5.3. Adolescent Self Concept Scale (ASCS) (Appendix C, Examiners' copies only)

Vrey defines self-concept as "the configuration of convictions about myself and attitudes towards myself which are dynamic and of which I am or may become conscious" (Vrey & Venter, 1983, p 2).

The Adolescent Self Concept Scale (ASCS) was developed by Vrey and Venter (1983) based on the Tennessee Self Concept Scale designed by Fitts. Vrey and Venter (1983) believe that self concept presupposes a conscious understanding of the self and
that which the individual is aware of or can be made conscious of. These dimensions are then in turn seen as the structure of the self concept. Six such structures exist and form the subtests of the ASCS: physical self, personal self, family self, social self, moral-ethical self, and self criticism. Each dimension is represented by items referring to self-identity, acceptance of the self, and perception of one’s behaviour. The ASCS is a pen-and-pencil test with 100 items and no time limit.

The ASCS was created for adolescents who had successfully completed their high school course, namely matriculation, the final examination of a secondary school or an equivalent examination. The initial test "Die Adolescente Selfkonsep Skaal" (ASKS) was based on a Afrikaans sample, but has since been translated and standardized by Venter in 1982.

Reliability establishes the accuracy to which a particular score represents the status of the individual or respondent in whatever the test measures him (Guilford, 1954, in Vrey & Venter, 1983). Using the Kuder-Richardson 20 Formula (KR-20), Vrey and Venter (1983) obtained a reliability coefficient for the total ASCS of 0.85. The reliability coefficient was also established for each individual dimension of the scale:

\[
\begin{align*}
\text{Physical self} & = 0.624 \\
\text{Personal self} & = 0.704 \\
\text{Family self} & = 0.748 \\
\text{Social self} & = 0.778 \\
\text{Moral-ethical self} & = 0.672 \\
\text{Self criticism} & = 0.563
\end{align*}
\]
The validity of the test expresses the certainty with which the test actually measures the dimensions for which it was designed, namely self concept in this case. Construct validity is the extent to which the test is based on a specific theory and is compared to other existing theories. Vrey and Venter could not establish this validity as no other South African test exists to which the ASCS could be compared. Internal consistency is the correlation between the item scores and the total test score; and whether they measure the same factor or dimension. Vrey and Venter found all correlations to be highly significant at the 0.01 level, $r=0.172$, suggesting that all subtests indicate one large common factor.

Norm scores are available for both English and Afrikaans speaking respondents in the Manual for the ASCS (Vrey & Venter, 1983). Since the creation of the first ASCS, discriminant analysis has allowed for a shortened self concept scale of only 63 items, while maintaining the same predictive validity as the former full length test.

The grouping of items for each dimension of the ASCS is provided in Appendix D, while the scoring key is provided in Appendix E (Examiners' copies only).

5.5.4. Sensation Seeking Scale (SSS) (Appendix F, Examiners' copies only)

Zuckerman, Kolin, Price and Zoob (1964) developed the first
Sensation Seeking Scale (SSS) which was designed to qualify the construct of "optimal stimulation level" as an individual difference measure. The main interest in Form I of the SSS was the discovery of a general trait through factor analysis. Of the original 50 items, 22 loaded 0.30 or higher in both males and females and constituted a general SSS M-F subscale. These 22 items formed the basis of the 34 forced choice items of Form II of the SSS (Zuckerman et. al., 1964). Farley (1967, in Zuckerman, 1971) was one of the first to suggest that this general SSS scale might in fact include more than one factor.

In continued research, Zuckerman and Link (1968) rotated the factors obtained in their Brooklyn College sample, to uncover four definable factors in males: Thrill Sensation Seeking, Social Sensation Seeking, Visual Sensation Seeking, and Antisocial Sensation Seeking. Only the first two factors were definable in females. Since Form I had insufficient items to define the first factor clearly, new items were written in an attempt to clearly define the dimensions of sensation seeking.

Form III hence became an experimental Form consisting of both original items and newly written items. The Form was tested on both undergraduates at Temple University and the University of North Carolina. The general factor identified was quite similar to that derived by Zuckerman et. al. (1964). Hence the General M-F subscale from Form II was retained in Form IV. Orthogonal and oblique rotations yielded four interpretable factors found in both sex groups and were tentatively labelled Thrill and Adventure Seeking (TAS), Experience Seeking (ES), Disinhibition
TAS items express the "desire to engage in outdoor sports or other activities involving elements of speed or danger" (p. 309, Zuckerman, Bone, Neary, Mangelsdorff and Brustman, 1972). ES can be regarded as the "hippie" scale. These items express the need for a broad variety of inner experiences such as art, travel, music, drugs (marijuana, and hallucinatory drugs), exhibitionism, and an unconventional life style. There appears also to be some resistance to conformity and rules (Zuckerman, 1971; Zuckerman et. al., 1972). The Dis scale is regarded as the "swinger" scale. These items express the loss of social inhibitions: "wild" parties, heavy social drinking, gambling, and a variety in sexual partners (Zuckerman, 1971; Zuckerman et. al., 1972). The final factor, BS, expresses a dislike of monotony, routine and repetition, and dull people, a preference for exciting people, and a general restlessness (Zuckerman, 1971; Zuckerman et. al, 1972).

Zuckerman, Eysenck and Eysenck (1978) researched the cross-cultural reliabilities of the factors in the Form IV of the SSS. If the factor analysis results of the original study showed cross-cultural and cross-sex reliability when compared with "a large, socially heterogenous sample of English population" (Zuckerman et. al., 1978, p. 140), then the four factors would be known to be meaningful and having a biological basis (Zuckerman, 1974). A secondary aim, was to develop a shorter, new version of the SSS based on the four factors mentioned above. The General Scale in Form II and IV was replaced with a Total score, which
was a summation of the four scales. The General scale had previously not contained an adequate sample of items for measuring the Dis and BS factors.

Form V of the SSS was constructed using 10 items selected for each of the four primary factors. The new Total score is obtained by summing up the four subscale scores (Zuckerman et. al., 1978).

Using both American and English samples, Zuckerman et. al. (1978) correlated the two samples, to find the factor reliabilities of the scales to be the following:

\[
\begin{align*}
\text{TAS} & = 0.72-0.90 \\
\text{ES} & = 0.51-0.75 \\
\text{Dis} & = 0.60-0.79 \\
\text{BS} & = 0.51-0.70
\end{align*}
\]

The internal reliabilities for the Form V factor scales were expected to be lower because of the shorter scales, but actually only one substantial drop occurred namely on the ES scale. The reliabilities for the English and American studies are as follows:

\[
\begin{align*}
\text{TAS} & \quad 0.81-0.82 \quad \& \quad 0.77 \\
\text{ES} & \quad 0.65-0.67 \quad \& \quad 0.61 \\
\text{Dis} & \quad 0.77-0.78 \quad \& \quad 0.74-0.76 \\
\text{BS} & \quad 0.59-0.65 \quad \& \quad 0.56-0.57 \\
\text{Total} & \quad 0.83-0.86 \quad \& \quad 0.84-0.85
\end{align*}
\]

(Zuckerman et. al., 1978).

Zuckerman (1979) notes that the Form V retest reliability was
just as high as Form IV reliabilities, with the exception of the BS scale. The 40 item Total score of the SSS Form V showed an excellent 3-week retest reliability of 0.94, while the individual scales ranged between 0.70 to 0.94.

Since the development of the Form V, a new Form VI of the SSS has been created to separate past experiences from those desired or intended future experiences on both the Dis and TAS scales (Zuckerman, 1984). It should be stressed that the Form VI is not a substitute for the Form V, but rather intended for those studies primarily interested in the TAS and Dis. Use of the new SSS Form VI is also advised for individual assessment.

Form VI of the SSS is not yet available in South Africa, and Form V was used for the purposes of this study.

Appendix G provides the scoring key and grouping of items for dimensions of the SSS Form V (Examiners' copies only).

5.5.5. Pavlovian Temperament Survey (PTS) (Appendix H, Examiners' copies only)

In an attempt to measure individual overt behaviour related to functions of the nervous system, in a variety of practical situations, Strelau (1972) developed a method of observation and inventory rating. Laboratory methods are usually indicated when diagnosing typological features within definite functions of nervous centers. Strelau’s inventory method allowed for an
overall appraisal of the different characteristics of the nervous system. A temperament inventory was constructed, comprising 150 equivalent questions on a 3-graded reply system to measure the strength of excitation, strength of inhibition, and the mobility and equilibrium of nervous processes. Studying the inventory's reliability and validity, 16 questions were dropped due to low coincidence of replies (Strelau, 1972). The original Strelau Temperament Inventory (STI) was thus left with 134 questions - 44 for Strength of Excitation (SE), 44 for Strength of Inhibition (SI), and 46 for Mobility of Nervous Processes (MO) (Strelau, 1983b).

In spite of the satisfactory construct validity (Strelau, 1983b), recent psychometric research has suggested that the STI was lacking as an acceptable diagnostic tool for the Central Nervous System (CNS) properties. Strelau, Angleitner and Ruch (1989, in Strelau, Angleitner, Bantelman and Ruch, 1990) conducted four independent studies which concluded that the STI subscales intercorrelated higher than expected (e.g. SE and SI up to 0.38; SE and MO up to 0.59), contained too many items, were highly loaded with social desirability, and certain items endorsed extreme replies.

The Strelau Temperament Inventory Revised (STI-R) was constructed in an attempt to rectify the above criticisms. Since Pavlov himself regarded Balance of the CNS property as a ratio between SE and SI, it was seen as a secondary property and not to be included in the new STI-R (Strelau, Angleitner, Bantelman and Ruch, 1990).
The ST1-R was developed as a psychometric tool to measure the CNS properties within the Pavlovian tradition for both adolescents and adults. From the original 252 pilot questionnaire, 86 items were excluded and a Social Desirability Scale (SD) was introduced to constitute the newly balanced 166 item ST1-R. The answering format was changed to a 4-point Likert scale ("fully agree", "agree", "disagree", and "disagree completely"). The resulting items for the four scales were rearranged in an alternating succession (Strelau et. al., 1990). The authors concluded that for research purposes a short form of the ST1-R, the ST1-RS was necessary. The ST1-RS was constructed by selecting 24 items for each of the three CNS properties to develop the 84 item test.

Two replication studies were conducted on the ST1-R namely, the Dusseldorf and the Bielefeld-2 studies. The first study used 132 subjects ranging in age from 18 to 70 (mean age of 30,8 years), while the second study used 122 subjects with a mean age of 32,0 years. The reliability coefficients for the ST1-R for the samples were quite similar, ranging from 0,86 to 0,87 for the Dusseldorf sample and ranging from 0,83 to 0,90 for the Bielefeld-2 sample. The Social Desirability (SD) Scale had alpha values of 0,66 and 0,70 respectively (Strelau et. al., 1990). The correlations between the scales again indicated a correlation between the SE and MO scales; 0,48 in the Dusseldorf and 0,61 in the Bielefeld-2 sample. The correlation for the SE and SI were similar in the two studies, 0,11 and 0,17; the correlation between the SI and MO differed substantially (Strelau et. al., 1990). All the scales showed positive correlation with the SD scale and hence Strelau et. al. (1990) had failed to construct an inventory relatively
free of social desirability, while the scale itself did not show high reliability. Strelau et. al. (1990) suggest the use of an already established Lie or Infrequency Scale together with the STI-R.

Ruch, Angleitner and Strelau (1991) examined the construct validity of the STI-R, by comparing its three scales with (a) other personality or temperament scales referring to the level of arousal, (b) selected temperament inventories, and (c) selected personality scales. The inventories used included: the Eysenck Personality Questionnaire-Revised (EPQ-R), Zuckerman's Sensation Seeking Scale (SSS), the EASI Temperament Survey (EASI), the Revised Dimensions of Temperament Survey (DOTS-R), the Structure of Temperament Questionnaire (STQ), the Impulsiveness Questionnaire (I.7), the Affect-Intensity Measure (AIM), Personality Research Form (RPF), and NEO Personality Inventory (NEO-PI). Ruch et. al. (1991) concluded, "the hypotheses regarding the place of the STI-R in the temperament and personality domain were confirmed, supporting the construct validity of the STI-R scales in the questionnaire domain" (p. 305).

In personal correspondence with Jan Strelau and Alois Angleitner, dated the 8 April 1992, Strelau and Angleitner indicated that the STI-R had presently been renamed the Pavlovian Temperament Survey (PTS). Since no North American or British/English version of the PTS exists to date, this study will use the Australian standardized PTS obtained through correspondence with Gregory Boyle, dated the 21 May 1992. The Australian version was
developed by Boyle, Strelau and Angleitner (1992) and consists of a 63 item, 4-point Likert scale format which is marked both positively and negatively.

Appendix I provides the scoring key and the item groupings of each of the three dimension of the PTS (Examiners' copies only).

5.5.6. Introversion-Extraversion Questionnaire (Appendix J Examiners' copies only)

J. M. Schepers, Professor at the Rand Afrikaans University (RAU) in the Human Resources Department, developed a standardized Personality and Temperament Questionnaire (Schepers, 1991). The Personality Questionnaire is also known as the Introversion-Extraversion Questionnaire and was used separately in this study.

The questionnaire originally included 61 items but was reduced to 48 due to poor item-total reliability for 13 items. The item reliability ranges from 0.112 to 0.30. The reliability of the test was measured by the Kuder-Richardson 14 and 20 Formulas, both providing a coefficient of 0.913 for the Introversion-Extraversion Questionnaire. The scores were obtained from a study on 577 Afrikaans Psychology students at the Rand Afrikaans University (RAU) (Schepers, 1991).

Appendix K provides the scoring key for the Introversion-Extraversion Questionnaire (Examiners' copies only).
5.6. Hypotheses

The aim of this study is to establish whether statistically significant differences exist between the following groups of swimmers:

A = Olympic Group
B = Successful Group
C = Unsuccessful Group

with reference to the following variables:

1 = Thrill and Adventure-Seeking (TAS)
2 = Disinhibition (Dis)
3 = Boredom Susceptibility (BS)
4 = Experience Seeking (ES)
5 = Sensation Seeking Scale Total
6 = IPAT A Scale (Unconscious Anxiety)
7 = IPAT B Scale (Conscious Anxiety)
8 = IPAT Total Anxiety
9 = SCAT Total Competitive Anxiety
10 = Physical Self Concept
11 = Personal Self Concept
12 = Self Criticism
13 = Self Concept Scale Total
14 = Introversion-Extraversion Total
15 = PTS-Excitation subscale

Because of the small N in Group A, it was decided not to test all the variables simultaneously, but to combine them as follows:

1 = Variable no. 1 (TAS)
   = Variable no. 2 (Dis)
= Variable no. 3 (BS)
= Variable no. 4 (ES)

2 = Variable no. 6 (IPAT A Scale)
= Variable no. 7 (IPAT B Scale)
= Variable no. 9 (SCAT Competitive Anxiety)

3 = Variable no. 10 (Physical Self Concept)
= Variable no. 11 (Personal Self Concept)
= Variable no. 12 (Self Criticism)

The above variables naturally combine together, measuring a similar trait.

The following variables do not naturally combine together and will be analysed separately:

Variable no. 5 (Total Sensation Seeking)
Variable no. 8 (IPAT Total Anxiety)
Variable no. 13 (Total Self Concept)
Variable no. 14 (Introversion-Extraversion)
Variable no. 15 (PTS-Excitation)

HYPOTHESIS 1

Null Hypothesis: There will be no statistically significant differences between the vectors of the average test scores of the three swimming groups A, B and C in relation to the four Sensation Seeking subscales scores considered together.
Alternative Hypothesis: There will be statistically significant differences between the vectors of the average test scores of the three swimming groups A, B and C in relation to the four Sensation Seeking subscales scores considered together.

HYPOTHESIS 2

Null Hypothesis: There will be no statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to each of the following four Sensation Seeking subscales considered separately, namely: TAS, Dis, BS and ES.

Alternative Hypothesis: There will be statistically significant differences in the average test scores of the three swimming groups A, B and C in relation to each of the following four Sensation Seeking subscales considered separately, namely: TAS, Dis, BS and ES.

HYPOTHESIS 3

Null Hypothesis: In terms of the pair groupings (A vs B, A vs C, B vs C) there will be no statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to each of the four Sensation Seeking subscales, namely: TAS, Dis, BS and ES.

Alternative Hypothesis: In terms of the pair groupings (A vs B, A vs C, B vs C) there will be statistically significant differences
HYPOTHESIS 6

Null Hypothesis: In terms of the pair groupings (A vs B, A vs C, B vs C) there will be no statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to each of the three Anxiety subscales, namely: IPAT A (Unconscious Anxiety), IPAT B (Conscious Anxiety) and SCAT Competitive Anxiety.

Alternative Hypothesis: In terms of the pair groupings (A vs B, A vs C, B vs C) there will be statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to each of the three Anxiety subscales, namely: IPAT A (Unconscious Anxiety), IPAT B (Conscious Anxiety) and SCAT Competitive Anxiety.

HYPOTHESIS 7

Null Hypothesis: There will be no statistically significant differences between the vectors of the average test scores of the three swimming groups A, B and C in relation to the three Self Concept subscales scores considered together.

Alternative Hypothesis: There will be statistically significant differences between the vectors of the average test scores of the three swimming groups A, B and C in relation to the three Self
between the average test scores of the three swimming groups A, B and C in relation to each of the four Sensation Seeking subscales, namely: TAS, Dis, BS and ES.

HYPOTHESIS 4

**Null Hypothesis:** There will be no statistically significant differences between the vectors of the average test scores of the three swimming groups A, B and C in relation to the two IPAT subscales and the SCAT subscale considered together.

**Alternative Hypothesis:** There will be statistically significant differences between the vectors of the average test scores of the three swimming groups A, B and C in relation to the two IPAT subscales and the SCAT subscale considered together.

HYPOTHESIS 5

**Null Hypothesis:** There will be no statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to each of the following three Anxiety subscales considered separately, namely: IPAT A (Unconscious Anxiety), IPAT B (Conscious Anxiety) and SCAT Competitive Anxiety.

**Alternative Hypothesis:** There will be statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to each of the following three Anxiety subscales considered separately, namely: IPAT A
HYPOTHESIS 8

Hypothesis 8: There will be no statistically significant differences between the average test scores of the three swimming groups A, B, and C in relation to each of the three Self Concept subscales considered separately, namely: Physical Self Concept, Personal Self Concept, and Self Criticism.

Alternative Hypothesis: There will be statistically significant differences in the average test scores of the three swimming groups A, B, and C in relation to each of the three Self Concept subscales considered separately, namely: Physical Self Concept, Personal Self Concept, and Self Criticism.

HYPOTHESIS 9

Hypothesis 9: In terms of the pair grouping (A vs B, A vs C, B vs C), there will be no statistically significant differences between the average test scores of the three swimming groups A, B, and C in relation to each of the three Self Concept subscales, namely: Physical Self Concept, Personal Self Concept, and Self Criticism.

Alternative Hypothesis: In terms of the pair groupings (A vs B, A vs C, B vs C), there will be statistically significant differences between the average test scores of the three swimming groups A, B, and C in relation to each of the three Self Concept subscales,
namely: Physical Self Concept, Personal Self Concept and Self Criticism.

HYPOTHESES 10

Null Hypotheses: There will be no statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to the SSS Total score.

Alternative Hypotheses: There will be statistically significant differences in the average test scores of the three swimming groups A, B and C in relation to the SSS Total score.

HYPOTHESIS 11

Null Hypothesis: In terms of the pair groupings (A vs B, A vs C, B vs C) there will be no statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to the SSS Total score.

Alternative Hypothesis: In terms of the pair groupings (A vs B, A vs C, B vs C) there will be statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to the SSS Total score.

HYPOTHESES 12

Null Hypotheses: There will be no statistically significant differences between the average test scores of the three swimming
groups A, B and C in relation to the IPAT Total score.

Alternative Hypotheses: There will be statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to the IPAT Total score.

HYPOTHESIS 13

Null Hypothesis: In terms of the pair groupings (A vs B, A vs C, B vs C) there will be no statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to the IPAT Total score.

Alternative Hypothesis: In terms of the pair groupings (A vs B, A vs C, B vs C) there will be statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to the IPAT Total score.

HYPOTHESES 14

Null Hypotheses: There will be no statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to the Self Concept (SC) Scale Total score.

Alternative Hypotheses: There will be statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to the Self Concept (SC) Scale Total score.
HYPOTHESIS 15

Null Hypothesis: In terms of the pair groupings (A vs B, A vs C, B vs C) there will be no statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to the Self Concept (SC) Scale Total score.

Alternative Hypothesis: In terms of the pair groupings (A vs B, A vs C, B vs C) there will be statistically significant differences between the average test scores of the three swimming groups A, B, and C in relation to the Self Concept (SC) Scale Total score.

HYPOTHESES 16

Null Hypotheses: There will be no statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to the Introversion-Extraversion Scale Total score.

Alternative Hypotheses: There will be statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to the Introversion-Extraversion Scale Total score.

HYPOTHESIS 17

Null Hypothesis: In terms of the pair groupings (A vs B, A vs C, B vs C) there will be no statistically significant differences between the average test scores of the three swimming groups A, B
and C in relation to the Introversion-Extraversion Scale Total score.

**Alternative Hypothesis:** In terms of the pair groupings (A vs B, A vs C, B vs C) there will be statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to the Introversion-Extraversion Scale Total score.

**HYPOTHESES 18**

**Null Hypotheses:** There will be no statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to the PTS-Excitation subscale score.

**Alternative Hypotheses:** There will be statistically significant differences between the average test scores of the three groups of swimmers A, B and C in relation to the PTS-Excitation subscale score.

**HYPOTHESIS 19**

**Null Hypothesis:** In terms of the pair groupings (A vs B, A vs C, B vs C) there will be no statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to the PTS-Excitation subscale score.

**Alternative Hypothesis:** In terms of the pair groupings (A vs B, A
vs C, B vs C) there will be statistically significant differences between the average test scores of the three swimming groups A, B and C in relation to the PTS-Excitation subscale score.

5.7. Statistical Analyses

The BMDP statistical package will be utilized to analyse the data in terms of the three groups of swimmers A, B and C. Multiple analysis of variance (MANOVA) will be used to ascertain if there are statistically significant differences between the three groups of swimmers A, B and C in terms of the groups of variables (indicated in 5.6), considered together. The various groups of variables are:

1) SSS subscales scores (TAS, ES, Dis, BS) (four variables)
2) IPAT Scale scores A and B and SCAT Scale scores (three variables)
3) Adolescent Self Concept Scale scores (physical, Personal, Self Criticism) (three variables)

Analysis of variance (ANOVA) will be used to ascertain if there are statistically significant differences between the three groups of swimmers A, B and C for each variable of the above groups of variables considered separately.

The Sceffe-test will be used to ascertain whether the differences, if any, occurred in groups A-B, A-C, or B-C, for each of the variables considered separately.
With reference to variables 5 (Sensation Seeking Scale Total), 8 (IPAT Total Anxiety), 13 (Self Concept Scale Total), 14 (Introversion-Extraversion Total) and 15 (PTS-Excitation subscale), ANOVA will be used for each of the variables, in order to ascertain if there are statistically significant differences between the three groups of swimmers A, B and C with reference to the variables. This will be followed by Scheffe-tests in order to ascertain between which two groups of swimmers (A-B, A-c or B-C) the differences, if any, manifest.

5.8. Chapter Summary

This chapter described the research sample, the testing procedure, the instruments used to measure the sample, and lastly the hypotheses involved in this study. The data was collected and statistically analysed. The results are presented in the following chapter, and discussed in Chapter 7.
In Chapter 6, the results of the data analyses are presented. The data was read onto a BE-editor program on an IBM-PC and the stiffy was handed to the statistical consultants at RAU for statistical analyses utilizing the previously mentioned BMPD statistical package. The computer was a HP 835. The results are presented in Table format according to the hypotheses formulated in Chapter 5.

6.1. Results of hypotheses 1, 2 and 3, relating to the SSS subscale scores

The results of hypotheses 1, 2 and 3 are presented in Tables 1, 2 and 3 (see following three pages).

According to Table 6.1, there were no statistically significant differences between the three groups of swimmers A, B and C with reference to the subscale scores of the Sensation Seeking Scale (SSS) considered together. Subsequent analyses of variance (ANOVA) (Table 6.2) did not manifest statistically significant differences between the three groups of swimmers A, B and C with
reference to the subscales of the SSS considered separately. Accordingly the Scheffe' test was not neccessary but the results are reported in Table 6.3 for a comprehensive report.
TABLE 6.1

MANOVA for three Groups of Swimmers A, B and C with reference to the SSS-subscale scores considered together

<table>
<thead>
<tr>
<th>TEST</th>
<th>VALUE</th>
<th>F-VALUE</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WILKS</td>
<td>.78907</td>
<td>1.63472</td>
<td>.124</td>
</tr>
</tbody>
</table>

DF = 8.00
Error DF = 104.00
TABLE 6.2
ANOVA for three Groups of Swimmers A, B and C with reference to each of the SSS-subscale scores considered separately

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>SUM OF SQUARES BETWEEN GROUPS</th>
<th>SUM OF SQUARES WITHIN GROUPS</th>
<th>MEAN SQUARES BETWEEN GROUPS</th>
<th>MEAN SQUARES WITHIN GROUPS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAS</td>
<td>7.0221</td>
<td>265.3917</td>
<td>3.5111</td>
<td>4.5253</td>
<td>.7276</td>
<td>.4876</td>
</tr>
<tr>
<td>DIS</td>
<td>25.0115</td>
<td>371.3333</td>
<td>12.5057</td>
<td>6.7515</td>
<td>1.8523</td>
<td>.1665</td>
</tr>
<tr>
<td>BS</td>
<td>26.8727</td>
<td>287.5583</td>
<td>13.4364</td>
<td>5.2283</td>
<td>2.5699</td>
<td>.0857</td>
</tr>
<tr>
<td>ES</td>
<td>9.3132</td>
<td>254.0833</td>
<td>4.6566</td>
<td>4.6197</td>
<td>1.0080</td>
<td>.3716</td>
</tr>
</tbody>
</table>
TABLE 6.3
Scheffe test: Comparison of pairs of groups of Swimmers A, B and C with reference to each of the SSS-subscale scores

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>GROUP A N = 10</th>
<th>GROUP B N = 24</th>
<th>GROUP C N = 24</th>
<th>* = significant at 5% level</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAS</td>
<td>6.7000</td>
<td>7.6667</td>
<td>7.2083</td>
<td>A - B</td>
</tr>
<tr>
<td>DIS</td>
<td>4.0000</td>
<td>4.0000</td>
<td>5.3333</td>
<td>A - C</td>
</tr>
<tr>
<td>BS</td>
<td>3.2000</td>
<td>2.8750</td>
<td>4.3333</td>
<td>B - C</td>
</tr>
<tr>
<td>ES</td>
<td>5.5000</td>
<td>4.3750</td>
<td>4.5417</td>
<td></td>
</tr>
</tbody>
</table>
6.2. Results of hypotheses 4, 5 and 6, relating to the IPAT A and B subscales scores and the SCAT score

The results of hypotheses 4, 5 and 6 are presented in Tables 4, 5 and 6 (see following three pages).

According to Table 6.4, there were no statistically significant differences between the three groups of swimmers A, B and C with references to the subscales scores of the IPAT and Sport Competition Anxiety Test (SCAT) score considered together. Subsequent analyses of variance (ANOVA) (Table 6.5) showed a statistically significant difference between the three groups of swimmers A, B and C in relation to the IPAT A subscale ($P < 0.05$), when the two IPAT subscales and the SCAT score were considered separately. The Scheffe-test was necessary to ascertain between which groups the statistically significant difference was to be found. The results of the Scheffe-test (Table 6.6) indicate a difference between Group 1 (Olympic Group) ($X = 12.1000$) and 3 (Unsuccessful Group) ($X = 17.4167$).
TABLE 6.4

MANOVA for three Groups of Swimmers A, B and C with reference to the two IPAT subscales and the SCAT subscale scores considered together

<table>
<thead>
<tr>
<th>TEST</th>
<th>VALUE</th>
<th>F-VALUE</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WILKS</td>
<td>.83590</td>
<td>1.65641</td>
<td>.139</td>
</tr>
</tbody>
</table>

DF = 6.00
Error DF = 106.00
TABLE 6.5

ANOVA for three Groups of Swimmers A, B and C with reference to the two IPAT subscales and the SCAT subscale scores considered separately

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>SUM OF SQUARES BETWEEN GROUPS</th>
<th>SUM OF SQUARES WITHIN GROUPS</th>
<th>MEAN SQUARES BETWEEN GROUPS</th>
<th>MEAN SQUARES WITHIN GROUPS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPAT A</td>
<td>216.6460</td>
<td>1701.2333</td>
<td>108.3230</td>
<td>30.9315</td>
<td>3.5020</td>
<td>.0370 *</td>
</tr>
<tr>
<td>IPAT B</td>
<td>110.2118</td>
<td>2113.3917</td>
<td>55.1059</td>
<td>38.4253</td>
<td>1.4341</td>
<td>.2471</td>
</tr>
<tr>
<td>SCAT</td>
<td>21.4626</td>
<td>791.9167</td>
<td>10.7313</td>
<td>14.3985</td>
<td>.7453</td>
<td>.4793</td>
</tr>
</tbody>
</table>

P * = significant at 5% level
### TABLE 6.5

ANOVA for three Groups of Swimmers A, B and C with reference to the two IPAT subscales and the SCAT subscale scores considered separately

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>SUM OF SQUARES BETWEEN GROUPS</th>
<th>SUM OF SQUARES WITHIN GROUPS</th>
<th>MEAN SQUARES BETWEEN GROUPS</th>
<th>MEAN SQUARES WITHIN GROUPS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPAT A</td>
<td>216.6460</td>
<td>1701.2333</td>
<td>108.3230</td>
<td>30.9315</td>
<td>3.5020</td>
<td>.0370*</td>
</tr>
<tr>
<td>IPAT B</td>
<td>110.2118</td>
<td>2113.3917</td>
<td>55.1059</td>
<td>38.4253</td>
<td>1.4341</td>
<td>.2471</td>
</tr>
<tr>
<td>SCAT</td>
<td>21.4626</td>
<td>791.9167</td>
<td>10.7313</td>
<td>14.3985</td>
<td>.7453</td>
<td>.4793</td>
</tr>
</tbody>
</table>

* P * = significant at 5% level
TABLE 6.6
Scheffe test: Comparison of pairs of groups of Swimmers A, B and C with reference to the two IPAT subscales and the SCAT subscale scores

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>GROUP A (N = 10)</th>
<th>GROUP B (N = 24)</th>
<th>GROUP C (N = 24)</th>
<th>GROUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>SD</td>
<td>X</td>
<td>SD</td>
</tr>
<tr>
<td>IPAT A</td>
<td>12.100</td>
<td>4.8178</td>
<td>14.750</td>
<td>6.1943</td>
</tr>
<tr>
<td>IPAT B</td>
<td>11.200</td>
<td>5.4119</td>
<td>14.4583</td>
<td>6.3587</td>
</tr>
<tr>
<td>SCAT</td>
<td>21.000</td>
<td>4.5704</td>
<td>20.2083</td>
<td>4.0538</td>
</tr>
</tbody>
</table>

* = significant at 5% level
6.3. Results of hypotheses 7, 8 and 9, relating to the three Adolescent Self Concept Scale subscales scores

The results of hypotheses 7, 8 and 9 are presented in Tables 7, 8 and 9 (see following three pages).

According to Table 6.7, there were no statistically significant differences between the three groups of swimmers A, B and C with reference to the three subscales scores of the Adolescent Self Concept Scale (ASCS) considered together. Subsequent analyses of variance (ANOVA) (Table 6.8) did not manifest statistically significant differences between the three groups of swimmers A, B and C with reference to the three subscales of the ASCS considered separately. Accordingly the Sceffe-test was not necessary, but the results are presented in Table 6.9 for a comprehensive report.
TABLE 6.7

MANOVA for three Groups of Swimmers A, B and C with reference to the three Self Concept subscales scores considered together

<table>
<thead>
<tr>
<th>TEST</th>
<th>VALUE</th>
<th>F-VALUE</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WILKS</td>
<td>0.90352</td>
<td>0.91932</td>
<td>0.484</td>
</tr>
</tbody>
</table>

DF = 6.00
Error DF = 106.00
TABLE 6.8
ANOVA for three Groups of Swimmers A, B and C with reference to each of the three Self Concept subscale scores considered separately

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>SUM OF SQUARES BETWEEN GROUPS</th>
<th>SUM OF SQUARES WITHIN GROUPS</th>
<th>MEAN SQUARES BETWEEN GROUPS</th>
<th>MEAN SQUARES WITHIN GROUPS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYSICAL</td>
<td>.1529</td>
<td>651.4333</td>
<td>.0764</td>
<td>11.8442</td>
<td>.0065</td>
<td>.9936</td>
</tr>
<tr>
<td>PERSONAL</td>
<td>13.6279</td>
<td>598.4583</td>
<td>6.8139</td>
<td>10.8811</td>
<td>.6262</td>
<td>.5384</td>
</tr>
<tr>
<td>CRITICISM</td>
<td>12.1876</td>
<td>187.1917</td>
<td>6.0938</td>
<td>3.4035</td>
<td>1.7905</td>
<td>.1765</td>
</tr>
</tbody>
</table>
TABLE 6.9
Scheffe test: Comparison of pairs of groups of Swimmers A, B and C with reference to each of the three Self Concept subscale scores

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>GROUP A N = 10</th>
<th>GROUP B N = 24</th>
<th>GROUP C N = 24</th>
<th>GROUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYSICAL</td>
<td>X 11.2000</td>
<td>X 11.3333</td>
<td>X 11.2500</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>SD 2.6162</td>
<td>SD 3.5098</td>
<td>SD 3.6505</td>
<td>A - B</td>
</tr>
<tr>
<td>PERSONAL</td>
<td>X 13.0000</td>
<td>X 13.7917</td>
<td>X 12.7500</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>SD 4.4472</td>
<td>SD 2.8281</td>
<td>SD 3.2067</td>
<td>A - C</td>
</tr>
<tr>
<td>CRITICISM</td>
<td>X 8.1000</td>
<td>X 6.8333</td>
<td>X 6.9583</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>SD 1.1005</td>
<td>SD 2.2198</td>
<td>SD 1.6545</td>
<td>B - C</td>
</tr>
</tbody>
</table>

* = significant at 5% level
6.4. Results of hypotheses 10-19, relating to:

- Hypotheses 10 and 11: SSS Total score
- Hypotheses 12 and 13: IPAT Total score
- Hypotheses 14 and 15: Self Concept Scale Total of 6 subscales score
- Hypotheses 16 and 17: Introversion-Extraversion Scale Total score
- Hypotheses 18 and 19: PTS-Excitation subscale score

The results of hypotheses 10-19 are presented in Tables 6.10 - 6.19 (see following 10 pages).

According to Tables 6.10 (ANOVA) and 6.11 (Scheffe-test) there were no statistically significant differences between the three groups of swimmers A, B, and C with reference to the Sensation Seeking Scale (SSS) Total score.

According to Tables 6.12 (ANOVA) and 6.13 (Scheffe-test) there were no statistically significant differences between the three groups of swimmers A, B, and C with reference to the IPAT Total score.

According to Tables 6.14 (ANOVA) and 6.15 (Scheffe-test) there were no statistically significant differences between the three groups of swimmers A, B, and C with reference to the Adolescent Self Concept Scale Total of the six subscales.

According to Tables 6.16 (ANOVA) and 6.17 (Scheffe-test) there were no statistically significant differences between the three
groups of swimmers A, B and C with reference to the Introversion-Extraversion Scale Total score.

According to Tables 6.18 (ANOVA) and 6.19 (Scheffe-test) there were no statistically significant differences between the three groups of swimmers A, B and C with reference to the PTS-Excitation subscale score.
TABLE 6.10

ANOVA for three Groups of Swimmers A, B and C with reference to the Total SSS Scale score

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>SUM OF SQUARES BETWEEN GROUPS</th>
<th>SUM OF SQUARES WITHIN GROUPS</th>
<th>MEAN SQUARES BETWEEN GROUPS</th>
<th>MEAN SQUARES WITHIN GROUPS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL SSS</td>
<td>89.1977</td>
<td>2232.7333</td>
<td>44.5989</td>
<td>40.5952</td>
<td>1.0986</td>
<td>.3405</td>
</tr>
</tbody>
</table>
TABLE 6.11

Scheffe test: Comparison of pairs of groups of Swimmers A, B and C with reference to the Total SSS Scale score

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>GROUP A (N = 10)</th>
<th>GROUP B (N = 24)</th>
<th>GROUP C (N = 24)</th>
<th>GROUPS</th>
</tr>
</thead>
</table>

* = significant at 5% level
TABLE 6.12

ANOVA for three Groups of Swimmers A, B and C with reference to the Total IPAT Scale score

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>SUM OF SQUARES BETWEEN GROUPS</th>
<th>SUM OF SQUARES WITHIN GROUPS</th>
<th>MEAN SQUARES BETWEEN GROUPS</th>
<th>MEAN SQUARES WITHIN GROUPS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL IPAT</td>
<td>601.6241</td>
<td>6334.6000</td>
<td>300.8121</td>
<td>115.1745</td>
<td>2.618</td>
<td>.0825</td>
</tr>
</tbody>
</table>
Scheffe test: Comparison of pairs of groups of Swimmers A, B and C with reference to the Total IPAT Scale score

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>GROUP A ( N = 10 )</th>
<th>GROUP B ( N = 24 )</th>
<th>GROUP C ( N = 24 )</th>
<th>GROUPS * = significant at 5% level</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPAT TOT</td>
<td>X = 23.3000 SD = 9.0314</td>
<td>X = 29.2500 SD = 11.4256</td>
<td>X = 32.5000 SD = 10.6281</td>
<td>A - B: - | A - C: - | B - C: -</td>
</tr>
</tbody>
</table>

TABLE 6.13
**TABLE 6.14**

ANOVA for three Groups of Swimmers A, B and C with reference to the Total Self Concept (SC) Scale score

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>SUM OF SQUARES BETWEEN GROUPS</th>
<th>SUM OF SQUARES WITHIN GROUPS</th>
<th>MEAN SQUARES BETWEEN GROUPS</th>
<th>MEAN SQUARES WITHIN GROUPS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL SC</td>
<td>123.4575</td>
<td>6472.2667</td>
<td>61.7287</td>
<td>117.6776</td>
<td>.5246</td>
<td>.5947</td>
</tr>
</tbody>
</table>
TABLE 6.15

Scheffe test: Comparison of pairs of groups of Swimmers A, B and C with reference to the Total Self Concept (SC) Scale score

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>GROUP A N = 10</th>
<th>GROUP B N = 24</th>
<th>GROUP C N = 24</th>
<th>* = significant at 5% level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>SD</td>
<td>X</td>
<td>SD</td>
</tr>
<tr>
<td>TOTAL SC</td>
<td>72.2000</td>
<td>12.4347</td>
<td>72.3333</td>
<td>9.9637</td>
</tr>
</tbody>
</table>

* = significant at 5% level
TABLE 6.16
ANOVA for three Groups of Swimmers A, B and C with reference to the Total Introversion-Extraversion (I-E) Scale score

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>SUM OF SQUARES BETWEEN GROUPS</th>
<th>SUM OF SQUARES WITHIN GROUPS</th>
<th>MEAN SQUARES BETWEEN GROUPS</th>
<th>MEAN SQUARES WITHIN GROUPS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL I-E</td>
<td>294.8626</td>
<td>3604.5167</td>
<td>147.4313</td>
<td>65.5367</td>
<td>2.2496</td>
<td>.1151</td>
</tr>
</tbody>
</table>
Scheffé test: Comparison of pairs of groups of Swimmers A, B and C with reference to the Total Introversion-Extraversion (I-E) Scale score

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>GROUP A (N = 10)</th>
<th>GROUP B (N = 24)</th>
<th>GROUP C (N = 24)</th>
<th>GROUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>SD</td>
<td>X</td>
<td>SD</td>
</tr>
<tr>
<td>TOTAL I-E</td>
<td>28.8000</td>
<td>9.9867</td>
<td>27.7083</td>
<td>6.9061</td>
</tr>
</tbody>
</table>
TABLE 6.18

ANOVA for three Groups of Swimmers A, B and C with reference to the PTS-Excitation subscale score

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>SUM OF SQUARES BETWEEN GROUPS</th>
<th>SUM OF SQUARES WITHIN GROUPS</th>
<th>MEAN SQUARES BETWEEN GROUPS</th>
<th>MEAN SQUARES WITHIN GROUPS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTS-E</td>
<td>25.3727</td>
<td>3226.5583</td>
<td>12.6864</td>
<td>58.6647</td>
<td>.2163</td>
<td>.8062</td>
</tr>
</tbody>
</table>
TABLE 6.19

Scheffe test: Comparison of pairs of groups of Swimmers A, B and C with reference to the PTS-Excitation subscale score

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>GROUP A</th>
<th>GROUP B</th>
<th>GROUP C</th>
<th>GROUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 10</td>
<td>N = 24</td>
<td>N = 24</td>
<td></td>
</tr>
<tr>
<td>PTS-E</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>51.3000</td>
<td>49.4167</td>
<td>50.1250</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.6891</td>
<td>8.3245</td>
<td>6.9176</td>
<td></td>
</tr>
</tbody>
</table>

* = significant at 5% level

A - B  | A - C  | B - C  |
6.5. Chapter Summary

According to the results presented above there are hardly any statistically significant differences between the various groups of swimmers in any of the measured temperament traits. The exception is the IPAT A scale which showed statistically significant difference between Group 1 (Olympic Group) and Group 3 (Unsuccessful Group).

The results are discussed in Chapter 7.
CHAPTER 7

DISCUSSION OF RESULTS, LIMITATIONS AND RECOMMENDATIONS

The results of the statistical analyses of the data collected, are presented in Chapter 6. These results are interpreted and discussed in the first section of this chapter (section 7.1.). This is followed by a critique of the study undertaken. The limitations which appear to have hampered the study are noted in section 7.2. Recommendations for future research follows in section 7.3. Finally a conclusion is presented in section 7.4.

7.1. Discussion of Results

7.1.1. Introduction

The present research study aimed to investigate possible temperament differences between successful swimmers subdivided according to three levels of success in competition.

The three groups used in the present study are unique with
reference to their group formulation. No research was found which truly differentiates between successful athletes and which uses an Olympic Group within the sample. Some studies have been found to use aspects of the present study but never as attempted in this study. Hence the present research is new and unique with very little data with which to compare it. It is especially unique because of the choice of sport used, namely swimming. Most studies use track and field athletes as a sample base. Also, because most research has been undertaken in America, baseball, basketball or football is used. Swimming is unique in that, although most authors refer to the sport as an individually orientated sport, this is in fact not altogether correct. The racing component of the sport is indeed individual, the training component is team orientated with regard to squad and team training and motivation. It is believed that the competitor has to be able to move from extremes of being totally introspective, to being socially competent in order to successfully remain and achieve within the sport. The choice of sport, according to the above explanation, makes the results difficult to compare to studies which specifically investigated either team or individually orientated sports.

With reference to the results, it needs to be emphasized that all the data collected for the study is, as far as it is controllable, correct and acceptable and that the process under which the data was collected, was correct and professionally handled. The variables and influences which could have affected the data whilst it was collected, was controlled and countered for as far as possible. In terms of the marking of the answer
sheets, all the scores of the questionnaires have been double checked.

In spite of great care and rigorous control, no significant results were found for either the four SSS-sub scales or the SSS-Total score, nor the three Self-concept subscales or the Self-concept Total score. Also no statistically significant differences between the groups of swimmers manifested with regard to the Total Introversion-Extraversion score, and the PTS-Excitation subscale score. Statistically significant differences were found in Unconscious Anxiety between Group A and C, with Group C betraying significantly more unconscious anxiety. No other differences in anxiety between the various groups manifested.

These various temperament traits will now be individually discussed in terms of relevant existing research results and weighed against the present results.

7.1.2. Self concept

The total scores of the Adolescent Self Concept Scale, as well as the subscale scores will be discussed in the section.

In terms of studies on self concept, the literature reviewed in previous chapters has shown contradictory research findings.

In the study by Ibrahim and Morrison (1976) a comparison is made between male and female athletes and nonathletes. The study
showed the athletes to have lower than average self concept scores. The male high school athlete differed from their nonathlete counterpart with regard to both self actualization and self concept. No differences were found between the female high school, female college and male college athletes and their nonathlete counterparts in terms of self concept. In contrast, Bester (1984) in a South African study, found participants in sport to score higher on self confidence, self esteem and self control as compared to nonparticipants. Smit (1990) found that male high school athletes' self worth was below average while Jones et. al. (1991) suggest that male and female university athletes showed a significant decrease in self confidence as competition neared.

Only two studies were reviewed in the present study, where a comparison was drawn between successful and unsuccessful athletes. The studies drew their sample groups from wrestlers. Highlen and Bennett (1979) were able to conclude that successful wrestlers were more confident than less successful wrestlers. Such confidence would be equated to a positive self concept. Gould et. al. (1981) supported the previous studies results.

Olyster and Arrasmith (1975) compared female competitive swimmers and nonactive people, and concluded that the latter group scored higher on self concept. This finding is contrary to that of Morris et. al. (1979), who noted that the self esteem scores of male swimmers were higher than the published norms. The three groups within the present study appear to rather form a single group with a similar score. Further research will have to be
conducted to compare these scores as a whole to the published norms of the ASCS.

7.1.3. Introversion-Extraversion

Various studies including Brunner (1969), Morgan (1972), and Colley et. al. (1985) found that sport participants or athletes scored higher than their nonactive counterparts on extraversion. Ogilvie et. al. (1971) noted that female athletes had similar personality profiles to the male athletes, with the exception of lower extraversion scores. Frazier (1987) concluded that the introversion-extraversion scores of male and female marathon runners were similar to those of the population norms.

There is little agreement in the literature as to whether swimming is a team or individual oriented sport. Team sports are normally associated with extraversion and individual sports with introversion. Swimmers would hence have average scores on the introversion-extraversion continuum, since swimming can be classified as a team as well as an individual sport. The literature also indicates that sex as a variable should be taken into account when empirically investigating the temperament. In the present study, the three groups consisted of both male and female swimmers within each category, which may have resulted in the failure to produce statistically significant differences in introversion-extraversion. Whiting and Stembridge (1965) concluded from their studies on both university and 11-12 year old samples, that the swimmers scored higher on extraversion than the nonswimmers. Meredith and Harrison (1969) note that the
group of female swimmers exhibited a pattern of introversion compared to those females enrolled in basic movements, tennis and golf. These studies thus contradict one another.

7.1.4. Anxiety

The present study showed a statistically significant difference in the IPAT A subscale scores ($p < 0.05$) between Group A and Group C (i.e., between the Olympic Group and the Unsuccessful Group). The mean ($X$) score for Group A was 12.1000 whilst the mean for Group C was 17.4167. The Standard Deviations (SD) for the two scores were 4.8178 and 5.1492 respectively. The results indicate a higher level of Unconscious Anxiety (IPAT A) for the Unsuccessful Group of swimmers compared to the South African Olympic Group of swimmers. The latter group represents the elite swimmers in this country and it would be expected that this group would have a lower level of anxiety since they are expected to be able to cope with the competitive situation more successfully. The fact that a difference was found in relation to the Unconscious Anxiety, indicates that these swimmers do not subconsciously worry about competition, or its outcome. They appear to be more in touch with their feelings and anxiety and cope with this on a conscious level rather than suppressing their fears and anxieties. The fact that the IPAT B (Conscious Anxiety) subscale failed to show a significant difference between any of the groups, may be interpreted as indicating that all swimmers, irrespective of their levels of success, experience day-to-day or competitive anxiety in similar ways. However, the two groups who function at lower success levels, allow for such anxieties to
become subconscious. The Olympic swimmers may be better at converting their conscious anxiety into effective energy needed for competing and racing. Thus their anxiety serves a positive role rather than having negative influences. The mean (X) scores for the three groups A, B and C with reference to the IPAT B, as shown in Table 6.6, shows a progressive increase in anxiety from 11.2000 for Group A (Olympic Group) to 15.0833 for Group C (Unsuccessful Group). Despite this observation, the differences were not statistically significant.

The lower anxiety score for the most successful of the swimming groups, is in line with Smith (1983) who found that All-star athletes had lower anxiety scores than their playing substitutes. Dowd and Innes (1981) also noted that State-level players in their study were less anxious than the average players. This is contrary to Slogrove et al.'s (1989) South African study on SA field hockey players. Here the more successful players had significantly higher anxiety measures than their unsuccessful counterparts. It must be noted that both Smith (1983) and Slogrove et al.'s (1989) findings were obtained using the SCAT as a measure of competitive anxiety, whereas the present study's findings were obtained using the IPAT A Scale. This study failed to find significant differences between the three groups of swimmers in relation to competitive anxiety when using the SCAT. This finding supports Dippenaar and Potgieter (1986), and Potgieter and Schooling (1986), who used the SCAT when testing cricket and squash players respectively. They were also unable to find differences in anxiety using success as a factor. Another study which used the SCAT is that of Power (1982). No significant
differences between international and non-international track and field athletes were obtained.

7.1.5. Sensation Seeking

Many of the studies investigating sensation seeking are an attempt to verify the existence of the sensation seeking trait. Many of these studies have focused on comparing dangerous or risk taking sports and non risk taking sports in terms of the sensation seeking trait. Such sports include skydiving, scuba diving, skiing, and mountain climbing (Hymbaugh & Garrett, 1974; Heyman & Rose, 1980; Connolly, 1981; and Cronin, 1991).

Stirling (1977) investigated the differences between contact and noncontact sports. Swimming was included in the latter category. On both TAS and Dis, the contact sport group scored the highest. The nonathletes scored the lowest, and the noncontact sports somewhere inbetween. Potgieter and Bisschoff (1990) compared medium risk (rugby) and low risk (marathon running) sports. In this study the former group scored significantly higher overall on sensation seeking.

No differences in sensation seeking scores between the three swimming groups were expected since swimming could well be classified as a low risk sport. Hence the participants would not be expected to have high scores in either the subscales or the total score of the SSS. If swimmers as a group, were expected to score low in relation to sensation seeking, it would be doubtful to expect the groups to be able to distinguish amongst
themselves. In further research, all the groups' scores will be combined in an attempt to provide norm scores, to be compared firstly to other low risk sports. Secondly, to be compared to other aquatic disciplines such as diving and synchronised swimming. These athletes are expected to have high scores in the sensation seeking trait.

7.1.6. Strength of the Nervous System

No literature was obtainable applying Strelau's theory of Strength of the Nervous System to sport. Hence the present study is one of the first of its kind.

Based on the theory of high and low reactive individuals, Strelau notes that high reactive individuals would show low endurance, be susceptible to fatigue, and would avoid risky situations which evokes emotional tension. Hence it can be deduced that swimmers would be low reactive individuals, and would score high in terms of nervous system strength. It was expected that the elite, Olympic swimmers would have the strongest nervous system. This hypothesis was not validated within this study. Further research will have to investigate the differences between swimmers and the general population in terms of strength of the Nervous System. It is also possible that the different stroke types or different distance events can differentiate between nervous system types.

7.1.7. Conclusion

When viewing the overall findings of this study, in terms of
successful versus nonsuccessful swimmers, the results are in line with some previous research. Mahoney (1974) noted that outstanding and less outstanding swimmers differed more from the general population than they differed amongst themselves. Huddelston and Gill (1981) failed to distinguish temperament differences between female track and field athletes, grouped according to skill, while Miller and Miller (1985) could not distinguish between elite and less successful netball players.

Singer (1969) found that only one of 15 variables yielded significance when comparing high- and low-rated tennis players, while no differences were noted between high- and low-rated baseball players. Singer (1969) notes in his conclusion that his findings were in line with those of other researchers who had failed to find personality differences when comparing outstanding and average athletes in a given sport, using the 16PF.

In conclusion, it appears that the three groups of swimmers under investigation in the present study, are more similar than dissimilar. If the groups were combined into one greater conglomerate group using swimming as the variable, they would differ more from the population and the norm, and more from the nonathletes than they differ within themselves. This may suggest that the variable of swimming, rather than success, differentiates this group. The swimming group appears to form part of a total athletic personality profile, but whether distinctions within this group can be made, requires further investigation. A reformulation of the research question to compare swimmers to the norm or general population, might provide
supportive or contradictory evidence to Riddick’s (1984) findings. Riddick (1984) concluded that the recreational swimmer has more positive personality characteristics than the competitive swimmer.

7.2. Limitations of Present Study

Although this research was planned with great care and interest, and is valuable in its own right, it necessary to mention certain limitations that may have negatively influenced the study.

7.2.1. The Number of Subjects

Fifty eight subjects were used in the present study. Despite the author’s involvement in the swimming community, from which the sample was drawn, it was difficult to increase the size of the sample. This was because the overall population from which the sample was drawn was limited. The respondents were required to have been selected to represent their province at the South African Championships. Due to the high standard of qualification times required to make the team, this group of successful swimmers remains limited. The research and the completion of the questionnaires were undertaken in the early part of the new swimming season so as not to interfere with the respondents’ training schedule. Unfortunately many of the successful swimmers were still on their winter break, and could not be allocated for the study. On the other hand, the Olympic Group, which formed the elite group of successful swimmers was small in size due to
financial restraints on the National Olympic Committee.

The size of the sample was small in comparison to the number of variables under investigation in the study, which may have influenced the reliability of the results.

7.2.2. Sex of the Subjects

Due to the size of the final sample group, the author was required to combine male and female respondents into one group. It would have been interesting to compare the possible differences between the males and females in the sample with reference to temperament. Recent research has indicated that sex differences are apparent to various personality and temperament traits.

7.2.3. Age of the Subjects

The author was required to limit the ages of the respondents because of the requirements of two of the questionnaires, namely the ASCS and the SCAT. The ASCS requires that the respondents be of adolescent age while Form A of the SCAT requires a minimum age of 15 years. Three members of the Transvaal Team were 13 years of age. It was decided that these subjects were too young to answer the series of questionnaires. Such youthfulness would also have required the author to use the Form B of the SCAT. While three other team members were 14 years of age and hence below the SCAT Form A minimum age, and technically were required to complete Form B, it was decided to allow them to complete Form A. This decision was based on the maturity of the respondents and the
fact that the distinction between 14 and 15 years of age in the early years of adolescence appeared unclear.

The oldest respondent was 27 and the youngest 14 years of age. According to Groups, the ages varied as follows: 25-17, 27-14 and 20-14 for the Olympic, Successful and Unsuccessful Group respectively. The apparent large age gap between respondents may have influenced the possible subtle distinctions between groups. The older respondents would be expected to understand and "know" themselves more fully while the younger respondents are yet to distinguish feelings, norms and standards for themselves. This was expected to be more evident in relation to the ASCS, where a vast majority of subjects were no longer adolescents.

7.2.4. Test Material

Six questionnaires were required to test temperament traits in the present study. Of these, three were developed in South Africa and was standardized for this country. The IPAT Anxiety Scale was standardized by Scheier and Madge (Cattell et. al., 1986) of the HSRC. The Introversion-Extraversion Questionnaire was developed by Schepers (1991) and the Adolescent Self Concept Scale (ASCS) was developed by Vrey (Vrey and Venter, 1983). The three remaining questionnaires, namely the SCAT, SSS and the PTS, are yet to be standardized for South African populations. The PTS is a newly developed questionnaire, based on the Strelau Temperament Inventory (STI), which although available in this country, is also yet to be standardized. Subtle cultural differences may result in variations to the findings of the study. It may be
beneficial for future research to use standardized versions of these questionnaires, or to begin by standardizing such questionnaires.

7.2.5. Success of the Subjects

The greatest query regarding the present study, exists in relation to the true classification of the groups based on "success".

At the time of the selection of the 1992 South African Olympic Team, great unpleasantness and suspiciousness was evident. It was believed that no "fixed" criteria were used in the selection of this team and that certain top South African swimmers were overlooked. The selection was also complicated by the fact that the team was restricted in size and that despite the selection of two girls at the National Championships in March of 1992, they were dropped from the team a month before departure to Barcelona. All but three of the initial team were South African Champions. A second point of contention with regard to the selection was that not the best ten swimmers were selected from South Africa, but rather that ten swimmers representing all strokes and all disciplines of swimming were selected. This allowed the selectors to choose an individual medley relay team, which should not be the priority of selection. Those swimmers who, in individual races would achieve the best results for South Africa, should rather be chosen. Although all ten selected swimmers had achieved excellence in their particular strokes, these swimmers did not necessarily represent the true elite in swimming. Once selected,
these swimmers did not undertake any tests with regard to physical strength or psychological development, to ensure that they were the best, or that they were capable of dealing with the pressure that would inevitably be placed on them.

Thorough inspection of the individual Olympic Team members questionnaire results, highlights the vast extreme differences between the respondents' scores, with regard to the various traits tested. It is the author's belief that these contradictory differences are as a result of the years sport isolation as a result of Apartheid. Because of the years of isolation, certain individuals who may have possessed the psychological "make-up" to become champions, failed to reach the heights of success due to lack of incentives. The situation hence allowed for other swimmers to win titles, while they may not necessarily have had the true ability to become champions. This appears to be an extremely harsh observation, but the author wishes to make the suggestion that in previous years, it was easier to achieve and win titles at the National Championships because of the lack of international competition. The "pool" of swimmers who competed was small and many of the very talented swimmers retired before they had achieved their best performances. It is not the intention to discredit any swimmers who may have won National titles in this period, as it is true that two or three of South Africa's greatest swimmers emerged from this period. It is however unknown what heights these swimmers could have reached, with international competition.

The second major limitation of the grouping according to success
levels, is that certain swimmers appeared to have been wrongly classified. For two of the respondents, the timing of this study appeared to be too late. They were both former South African champions, who would undoubtedly have represented this country at the Olympics had we not been in isolation. They are now two of the oldest respondents in the present study, and unfortunately both at the end of their respective careers. They were however classified according to their present achievements (Group B), which does them no justice, rather than on their previous highest achievements. Three other subjects who represented the second group, the Successful Group, were in fact National title holders, but had failed to be selected for the Olympic team, for any of the reasons mentioned above. This raises the question whether the term "success" was the correct one and what exactly was meant by this term in relation to a sample of swimmers who were already seen as successful.

The third limitation of classification appears to be that of age. It has come to the author's attention that the vast majority of the respondents who fell into the classification of the Unsuccessful Group of swimmers were in fact the youngest members of the sample. These swimmers were still in their first or second year of competing at the National Championships, and in fact had not yet been given time to "prove" themselves. Again it was not known whether they in fact have the psychological "make-up" of a true champion. It may have been appropriate for the author to subject the respondents to a minimum period of five years of competing for the Transvaal Team at the National Championships. Unfortunately, because of isolation or lack of interest, many
swimmers may fail to achieve this criterium and standard. This is especially true for the weaker swimmers, who quickly become disillusioned and see representing their province as the ultimate goal. The sample was also restricted in size and numbers, and the author could not afford to sideline certain respondents. It is also the author's belief that it would always be extremely complicated to find a sample which truly meets the criteria of "unsuccessful" successful competitors, without the influence of youthfulness.

In conclusion, the distinction of "success" appears to be inappropriate, despite all the subjects having fulfilled the requirements of being successful. The author has come to realize that no rule or distinction can be vigorously applied to any group, but that leniency may allow for researcher bias.

7.2.6. Correspondence

A attempt was made to maintain and control the environment under which the subjects completed the various questionnaires. Because of the fragmentation involved in sports in South Africa, whereby sportsmen and women are coached by various coaches in varying circumstances, the tests could not be undertaken in one environment. The author attempted to test each squad of swimmers together under similar circumstances, such as time of the day, motivation and setting. Since many of the Olympic swimmers were either training in American and European universities, or live around the country, these subjects were corresponded with via the postal services. The author was hence not able to control the
circumstances or environments under which the questionnaires were answered.

7.3. **Recommendations for future research**

More systematic research is required in South Africa with regard to sportsmen and women and their psychological development. Such research, not subject to any particular sport investigated, should consider the following recommendations:

a) A large sample group should be selected which would allow statistical credibility for each variable under investigation. The larger the sample the more reliable the data and the findings, which is ultimately the goal.

b) Future studies should distinguish between male and female subjects within the sample. Preferably a comparison should be undertaken between the sexes regarding each variable under investigation.

c) The researcher should attempt to minimize the age variance between respondents, either aiming at an adolescent group or opting for an older more mature group. The age of respondents will be strongly influenced by the testing instruments being used by the researcher.

d) The environmental circumstances under which the research is undertaken, needs to be more strongly controlled in an attempt to
prevent any potential influences. It is recommended, that research not be undertaken via the postal service. If this option is a necessity, the researcher needs to be aware that certain subjects will fail to return their questionnaires and that the sample should be increased to counteract this problem.

e) The questionnaires used in the research should be standardized in South African to allow for specific cultural variations. Much research is required in this country to standardize the various sport psychology instruments which have been developed. Much needed meaningful sport research can be conducted with excellent measuring instruments.

f) A truly quantifiable definition of success is required to classify the sample group which is already selected on the basis of success.

g) More definite and interesting results may be obtained if the scope of the investigation is narrowed to one or two basic traits, rather than numerous traits being investigated in one study. This will mean that the sample, if kept large, can produce results that are statistically significant and acceptable.

7.4. Chapter Summary

The present study was innovative with regard to the subject matter, the sample selection, the classification used, and the traits under investigation. Hence it was difficult to either
verify or disprove previous research undertaken in America or
South Africa. The latter is extremely sparse in relation to the
subject matter under investigation.

The research framework emphasized a distinction between three
levels of successful swimmers with reference to various
temperament traits. The present research was able to show
statistically significant differences between the groups in the
IPAT Anxiety Scale A subscale, which represents the respondents' levels of unconscious anxiety. The Unsuccessful Group had
statistically significant higher levels of Unconscious Anxiety
than the Olympic Group. It was suggested that the Olympic swimmers, who represent the elite sportsmen and women this
country has to offer, are able to cope with both competitive and living anxiety at a conscious level. This may involve the conversion of such anxiety into workable energy, rather than allow such anxiety to be suppressed and undealt with. Future research is needed to investigate whether this phenomenon of anxiety conversion, can truly be achieved by the sportsmen and women.


