

**LIFESTYLE AND MOOD FACTORS IN  
SPORT PERFORMANCE**

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## ABSTRACT

Elite (n=37), sub-elite (n=37) or non-elite (n=24) sportpersons participating in any one of eight individual Olympic recognized sports (archery, fencing, gymnastics, ice skating, swimming, track and field, weightlifting and wrestling) took part in the study. Age and sex of subjects were not controlled. Subjects were given the 'How Healthy a Life do you Lead?', the 'Profile of Mood States' and a general questionnaire to complete. Descriptive analysis portrayed similar lifestyle and mood profiles across the three levels of sport performance while discriminant analysis revealed that lifestyle as well as mood variables could not predict level of sport performance ( $p < 0.05$ ). The research hypotheses that healthier lifestyle and mood profiles are related to better sport performance were therefore not supported. Other results however revealed that the structure of the lifestyles was related to level of sport performance. Considerations for future research in this area are discussed.

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## **CHAPTER ONE**

### **INTRODUCTION**

Sport psychology dates back to the time of ancient civilizations with its ideas about the mind-body relationship. It has however only been since the late twentieth century that sport psychology has differentiated into a specialized field (Mahoney & Suinn, 1986).

Early literatures of China and Greece advocate the mind-body relationship (Weiss, 1969) but it is only recently that this relationship has undergone scientific scrutiny in what is now understood as sport psychology. Geron (1982), for instance, states that sport psychology is a new science without a long history. According to Cox, Qiu and Liu (1993) the application of sport psychology took place long before the term was actually used, but that it is now defined as the science of applying psychology to sport.

#### **1.1 PRESENT RESEARCH IN SPORT PSYCHOLOGY**

According to Cratty (1980), the psychological forces in the world of highly competitive sport are complex, unique and largely unexplored. It is for this reason that research in sport psychology becomes important in the present and future.

Presently sport psychology attempts to identify psychological variables that can affect and ultimately enhance sport performance. It has generally been accepted by researchers and practitioners that sport performance is related to a set of psychological variables that have the potential to be identified (Silva, Schultz, Haslam, Martin & Murray, 1985). This identification has intrigued social scientists for many years and the importance of this research is emphasized by Mahoney (1989). Although the importance of psychological variables has long been recognized, the research in this area is relatively recent (Browne and Mahoney, 1984).

#### 1.1.1 PSYCHOLOGICAL DIFFERENTIATIONS BETWEEN HIGH ACHIEVING AND LOW ACHIEVING SPORTPERSONS

One of the major areas of sport psychology research focuses on psychological variables that differentiate high achieving sportpersons from low achieving sportpersons (Craighead, Privette, Vallianos & Byrkit, 1986). In the mid 1970s Morgan (1974) put forward the concept that high level performers in sport are characterized by psychological profiles which generally distinguish them from lower level performers.

A number of studies support this notion. Morgan and Johnson (1977) revealed that successful wrestlers possessed psychological differences to less successful wrestlers in that they exhibited a more desirable mental health. They concluded that positive mental health plays an important role in determining success in sport. Another study

by Morgan and Johnson (1978) showed that successful sportpersons possess lower levels of anxiety, depression and neuroticism compared to less successful sportpersons.

Bushan and Agarwal (1978) showed that high achieving table tennis and badminton players scored differently on certain personality factors compared to low achieving players.

Studies also indicate that successful elite gymnasts (Mahoney & Avenier, 1977), raquetball players (Meyers, Cooke, Cullen & Liles, 1979), wrestlers (Highlen & Bennett, 1979; Gould, Weiss & Weinberg, 1981; Silva et al., 1985) and marathoners (Silva & Hardy, 1986) have different cognitive strategies compared to less successful sportpersons. Silva et al. (1985) and Silva and Hardy (1986) also conclude that these studies suggest that a more direct, focused and positive psychological set is related to better performance.

Morgan (1980b) later posited that mental health and sport success are directly related. This view, according to Paulsen, French and Sherill (1990), has been widely accepted.

Studies, however, have not always supported the concept that high level sport performers are characterized by psychological profiles that distinguish them from lower level performers. Rushall (1970, 1972), using the 16 Personality Factor Inventory, failed

to demonstrate any relation between personality and performance in swimming and football.

A study by Riddick (1984) that looked at psychological profiles of competitive, recreational and inactive swimmers suggests that the recreational swimmers, more so than the competitive and inactive swimmers, had the most positive personality characteristics. One must, however, note that this study did not necessarily look at the difference between successful and less successful swimmers i.e. recreational swimmers may be more successful swimmers.

A study by Miller and Miller (1985) using five self-report psychological inventories of elite netballers found no significant differences in any of the psychological factors between the successful and unsuccessful members of the squad.

Lastly, a study by Meyers, Sterling, Treadwell, Bourgeois and Le Unes (1994) found no significant differences in psychological skills, as measured by the Psychological Skills Inventory for Sports (PSIS), between top, middle and bottom world ranked female tennis players.

All except two of these studies that failed to support the notion that successful sportpersons have differing psychological profiles to unsuccessful sportpersons investigated personality differences of the sportpersons. All except one of the studies,

however, that supported this notion did not look at personality differences but rather at more specific psychological variables such as anxiety, depression, and self-talk. This could suggest that either personality is not a discriminatory factor in terms of sport performance or that personality is too broad a variable to investigate as a discriminatory factor in sport performance. This point is supported when it is stated that there is a long-standing debate regarding the efficacy of personality traits in sport psychology research (Morgan, O'Connor, Ellickson & Bradley, 1988). This is despite Morgan (1979) stating that elite performers of sports such as wrestling, long distance running and rowing are more alike from a personality standpoint than they are unlike, and that they differ from the general population in a positive way. This point, however, is not elaborated on or explained. Eysenck, Nias and Cox (1982) suggest that much of the literature of sport and personality is of unacceptable low scientific standard and that this is the reason why many of the results are contradictory and difficult to interpret.

#### 1.1.1.i MENTAL HEALTH MODEL OF SPORT PERFORMANCE

Following a range of studies, Morgan (1985) introduced the Mental Health Model of sport performance which states that psychopathology is negatively related to success in sport. According to this model, the presence of a positive psychological profile is associated with performance that is superior to that of sportpersons with more negative psychological profiles. Morgan (1985) mentions that this Mental Health Model is characterized by theoretical parsimony, has heuristic potential, is based on extensive

cross-sectional studies and that psychometric assessment has been employed with 70-80 % accuracy in efforts designed to predict success in sports.

With studies in this area Heyman (1982) has, however, warned that one must be careful not to mistake correlational data for causal data. This point has been noted by Morgan (1979) when the question was put forward if better sport performance produced or required positive mental health, and later when Morgan (1985) stated that the studies in this area were largely correlational and that they therefore imply, but do not specify, causality. Although researchers have been cautious in their conclusions of these studies, practitioners must be careful of misapplication of these results by putting forward that better sport performance is caused by positive psychological profiles.

The above discussion reveals that studies looking at the psychological differences between successful and less successful sportpersons have not reached a persuasive viewpoint, but that further studies may do so and they therefore have the potential of providing very relevant and pertinent information for sport psychology. This area therefore seems worth pursuing further in scientific research studies and it is with this intention that this present study will look at the relationship between lifestyle as well as mood factors in sport performance.

### 1.1.1.ii LIFESTYLES

No studies centre on the relationship between lifestyle factors and sport performance. This is despite there being literature on the influence of lifestyles in other areas such as the relationship between lifestyles and health.

#### 1.1.1.ii.a RELATIONSHIP BETWEEN LIFESTYLES AND HEALTH

Studies into the relationship between lifestyles and health seem to have made such an impact that they contributed to the emergence of a new field within the discipline of psychology. Stroebe and Stroebe (1995) mention that the growing recognition that lifestyle factors contribute substantially to morbidity and mortality was one of the reasons which lead to the development of health psychology in the late 1970s. Evans (1988) has stated that the field of health psychology concerns itself with the relationship between "lifestyles and incidence of disease, morbidity and mortality" (p.203).

Belloc and Breslow (1972; in Pitts, 1991) were the first to systematically study this notion of lifestyle with health. They studied a sample of 6 928 people living in Alameda County, California where they examined several common health practices such as hours of sleep, regulation of meals, physical activity, drinking and smoking as well as the responses to the issues of health. They found that all adults who engaged in most

of the health practices were in better health than those who engaged in a few or none.

Matarazzo (1983) mentions that our high frequency in illness and growing health problems continue to be directly tied to behavioural pathogens and lifestyle factors. According to Walker, Sechrist and Pender (1987), there is increasing support for the interrelation between a person's style of life and his/her health status although they fail to elaborate on this. Schomer (1990) suggests that there is growing evidence that certain unhealthy lifestyles are linked to such major health problems as cardiovascular disease, obesity and cancer while Sarafino (1990) mentions that principal health problems today are chronic diseases that can often be prevented by people's lifestyles. Stroebe and Stroebe (1995) also state that people are persuaded to engage in a healthy lifestyle to lengthen their lives, stay fit longer and to lead an active life right into old age "without being plagued by pain, infirmity and chronic disease" (p. 8).

Lifestyles have not only been related to physiological-based diseases but also to mental health problems. Schlebusch (1990) states that serious physical and mental health problems can be predisposed, initiated, sustained or exacerbated by behaviours of people related to their lifestyles.

It has also been stated in the 1979 Surgeon General's Report (in Walker et al., 1987) that at least 50% of deaths in the United States of America each year are due to unhealthy lifestyles. Also, it has been estimated that 50% of the mortalities from the ten

leading causes of death may be attributed to lifestyle (Hamburg, Elliot & Parron, 1982).

One should however question if this refers to a global phenomenon or only in specific countries.

The argument of a lifestyle's influential role in health is reinforced when it is stated by the National Centre for Health Statistics that the majority of diseases and premature deaths in the United States of America are associated with unhealthy lifestyles (Nattiv and Puffer, 1991).

The above studies suggest that lifestyles have an influential relationship with health. It might then become useful to investigate if lifestyles have an influential relationship in other areas, specifically that of sport performance.

#### 1.1.1.ii.b RELATIONSHIP BETWEEN LIFESTYLES AND SPORT PERFORMANCE

Two studies in the late 1970s touched on this topic extremely briefly while discussing broader psychological issues. Mahoney and Avenir (1977), in an exploratory study looking at the psychology of the elite gymnast, briefly mention the issue of lifestyles on sport performance. They found that a relatively relaxed and unstructured lifestyle (as opposed to a regimented one) was associated with greater performance anxiety. They do not elaborate what this means in terms of sport performance but mention earlier in

their paper that subjects with lower performance anxiety were the better sportpersons. This study therefore implies that relaxed and unstructured lifestyles are associated with lower performance.

Highlen and Bennett (1979), in an exploratory study looking at the psychological characteristics of successful and non-successful elite wrestlers, mention that qualifying wrestlers reported their lifestyles to be slightly more structured and organized than the non-qualifiers. This supports Mahoney and Aveners' (1977) implication that there is a relationship between lifestyles and sport performance where structured lifestyles are associated with better sport performance.

These two studies seem to be the only studies that mention anything about the relationship between lifestyles and sport performance. They suggest that there is scope in this relationship and it may therefore be worthwhile to explore this further. It is with this intention that this present research study was carried out. It is now appropriate to define what is meant by the term 'lifestyle'.

#### 1.1.1.ii.c DEFINITION OF THE TERM 'LIFESTYLE'

The term 'lifestyle' used in ordinary speech has not yet become firmly established in scientific parlance (Health Education Unit, 1986), while Abel (1991) states that there is a vagueness in the notion of lifestyle and that the term constitutes a wide range of

behavioural and attitudinal components.

Singer (1982) defines lifestyle as a way of living or the manner in which people conduct their day-to-day activities, while Wiley and Camacho (1980) define lifestyle as a constellation of discretionary activities with significant impact on health status that are an integral part of one's pattern of living. These two definitions are very broad and more specificity is needed.

Milio (1981) states that "lifestyles are patterns of (behavioural) choices made from alternatives that are available according to the socio-economic circumstances and to the ease with which they are able to choose certain ones over others" (p.901). Abel (1991) feels that this definition must be more focused and therefore proposes that a lifestyle comprises of patterns of health-related behaviours, values and attitudes adopted by groups of individuals in response to their social, cultural and economic environments. More specificity is still needed in terms of what actually constitutes a lifestyle.

Walker et al. (1987) define a lifestyle as "a multidimensional pattern of self-initiated actions and perceptions that serve to maintain or enhance the level of wellness, self-actualization and fulfillment of the individual" (p.77). Although this definition includes ideas about patterns of actions and perceptions, it still does not specify what these patterns are that constitute a person's lifestyle and one therefore still needs to look further.

Travis (1977; in Walker et al., 1987) begins this specification of what actually constitutes lifestyles. Here the dimensions of a health-promoting lifestyle are described as self-responsibility, nutrition, physical awareness and stress control. This approach to describing lifestyles, unlike previous approaches mentioned, focuses on specific factors or dimensions rather than talking in broad and general terms. Ardell (1986) refined and expanded these dimensions to self-responsibility, nutrition awareness, stress management, physical fitness and environment sensitivity.

Along the same lines Silbert, Schneiderman and Braunstein (1981) define lifestyle in terms of experiences and events that make up the daily patterns of living of an individual and include the following:

1. where he/she lives or conditions of home environment ,
2. type of work/conditions ,
3. food ,
4. personal habits ,
5. physical activity ,
6. recreational activities and
7. associates.

With this definition the notion of lifestyles has become more comprehensible and understandable in terms of what actually constitutes and is associated with lifestyles.

This definition, therefore, seems to be the most appropriate.

However, there are still points to consider when defining the term 'lifestyle'. Abel (1991), mentions the problem of operationalizing the term lifestyle in empirical research i.e. how is the term lifestyle measured? Secondly, it is maintained that researchers have failed to construct convincing empirical measures by relying on single cumulative scales based on selected health behaviours or attitudes and it is asked what explicitly is it that the lifestyle concept is supposed to measure? It is said that these are still unresolved problems specifically in terms of how lifestyles can be measured and what is actually meant by lifestyles. Another point put forward by the Health Education Unit (1986) is that there is almost no agreement either in theory or practice as to what constitutes a lifestyle. Any work done in the area of lifestyles has to take these issues into consideration. At this point, however, the definition put forward by Silbert et al. (1981) will be appropriate.

#### 1.1.1.ii.d RESEARCH QUESTION

The above discussion illustrates that there is scope to investigate the relationship between lifestyles and sport performance and that a definition of the term 'lifestyle' has been obtained. The research question that arises from this is the following:

What is the relationship between lifestyle factors and sport performance?

#### 1.1.1.ii.e RESEARCH HYPOTHESIS

Following on from this research question is the research hypothesis:

Healthy lifestyles are positively related to sport performance.

In other words, the healthier a sportperson's lifestyle the better is his/her sport performance.

#### 1.1.1.iii MOODS

##### 1.1.1.iii.a RELATIONSHIP BETWEEN MOODS AND SPORT PERFORMANCE

According to McGowan, Miller and Henschen (1990) research over the past decade has demonstrated that mood states and performance are related. Specific to sport psychology, Morgan (1985) has stated that psychological mood states have been shown to affect the physical performance of sport athletes. Frazier (1988) goes further to state that research in sport psychology has identified mood state levels as predictors of sport success. Much work in sport psychology has looked at the relationship between psychological mood factors and sport performance.

### 1.1.1.iii.b THE PROFILE OF MOOD STATES (POMS) QUESTIONNAIRE AND SPORT PERFORMANCE

The Profile Of Mood States (POMS) Questionnaire's place in the history of sport psychology was guaranteed almost from its first appearance due to its simplicity as well as the wholehearted, enthusiastic and uncritical support it received (Kremer & Scully, 1994). Morgan (1979) was one of the first sport researchers to employ the POMS as a diagnostic tool and it has been used by numerous researchers when investigating the differences between successful and unsuccessful sportpersons. Morgan (1980b) has described the POMS as being the most highly predictive psychological tool that he and his colleagues have used with the sporting population. Research by Morgan (1979), and Silva, Schultz, Haslam and Murray (1981) has indicated that the POMS is a useful measure of pre-competitive psychological affect or mood. Morgan (1979, 1980b) using the POMS had 70% predictive accuracy in selecting elite athletes in several sports.

In a review of the POMS in the prediction of sport success, however, Renger (1993) states that there have been misunderstandings in the use of the POMS in this kind of research and that future researchers in this area should "abandon the POMS" (p.83). This line of argument maintains that the original aim of the POMS in sport research was to identify the sportperson from the non-sportperson while later research was implying that this meant that the POMS was able to differentiate sportpersons of differing levels of ability. It was therefore felt that the POMS was used for a different purpose to what

it was originally intended and that this resulted in misunderstandings and contradictory findings when compared to the original work with the POMS. Renger (1993) cites three original studies with the POMS in sports research (Nagle, Morgan, Helickson, Serfass & Alexander, 1975; Morgan & Pollock, 1977 and Morgan & Johnson, 1978) that identified the sportperson from the non-sportperson.

It is proposed here, however, that this line of argument may be inappropriate. This is because Morgan has stated that the POMS is useful in the prediction of differing levels of sport performance (Morgan, 1979, 1980b, 1985) and that this has also been supported by a number of studies by Morgan (1985), Morgan, Brown, Raglin, O'Connor and Ellickson (1987a), Morgan et al. (1988), Ungerleider, Golding and Porter (1989) and Newby and Simpson (1994). It is therefore felt that Renger (1993) may be correct in stating that the POMS was first used to identify the sportperson from the non-sportperson, but failed to trace the development of the POMS in sport research which showed that it may have a use in differentiating sportpersons of differing levels of ability. It is therefore argued here that the POMS should not be abandoned but be considered further in future studies in this area of research.

The POMS has been used across a variety of studies within sport. Early work with the POMS could be used to distinguish between highly successful athletes and the normative population and to investigate mood changes as a function of participation in sport and exercise activities (Grove & Prapavessis, 1992). Studies have also suggested

that successful sportpersons may differ from less successful ones on certain POMS subscales ( Silva et al. 1985; Furst and Hardman, 1988; Simpson and Newby, 1994). According to Miller and Miller (1985) and McGowan and Miller (1989), however, few studies have attempted to further Morgan's work in establishing differences in mood states between successful and less successful sportpersons within specific subgroups.

Morgan (1980b) has stated that the POMS is widely accepted as a measure of mental health. It is for this reason that the POMS has often been used in association with the Mental Health Model and the description of sport performance differences. With the POMS Morgan (1980a) has stated that successful sportpersons are typified by what was termed an 'Iceberg Profile' while the normal population do not exhibit this POMS profile. The term 'Iceberg Profile' is derived from the graph of the POMS scores, where successful sportpersons score below the average on five scores and above average on one score thus producing an iceberg-like outline. The normal population on the other hand score all six scores around the average area. Along the same lines it is stated that the presence of the iceberg profile is associated with performance that is superior to those performances of sportpersons with mood disturbance(s). Following on from this, the Mental Health Model predicts that successful elite sportpersons possess more positive mood states (iceberg profiles) than unsuccessful sportpersons.

### 1.1.1.iii.c MENTAL HEALTH MODEL, MOODS AND SPORT PERFORMANCE

Since the inception of the Mental Health Model in 1985 there has been empirical evidence for the use of the model with moods. Studies with rowers (Morgan, 1985), swimmers (Morgan et al. 1987a), distance runners (Morgan et al., 1988), track and field athletes (Ungerleider et al., 1989) and basketball players (Newby and Simpson, 1994) have supported the Mental Health Model with the POMS.

Morgan's Mental Health Model with moods has, however, not gone without criticism. Prapavessis and Grove (1991) state that the model suffers from several conceptual, methodological and interpretative problems. They highlight that studies have not assessed sportpersons' mood states more than once during a competition season to determine if the Mental Health Model can be consistent and accurate to explain and predict performance. Cockerill, Nevill and Lyons (1991) go on to criticize that although the model has plausibility and simplicity on initial appraisal, closer scrutiny indicates that it is unwise to reject the possibility of physiological parameters.

Some studies have not always supported Morgan's Mental Health Model with the POMS. Studies with netball players (Miller & Miller, 1985) and basketball players (Craighead et al., 1986) found the POMS to be ineffective in differentiating sportpersons of differing levels of ability.

A study by Daiss, Le Unes and Nation (1986) with college and professional football players did not confirm that professional players would exhibit the iceberg profile. They, however, cite that the small number of subjects may have contributed to this.

Studies with elite and non-elite marathon runners (Durtschi & Weiss; 1986), control and elite female runners (Morgan, O'Connor, Sparling and Pate; 1987b), and ultramarathoners (Tharion, Strowman & Rauch; 1988) did not support the Mental Health Model with the POMS and sport performance.

Frazier (1988) states that similar mood states in a study between sportpersons suggest that the model may not be an accurate predictor of sport performance.

McGowan and Miller (1989), when investigating differences in mood states between successful and less successful karate participants, found no significant difference between semi-finalists and lower - placed finishers in a state tournament. They point out, however, that using the combined competition results taken over one year illustrated that successful fighters were significantly different from less successful in measures of anger - successful fighters were more angry.

Also, a study by Mahoney (1989) looking at differences between elite and non-elite weightlifters did not reveal significant differences on subscales of the POMS. It is noted that the former group's profiles on the POMS appeared slightly more congruent with

Morgan's iceberg profile.

A study by McGowan et al. (1990), looking at differences in mood states between belt ranks of karate competitors, suggests that successful competitors do not necessarily exhibit the traditional iceberg profile prior to competition while a study with wheelchair sportpersons and non-sportpersons (Paulsen et al. ,1990) also did not support the model as both sets of sportpersons exhibited the iceberg profile.

A study by Wughalter and Gondola (1991) with professional tennis players only partially supports the model, in that only the older tennis players exhibited the iceberg profile while the younger players did not. Another study with tennis players showed no significant differences on the POMS between top, middle, or bottom female world ranked players with all three ranks displaying the iceberg profile (Meyers, et al., 1994).

These studies reviewed above do not show a unanimous, clear and direct relationship between mood and sport performance. Gould, Horn and Spreeman (1983; in Silva & Hardy, 1984) argue that these results must be viewed with caution as there is a lack of congruence in the studies due to three reasons:

1. small sample sizes;
2. use of psychological measures that do not have established psychometric properties and
3. lack of statistical testing for differences between groups.

Based on the following three points:

1. few studies have attempted to further Morgan's work in looking at differences in mood states between successful and unsuccessful sportpersons (Miller & Miller, 1985 and McGowan & Miller, 1989);
2. there is still no clear relationship between mood factors and success in sport and
3. the lack of congruence in studies in this area (Gould et al., 1983; in Silva & Hardy, 1984).

it seems appropriate to explore the relationship between mood factors and sport performance further. First it would be appropriate to look at what is meant by the term 'mood'.

#### 1.1.1.iii.d DEFINITION OF THE TERM 'MOOD'

Morris (1989) has stated that this construct label has been subjected to a history of casual use while Matthews (1992) defines mood in "everyday parlance" (p. 1) as a pervasive and relatively mild emotional state.

Defining the term in psychology has not been an easy task. Matthews (1992) states that the term has been "distinctly fuzzy" (p. 161) when used in psychology. There is, however, consensus that the effects of mood are general and pervasive and that they have a breadth of influence i.e. they are capable of altering affective, cognitive and

behaviour responses to a wide array of objects and events (Morris, 1989). Although this helps in the understanding of the term, a definition is still lacking. Morris (1989) goes on to define moods as "affective states that are capable of influencing a broad array of potential responses, many of which seem quite unrelated to the mood precipitating event" (p. 3).

Mayer (1986, in Matthews 1992) views moods as emotion-like experiences that last for at least several minutes while Berger, Owen and Man (1993) mention that a mood is a short term phenomenon and readily fluctuates. These definitions have defined moods within a time dimension. Staying with this dimension, Matthews (1992) states that moods can be distinguished from specific cognitive evaluations and that mood states are quite persistent over time. Mandler (1984) goes on to say that moods are seen to be little emotions or "emotional outliers" (p. 131) but are persistent rather than transitory. Mandler (1984) defines moods as fairly persisting evaluative states that affect the characters (evaluations) of all other ongoing evaluations - and emotions. This last definition seems the most appropriate for the present study.

#### 1.1.1.iii.e RESEARCH QUESTION

The above discussion illustrates that there is scope to investigate the relationship between mood and sport performance and that a definition of the term 'mood' has been

obtained. The research question that arises from this is the following:

What is the relationship between mood factors and sport performance?

#### 1.1.1.iii.f RESEARCH HYPOTHESIS

Following on from this research question is the research hypothesis:

Mood disturbances are negatively related to sport performance.

In other words, the healthier the sportperson's mood profile, the better his/her sport performance.

#### 1.1.2 SUMMARY

This present chapter has attempted to show that there has been much research in sport psychology that looks at psychological variables that differentiate the high achieving sportperson from the low achieving sportperson.

Based on the point that literature states there is a relationship between lifestyles and health, it was asked if a relationship may exist between lifestyles and sport performance i.e. do lifestyle factors differentiate high achieving from low achieving sportpersons?

Although no work was found that investigated this issue in any great detail, two studies were found that suggest that it may be worth pursuing this issue. It was also noted in the literature looking at psychological variables that differentiate high achieving sportpersons from low achieving sportpersons, that much research has looked at the mood variable with no conclusive findings. It is with these ideas that two research questions and hypotheses were put forward and the present research study formulated and carried out.

## **CHAPTER TWO**

### **METHODOLOGY**

#### **2.1 RESEARCH DESIGN**

##### **2.1.1 BETWEEN-SUBJECTS RESEARCH DESIGN**

A three-group between-subjects design was implemented in this research study. Subjects were placed into one of three groups -elite, sub-elite or non-elite -according to their level of sport performance and were not matched on any criteria. The three levels of sport performance were compared with one another on two factors -lifestyle and mood.

#### **2.2 DEPENDENT VARIABLE**

##### **2.2.1 SPORT PERFORMANCE**

This research study looked at three levels of sport performance - elite, sub-elite and non-elite sport performance.

### 2.2.1.i ELITE SPORT PERFORMANCE

Elite sport performance for this research study is defined as sport performance of a sportperson who, at the time of completing the research questionnaires had national colours in his/her sport.

### 2.2.1.ii SUB-ELITE SPORT PERFORMANCE

Sub-elite sport performance for this research study is defined as sport performance of a sportperson who, at the time of completing the research questionnaires had only provincial colours in his/her sport.

### 2.2.1.iii NON-ELITE SPORT PERFORMANCE

Non-elite sport performance for this research study is defined as sport performance of a sportperson who, at the time of completing the research questionnaires had no national or provincial colours in his/her sport, but competed in the sport at club or association level.

## 2.3 PROCEDURE

Any sportperson participating in any individual (as opposed to team) Olympic

recognized sport was a potential subject for this research study. A list of the Western Province (Cape Town and surrounding areas) sport organizations and names of contact persons for each sport was obtained from the University of Cape Town's Sport Administration Department. Ten contact names involved in ten different individual Olympic recognized sports were selected. The sports, which were selected randomly, were archery, boxing, fencing, gymnastics, ice skating, modern pentathlon, swimming, track and field, weightlifting and wrestling.

All contact persons were telephoned and it was explained to them that a research study was being conducted to look at the relationship between lifestyles/moods and sport performance. They were told that the sportpersons in their respective sports needed to complete research questionnaires and that this would take about half an hour to do. Some contact persons were willing to take part while others suggested telephoning other contact persons in the sport. These alternate contact persons were then contacted and the study explained to them. The result was that all contact persons in all ten sports were willing to take part in the study and to distribute the research questionnaires to sportpersons in their respective sports.

It was arranged that copies of the research questionnaires together with a covering letter were given to the contact person for each sport who would in turn distribute the questionnaires and covering letters to the relevant sportpersons. The research study was explained in the covering letter. Confidentiality of the sportperson was guaranteed

and feedback of the research study was offered in the covering letter. Names of sportpersons were optional. The contact person in each sport determined the appropriate number of questionnaires to be distributed to the sportpersons in the sport.

A total of 455 sets of questionnaires were distributed to the contact persons across the 10 sports - 30 to archery, 90 to boxing, 40 to fencing, 75 to gymnastics, 20 to ice skating, 5 to modern pentathlon, 30 to swimming, 80 to track and field, 15 to weightlifting and 70 to wrestling.

The contact persons distributed and collected the questionnaires from the sportpersons over a time-period of about two months. The questionnaires were then collected by the researcher from the contact persons while a few questionnaires were returned by post.

Of the 455 sets of questionnaires distributed, a total of 122 questionnaires were returned - a return rate of 26.81 percent. 98 questionnaires were returned usable and 24 returned unusable - a usable return rate of 21.54 percent.

Descriptive, statistical (using the Statgraphics Version 6.0 computer programme) and qualitative analyses (using the content analysis technique) were carried out on the data.

## 2.4 SUBJECTS

Subjects came from eight sport affiliations -archery, fencing, gymnastics, ice skating, swimming, track and field, weightlifting and wrestling -in Cape Town and surrounding areas. All subjects participated on a voluntary basis. Any sportsperson who participated in an individual Olympic recognized sport at club, association, provincial or national level and who filled out the research questionnaire appropriately was used in this research study. Subjects were excluded from the research study if their questionnaires were incomplete or inappropriately filled in. Gender, age and socio-economic status were not relevant in the selection of subjects.

A total of 98 subjects participated in the research study -37 elite sportpersons, 37 sub-elite sportpersons and 24 non-elite sportpersons.

Summary data of subjects is shown in Table 1.

**TABLE 1**  
**SUMMARY DATA OF SUBJECTS**

SPORT	ELITE		SUB-ELITE		NON-ELITE		
	M	F	M	F	M	F	
ARCHERY	3	1	-	-	2	1	n = 7
FENCING	6	2	2	1	-	1	n = 12
GYMNASTICS	3	5	4	5	-	-	n = 17
ICESKATING	3	1	3	3	-	-	n = 10
SWIMMING	-	-	1	1	1	3	n = 6
TRACK AND FIELD	1	1	2	8	6	3	n = 21
WEIGHTLIFTING	5	-	-	-	1	-	n = 6
WRESTLING	6	-	7	-	6	-	n = 19

$n = 27$   $n = 10$      $n = 19$   $n = 18$      $n = 16$   $n = 8$   
 $N = 37$                        $N = 37$                        $N = 24$                        $N = 98$   
 $\bar{x}_{E} = 28.89$                $\bar{x}_{S} = 17.62$                $\bar{x}_{N} = 23.33$                $\bar{x}_{T} = 23,08$   
AGE                      AGE                      AGE                      AGE

## 2.5 MEASURES-INDEPENDENT VARIABLES

### 2.5.1 LIFESTYLES

The British Printing Corporation (BPC) lifestyle questionnaire "How Healthy a Life Do You Lead?" (Wright, 1975) was used in this research study. This questionnaire consists of 112 questions designed to assess lifestyle variables. It is a two-part questionnaire with both parts comprising of 56 questions. Each of the 112 questions is a simple statement to which the respondent needs to respond to a YES/NO format.

Part 1 covers four of the eight variables measured: food, drugs, exercise and care of body. All respondents answer all 56 questions. An example of a question is: Do you take sugar in your tea or coffee?

Part 2 covers the remaining four variables measured: work, leisure, social and mental state. Questions in this part are either not prefixed, prefixed with an A or prefixed with a B. Questions not prefixed are answered by all respondents, those prefixed with an A are answered by male and female respondents in full time employment only and those prefixed with a B are answered by male and female respondents not in full time employment. Question 30 is answered only by male respondents and question 38 is answered only by female respondents. An example of a question is: (A) Do you find your work really enjoyable?

Each of the eight variables measured in this questionnaire has a minimum score of 0 (unhealthy lifestyle factor) and a maximum score of 14 (healthy lifestyle factor)

The "How Healthy a Life Do You Lead?" Lifestyle questionnaire has been used in a previous psychological research study (Giese & Schomer, 1986).

## 2.5.2 MOODS

The Profile of Mood States (POMS) questionnaire (McNair, Lorr & Droppleman, 1971)

was used in this research study. This questionnaire is a 65-item checklist designed to assess mood variables where the subject needs to respond to a word or group of words (an item) that best describes his/her mood. The response set used in the present research study was the standard instructional set "how have you been feeling during the past week including today?". Respondents are given five alternative answers for each of the 65 items - 'not at all', 'a little', 'moderately', 'quite a bit' and 'extremely' - to which they must give one answer. Variable scores range from 0 for 'not at all' to 4 for 'extremely'.

The POMS can identify six variables (moods) - tension, depression, anger, vigour, fatigue and confusion - as well as a total or global mood factor.

The psychometric properties of the POMS are sound (Berger & Owen, 1992). Previous studies have revealed high internal consistency within mood dimensions and test-retest reliability ranging from  $r = 0.67$  to  $r = 0.74$  (Peterson & Headen, 1984) while the validity of the test is well established (Weckowicz, 1978).

The POMS was selected for the present study because of its ease of administration and its frequent use in related studies (Morgan, 1985).

The POMS has been used extensively in research psychology (Berger & Owen, 1983) and in particular, sport psychology (Grove & Prapavessis, 1992). Sport psychology has

used the POMS when investigating differences between successful and less successful sportpersons (Morgan & Johnson, 1977; Durtshi & Weiss, 1986; Mahoney, 1989; McGowan et al., 1990). Morgan (1980b) states that the POMS has been the most highly predictive psychological tool that he and his colleges have used with the sporting population and that the POMS has 70% predictive accuracy in selecting elite sportpersons.

### 2.5.3 THE GENERAL QUESTIONNAIRE

This questionnaire was included to provide biographical details of the sportperson as well as other details about his/her lifestyle and sport.

## CHAPTER THREE

### RESULTS

#### 3.1 LIFESTYLE RESULTS

##### 3.1.1 "HOW HEALTHY A LIFE DO YOU LEAD?" LIFESTYLE QUESTIONNAIRE

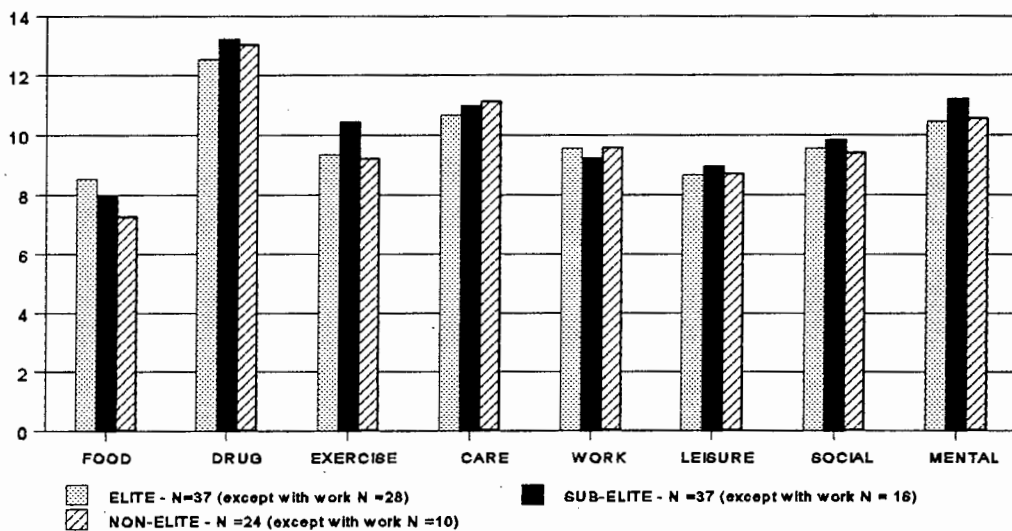
###### 3.1.1.i DESCRIPTIVE ANALYSIS

Descriptive data of the lifestyle variables by group membership is presented in Table 2 and Figure 1. Group means across the three groups are generally similar to one another on all eight lifestyle variables.

TABLE 2

DESCRIPTIVE DATA OF LIFESTYLE VARIABLES BY GROUP MEMBERSHIP

VARIABLE	ELITE			SUB-ELITE			NON-ELITE		
	N	M	SD	N	M	SD	N	M	SD
FOOD	37	8.54	2.36	37	7.95	2.47	24	7.25	1.94
DRUGS	37	12.54	1.99	37	13.24	0.93	24	13.04	2.00
EXERCISE	37	9.35	2.09	37	10.46	1.95	24	9.21	2.11
CARE	37	10.68	1.51	37	11.00	1.92	24	11.13	1.65
WORK	28	9.57	3.42	16	9.25	2.72	10	9.60	3.37
LEISURE	37	8.68	1.84	37	8.97	1.70	24	8.71	1.99
SOCIAL	37	9.57	2.56	37	9.84	2.23	24	9.42	2.75
MENTAL	37	10.46	2.43	37	11.22	1.29	24	10.58	2.04



**FIGURE 1**

**DESCRIPTIVE DATA OF LIFESTYLE VARIABLES BY GROUP MEMBERSHIP**

With food, the elite group have the healthiest food habits, the sub-elite group less healthy food habits and the non-elite group the least healthy food habits.

With consumption of drugs, the sub-elite group has the healthiest drug habits, the non-elite group slightly less healthy drug habits and the elite group the least healthy drug habits.

In exercise, the sub-elite group has the healthiest exercise habits, the elite less healthy exercise habits and the non-elite the least healthy exercise habits.

With care of their bodies, the non-elite group care for their bodies the most, the sub-elite group care for their bodies minimally less and the elite group care for their bodies the least.

With work, the non-elite group have the most integrated and healthiest worklife, the elite group have a slightly less integrated and healthy worklife and the sub-elite have the least integrated and healthy worklife.

With leisure, the sub-elite group have the healthiest leisure life, the non-elite group a slightly less healthy leisure life and the elite the least healthy leisure life.

Socially, the sub-elite group has the most active social life, the elite group a slightly less active social life and the non-elite group the least active social life.

Mentally, the sub-elite group are the healthiest, the non-elite are less healthy and the elite group are the least healthy.

Overall, the sub-elite group are the healthiest group in five out of the eight variables, the non-elite in two variables and the elite in one variable, while the elite are the least healthy group in four out of the eight variables, the non-elite in three variables and the sub-elite in one variable. In general, the sub-elite seem to be the healthiest group with the elite being the least healthy group.

### 3.1.1.ii DISCRIMINANT ANALYSIS

Before proceeding with the discriminant analysis it was necessary to test the eight lifestyle variables for normality (food, drugs, exercise, care, work, leisure, social and mental). This was done with the Kolmogorov-Smirnov One Sample Test which showed four variables - drugs, exercise, social, and mental- not to be normal. These four variables were transformed (using a suitable transformation, e.g. log) and then retested with the Kolmogorov-Smirnov test. The test now showed that each of the eight lifestyle variables could be considered normally distributed.

The lifestyle variable of work was excluded in the discriminant analysis because too many subjects were unable to complete this part of the questionnaire and the discriminant model's power would be compromised by including a variable with so many missing values.

In order to consider the correlations between lifestyle variables, every variable was correlated with every other variable within the lifestyle questionnaire. These correlations suggest that multi-collinearity could be expected. Correlations among lifestyle variables are shown in Table 3.

TABLE 3

CORRELATIONS AMONG LIFESTYLE VARIABLES (MINUS WORK)

	FOOD	DRUGS	EXERCISE	CARE	LEISURE	SOCIAL	MENTAL
FOOD	-	.12	.07	.23	.29	.01	.18
DRUGS	.12	-	.46	.33	.19	-.03	.54
EXERCISE	.07	.46	-	.33	.26	.16	.44
CARE	.23	.33	.33	-	.09	-.02	.28
LEISURE	.29	.19	.26	.09	-	.29	.11
SOCIAL	.01	-.03	.16	-.02	.29	-	.22
MENTAL	.18	.54	.44	.28	.11	.21	-

Discriminant analysis revealed that lifestyle variables could not predict level of sport performance ( $p < 0.05$ ). The two discriminant functions were insignificant;

Function 1: Wilks-Lambda = 0.68, Chi-Square (N = 54) = 18.17,  $p < 0.31$ ;

Function 2: Wilks-Lambda = 0.87, Chi-Square (N = 54) = 6.59,  $p < 0.47$ .

A classification matrix (Table 4) shows that prediction based upon lifestyle variables resulted in 57.14% classification accuracy for elite sportpersons, 56.25% for sub-elite sportpersons and 60.00% for non-elite sportpersons. The classification accuracies for all three groups are above the chance classification of 38% for the elite and sub-elite groups and 24% for the non-elite group. Due to the discriminant failure it is unlikely that sport performance can be predicted based on the limited lifestyle variables quantified here to any significant degree.

**TABLE 4**

**CLASSIFICATION MATRIX OF SPORT PERFORMANCE BASED ON LIFESTYLE VARIABLES (MINUS WORK VARIABLE)**

		PREDICTED GROUP			% CORRECT
		ELITE	SUB-ELITE	NON-ELITE	
ACTUAL GROUP	ELITE (N=28)	16	7	5	57.14
	SUB-ELITE (N=16)	5	9	2	56.25
	NON-ELITE (N=10)	2	2	6	60.00
	TOTAL N = 54				

Discriminant function coefficients in order of importance are presented in Table 5. The discriminant function coefficients show that the exercise and social variables have the greatest discriminatory power when it comes to lifestyle variables in sport performance. Caution in interpretation needs to be made here in that multicollinearity can suggest that redundant information was used in the analysis.

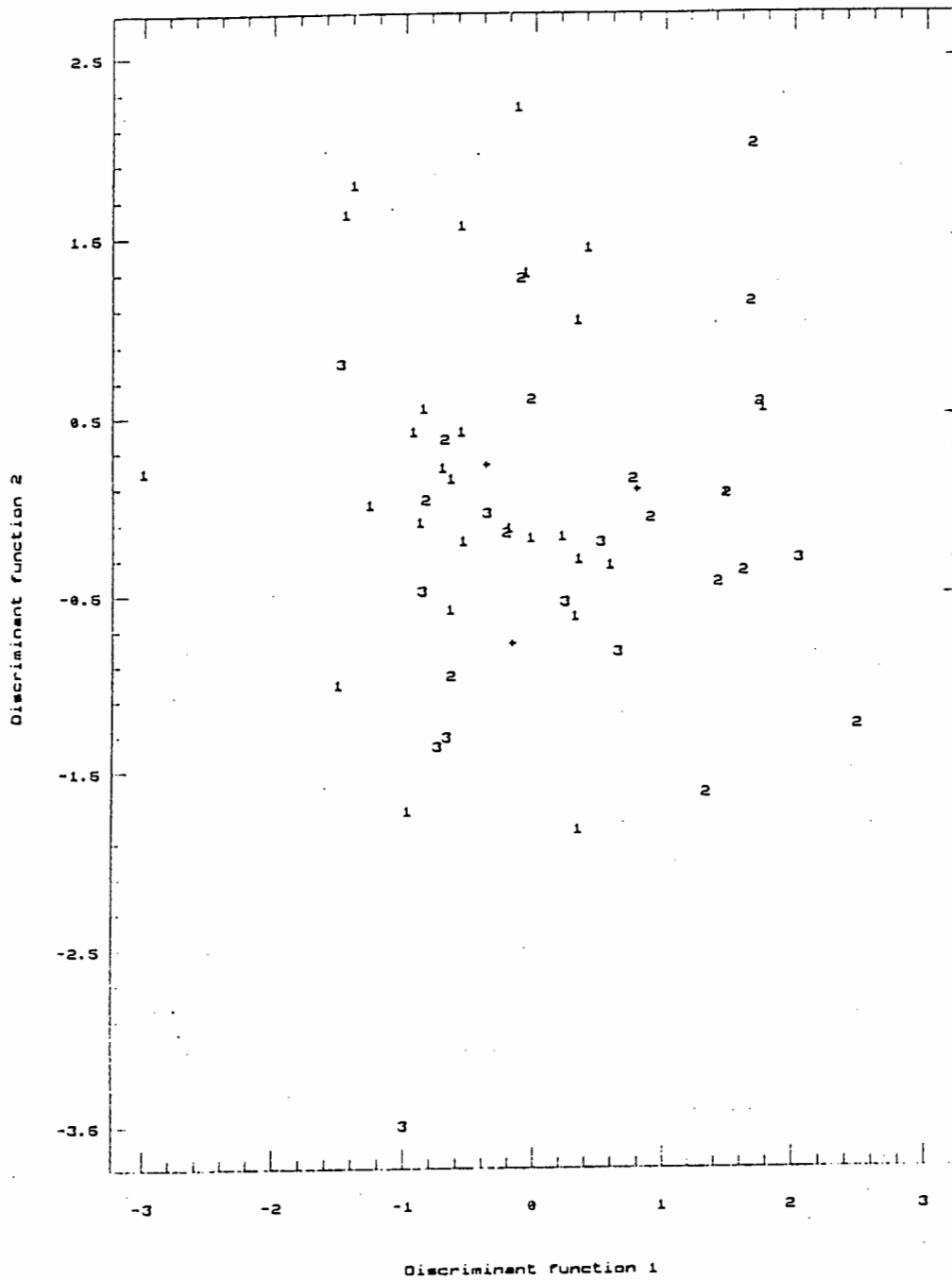
<b>FUNCTION 1</b>	<b>FUNCTION 2</b>
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<b>SOCIAL</b>	<b>3.90</b>	<b>SOCIAL</b>	<b>1.43</b>
<b>EXERCISE</b>	<b>- 3.50</b>	<b>MENTAL</b>	<b>- 0.84</b>
<b>DRUGS</b>	<b>0.78</b>	<b>DRUGS</b>	<b>- 0.49</b>
<b>FOOD</b>	<b>- 0.71</b>	<b>CARE</b>	<b>- 0.45</b>
<b>LEISURE</b>	<b>0.47</b>	<b>EXERCISE</b>	<b>- 0.45</b>
<b>WORK</b>	<b>- 0.44</b>	<b>WORK</b>	<b>0.43</b>
<b>CARE</b>	<b>- 0.31</b>	<b>FOOD</b>	<b>0.38</b>
<b>MENTAL</b>	<b>0.09</b>	<b>LEISURE</b>	<b>- 0.29</b>

**TABLE 5**

**STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS OF LIFESTYLE VARIABLES IN ORDER OF IMPORTANCE**

Figure 2 represents a scatter diagram of lifestyle discriminant functions 1 and 2. No clear clusters in terms of sport performance levels can be seen.



1 = ELITE      2 = SUB-ELITE      3 = NON-ELITE

**FIGURE 2**

**SCATTER DIAGRAM OF LIFESTYLE DISCRIMINANT FUNCTIONS 1 AND 2**

### 3.1.2 THE GENERAL QUESTIONNAIRE

#### 3.1.2.i DESCRIPTIVE ANALYSIS

100% of the sportpersons in all three levels of sport performance enjoy their sport, suggesting that there is no relationship between level of sport performance and enjoyment of sport.

62% of the elite sportpersons, 78% of the sub-elite sportpersons and 50% of the non-elite sportpersons stated that their lifestyles have changed while participating in their sport while 51% of the elite sportpersons and 51% of the sub-elite sportpersons stated that their lifestyles have changed as they moved from one level of competition to the next. This suggests that lifestyles do not always necessarily change as the level of competition changes.

The majority of the sportpersons are happy with their lifestyles while participating in their sport (92% of the elite group, 78% of the sub-elite group and 86% of the non-elite group) and also enjoy the lifestyle they lead while playing their sport (92% of the elite group, 78% of the sub-elite group and 86% of the non-elite group). There thus seems to be no relationship between level of sport performance and enjoyment and happiness with lifestyles.

There does, however, seem to be a relationship between level of sport performance and type of lifestyle. The majority of the elite (57%) and the sub-elite (62%) sportpersons have a rigid/regimented lifestyle as opposed to the majority of non-elite sportpersons (73%) who have a relaxed/unstructured lifestyle. This is related to the majority of the elite (68%) and the sub-elite (62%) saying they have a specific lifestyle geared to their sport as opposed to the majority of the non-elite (59%) saying they have no specific lifestyle geared towards their sport. Although there is no major difference between the elite and sub-elite groups in terms of type of lifestyle, there is a difference between these two groups and that of the non-elite group. This suggests that there is a relationship between level of sport performance and type of lifestyle (the two more elite groups as opposed to the non-elite group have a more rigid and structured lifestyle).

### 3.1.2.ii QUALITATIVE ANALYSIS

The qualitative data in this research study were analyzed using the content analysis technique.

The history of the sportperson does not reveal any major differences in terms of personal history and present level of sport performance.

The main theme emerging as to why sportpersons' lifestyles have changed while

participating in their sport was that they had less time for themselves. This was more evident with the two more elite groups as 16% of the elite sportpersons and 24% of the sub-elite sportpersons, compared to less than one percent of the non-elite sportpersons, stated that they had less time to do things beside their sport. These results suggest that the two more elite groups changed their lifestyles more than the non-elite group and that they spend more time on sport than does the non-elite group.

In terms of how the sportperson sees the relationship between his/her lifestyle and sport performance, the main themes that emerged were that 24% of the elite and 16% of the sub-elite sportpersons, as opposed to less than one percent of the non-elite sportpersons, state that the relationship is interrelated; and 14% of the elite and 24% of the sub-elite sportpersons, as opposed to 1% of the non-elite sportpersons, state the relationship to be good. This suggests that the lifestyle-sport performance relationship is more interrelated and seen as better among the two more elite groups.

In terms of considerations of ideal lifestyles, all three groups mentioned that an ideal lifestyle would include more time for the sport -elite (19%), sub-elite (11%) and non-elite (18%). Only the two more elite groups mentioned that professionalization of the sport would be ideal -elite (14%) and sub-elite (8%).

Also included in ideal lifestyles were better eating habits -elite 0.3%, sub-elite 27% and non-elite 18%, and more rest time -elite 0.3%, sub-elite 11% and non-elite 9%. Eating

habits and rest time percentages suggest the elite group is more satisfied than the sub-elite and non-elite groups when it comes to eating habits and rest time factors of their lifestyle.

### 3.2 MOOD RESULTS

#### 3.2.1 PROFILE OF MOODS (POMS) QUESTIONNAIRE

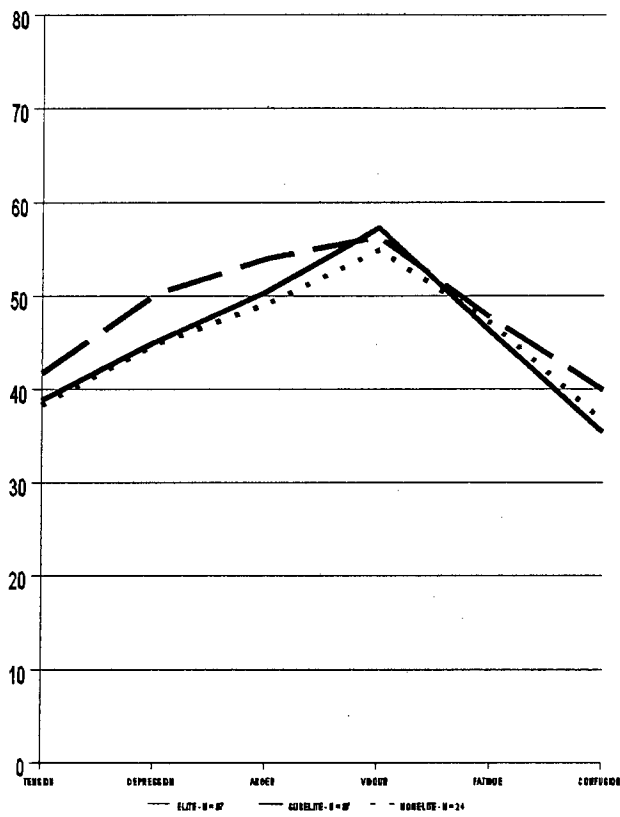
##### 3.2.1.i DESCRIPTIVE ANALYSIS

Descriptive data of mood variables by group membership is presented in Table 6 and Figure 3. Group means across the three groups are generally similar to one another on all six variables.

**TABLE 6**

**DESCRIPTIVE DATA OF MOOD VARIABLES BY GROUP MEMBERSHIP**

VARIABLE	ELITE			SUB-ELITE			NON-ELITE		
	N	M	SD	N	M	SD	N	M	SD
TENSION	37	38.84	7.82	37	41.76	8.35	24	38.33	8.31
DEPRESSION	37	45.03	6.78	37	50.14	8.93	24	44.79	6.99
ANGER	37	50.54	10.10	37	54.03	11.86	24	49.17	9.64
VIGOUR	37	57.30	7.90	37	56.35	8.68	24	54.96	9.63
FATIGUE	37	46.11	9.70	37	47.70	9.89	24	47.08	9.29
CONFUSION	37	35.35	7.48	37	39.92	8.22	24	36.67	6.13



**FIGURE 3**

**DESCRIPTIVE DATA OF MOOD VARIABLES BY GROUP MEMBERSHIP**

The profiles of all three groups found in the present study only slightly approximate the 'iceberg profile' noted by Morgan (1980a). In the sub-elite group the variables of tension, depression, anger, fatigue and confusion are all too high to depict the classical 'iceberg profile', while in the elite and non-elite groups the variables depression, anger and fatigue are all too high to depict the classical 'iceberg profile'.

The elite group, compared to the sub-elite group, scored lower on all the variables except vigour, while the non-elite group scored lower on all the variables when compared to the sub-elite group. The non-elite group, compared to the elite and sub-elite groups, scored lower on all the variables except on fatigue and confusion where they scored between the elite and sub-elite groups. The elite and non-elite groups resembled the 'iceberg profile' more closely than the sub-elite group.

### 3.2.1.ii DISCRIMINANT ANALYSIS

Before proceeding with the discriminant analysis, it was necessary to test the six mood variables for normality (tension, depression, anger, vigour, fatigue and confusion). This was done with the Kolmogorov-Smirnov One Sample Test which showed three variables tension, depression and confusion not to be normal. These three variables were transformed (using a suitable transformation, e.g. log) and then retested with the Kolmogorov-Smirnov test. The test now showed that each of the six variables could be considered normally distributed.

In order to consider the correlations between mood variables, every variable was correlated with every other variable within the POMS questionnaire. These correlations suggest that multicollinearity could be expected. Correlations among mood variables are shown in Table 7.

**TABLE 7**  
**CORRELATIONS AMONG MOOD VARIABLES**

	TENSION	DEPRESSION	ANGER	VIGOUR	FATIGUE	CONFUSION
TENSION	-	.74	.60	-.16	.61	.70
DEPRESSION	.74	-	.69	-.17	.47	.69
ANGER	.60	.69	-	-.11	.38	.54
VIGOUR	-.16	-.17	-.11	-	-.27	-.24
FATIGUE	.61	.47	.38	-.27	-	.51
CONFUSION	.70	.69	.54	-.24	.51	-

Discriminant analysis revealed that mood variables could not predict level of sport performance ( $p < 0.05$ ). The two discriminant functions were insignificant;

Function 1: Wilks-Lambda = 0.86, Chi-Square (N = 98) = 14.06,  $p < 0.30$ ;

Function 2: Wilks-Lambda = 0.98, Chi-Square (N = 98) = 1.53,  $p < 0.91$ .

A classification matrix (Table 8) shows that prediction based upon mood variables resulted in 37.84% classification accuracy for elite sportpersons, 51.35% for sub-elite sportpersons and 41.67% for non-elite sportpersons. The classification accuracies for all three groups are poor the elite group is below the chance classification of 38%, although the sub-elite and non-elite groups are above their chance classifications of 38% and 24% respectively. Due to the discriminant failure, it is unlikely that sports performance can be predicted based on the limited mood variables quantified here to any significant degree.

**TABLE 8****CLASSIFICATION MATRIX OF SPORT PERFORMANCE BASED ON MOOD  
VARIABLES**

		PREDICTED GROUP			% CORRECT
		ELITE	SUB-ELITE	NON-ELITE	
ACTUAL GROUP	ELITE (N=37)	14	10	13	37.84
	SUB-ELITE (N=37)	6	19	12	51.35
	NON-ELITE (N=24)	4	10	10	41.67
	TOTAL N = 98				

Discriminant function coefficients in order of importance are presented in Table 9. The discriminant function coefficients show that the anger and vigour variables have the strongest discriminatory power when it comes to mood variables in sport performance. Caution in interpretation needs to be made here again in that multicollinearity can suggest that redundant information was used in the analysis.

<b>FUNCTION 1</b>	<b>FUNCTION 2</b>
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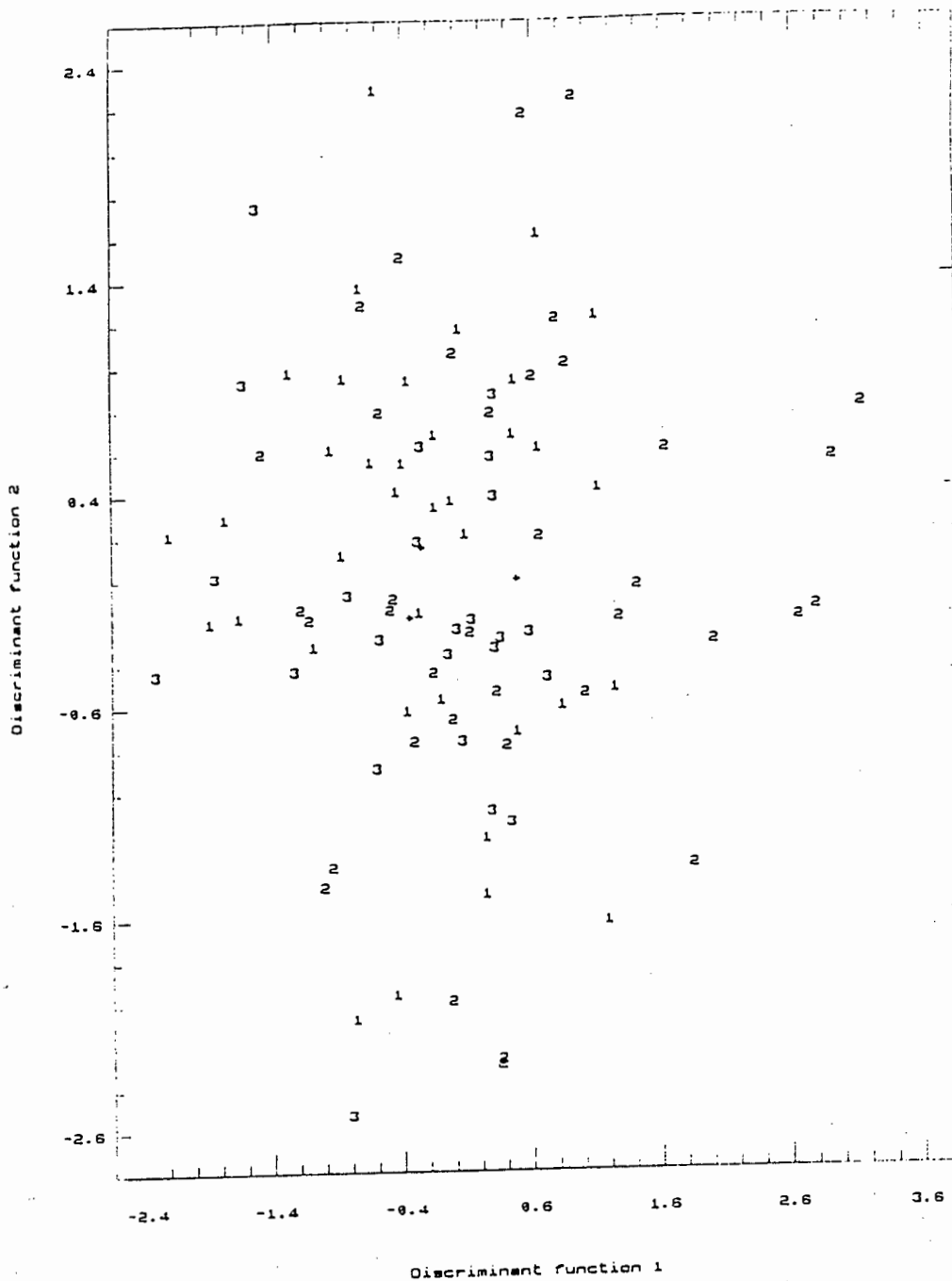
<b>ANGER</b>	<b>0.66</b>	<b>VIGOUR</b>	<b>0.83</b>
<b>CONFUSION</b>	<b>0.55</b>	<b>FATIGUE</b>	<b>- 0.45</b>
<b>TENSION</b>	<b>0.54</b>	<b>ANGER</b>	<b>0.35</b>
<b>FATIGUE</b>	<b>0.15</b>	<b>CONFUSION</b>	<b>- 0.35</b>
<b>DEPRESSION</b>	<b>0.05</b>	<b>DEPRESSION</b>	<b>- 0.09</b>
<b>VIGOUR</b>	<b>- 0.02</b>	<b>TENSION</b>	<b>0.05</b>

**TABLE 9**

**STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS OF MOOD**

**VARIABLES IN ORDER OF IMPORTANCE**

Figure 4 represents a scatter diagram of mood discriminant functions 1 and 2. No clear clusters in terms of sport performance levels can be seen.



1 = ELITE    2 = SUB-ELITE    3 = NON-ELITE

FIGURE 4

SCATTER DIAGRAM OF MOOD DISCRIMINANT FUNCTIONS 1 AND 2

### 3.3 COMBINED LIFESTYLE AND MOOD RESULTS

#### 3.3.1 "HOW HEALTHY A LIFE DO YOU LEAD?" LIFESTYLE AND PROFILE OF MOODS (POMS) QUESTIONNAIRES

##### 3.3.1.i DISCRIMINANT ANALYSIS

Discriminant analysis revealed that combined lifestyle and mood variables could not predict level of sport performance ( $p < 0.05$ ). The two discriminant functions were insignificant:

Function 1: Wilks-Lambda = 0.60, Chi-Square ( $N = 54$ ) = 22.53,  $p < 0.76$ ;

Function 2: Wilks-Lambda = 0.82, Chi-Square ( $N = 54$ ) = 8.87,  $p < 0.78$ .

A classification matrix (Table 10) shows that prediction based upon the combined lifestyle and mood factors resulted in a 67.86% classification accuracy for elite sportpersons, 62.50% for sub-elite sportpersons and 80.00% for non-elite sportpersons. The classification accuracies for all three groups are above the chance classification of 38% for the elite and sub-elite groups and 24% for the non-elite group. Due to the insignificant levels it is problematical to predict sport performance based on combining lifestyle and mood factors.

**TABLE 10**

**CLASSIFICATION MATRIX OF SPORT PERFORMANCE BASED ON COMBINED LIFESTYLE AND MOOD VARIABLES (MINUS WORK VARIABLE)**

		PREDICTED GROUP			% CORRECT
		ELITE	SUB-ELITE	NON-ELITE	
ACTUAL GROUP	ELITE (N=28)	19	5	4	67.86
	SUB-ELITE (N=16)	3	10	3	62.50
	NON-ELITE (N=10)	1	1	8	80.00
	TOTAL N = 54				

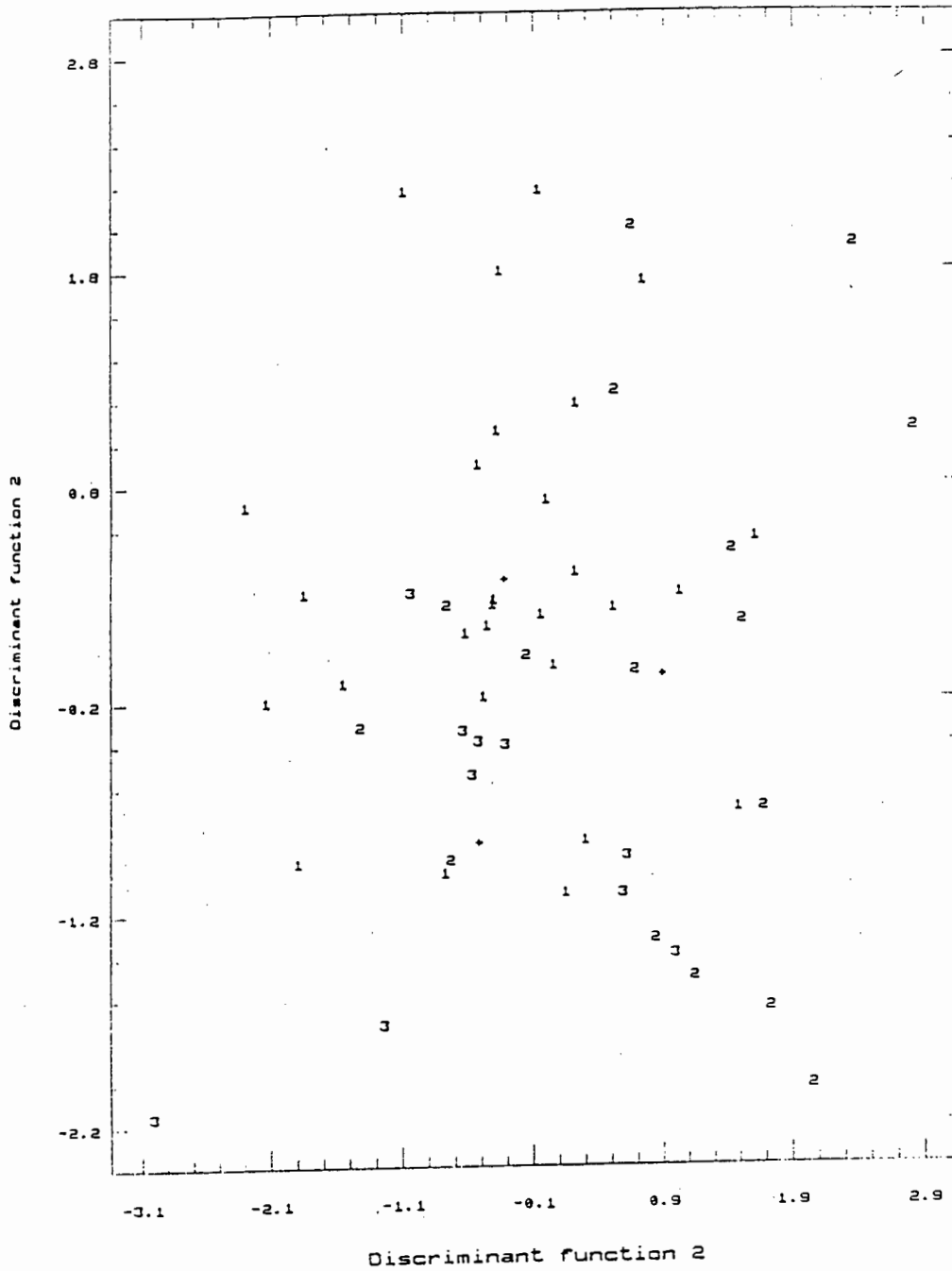
Discriminant function coefficients in order of importance are presented in Table 11. The discriminant function coefficients show once again that the exercise and social variables have the strongest discriminatory power when it comes to lifestyle and mood variables in sport performance. Once again, caution in interpretation needs to be made here in that multicollinearity can suggest that redundant information was used in the analysis.

FUNCTION 1		FUNCTION 2	
SOCIAL	3.46	MENTAL	- 1.95
EXERCISE	- 3.20	SOCIAL	1.82
LEISURE	0.65	DEPRESSION	1.33
CARE	- 0.65	EXERCISE	- 0.77
ANGER	0.61	FOOD	0.64
DRUGS	0.58	WORK	0.50
CONFUSION	0.48	ANGER	0.50
FOOD	- 0.34	LEISURE	- 0.47
VIGOUR	- 0.25	CARE	- 0.45
WORK	- 0.23	TENSION	- 0.37
MENTAL	- 0.21	DRUGS	- 0.37
DEPRESSION	0.12	CONFUSION	- 0.34
TENSION	0.09	FATIGUE	- 0.30
FATIGUE	- 0.05	VIGOUR	0.20

**TABLE 11**

**STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS OF COMBINED  
LIFESTYLE AND MOOD VARIABLES IN ORDER OF IMPORTANCE**

Figure 5 represents a scatter diagram of combined lifestyle and mood discriminant functions 1 and 2.



1 = ELITE    2 = SUB-ELITE    3 = NON-ELITE

FIGURE 5

SCATTER DIAGRAM OF COMBINED LIFESTYLE AND MOOD DISCRIMINANT  
FUNCTIONS 1 AND 2

## CHAPTER FOUR

### DISCUSSION

#### 4.1 LIFESTYLE FACTORS IN SPORT PERFORMANCE

The research hypothesis that healthy lifestyles are positively related to sport performance was not supported by the results of this research study. Some of the other results in this research study suggest however that the structure of lifestyles and sport performance is related.

Based on the eight lifestyle variables (food, drugs, exercise, care of body, work, leisure, social, mental state) used in this research study, sportpersons across the three levels of sport performance showed no major descriptive differences and it was not possible to predict level of sport performance. However, some of the other results suggest that the two more elite groups (the elite and sub-elite sportpersons) have more rigid/structured and specifically geared lifestyles as opposed to the non-elite sportpersons who have more relaxed/unstructured and unspecific lifestyles. This present research study therefore suggests that healthier lifestyles are not related to better sport performance but that the structure of the lifestyle is related to sport performance.

Despite the discriminant analysis in the present study showing that lifestyle is not a significant discriminator in sport performance, what is still encouraging for future studies in this area is the fact that the classification accuracies for all three levels of sport performance were above the criteria for classification being due to chance. This merits further investigation in the future.

It must be remembered that the multicollinearity situation of the variables used in this study suggests that redundant information could have been used in the analysis. Therefore, a reconsideration in terms of what constitutes lifestyle variables in sport performance or how the term 'lifestyle' should be measured may be necessary in future research studies in this area. The definition of Silbert et al. (1981) for the term 'lifestyle' and / or the 'How Healthy a Life Do You Lead?' lifestyle questionnaire that was used in this research study may be inappropriate in sport psychology. A more sensitive definition or a more suitable lifestyle questionnaire may be needed in the future when researching lifestyles and sport performance. This issue was brought up earlier in this study when defining the term 'lifestyle'. It was mentioned that Abel (1991) had stated that there were problems in operationalizing the term lifestyle and how it was to be measured in empirical research studies. This issue, as stated earlier, has to be taken into account in this area of research.

Related to this issue of questionnaire appropriateness is the fact that the work variable of the lifestyle questionnaire was not included in the discriminant analysis. The younger

subjects found these questions inappropriate to answer, resulting in a large proportion of the sample not completing this particular section of the questionnaire. However, the work aspect of an individual's life (school or employment) takes up much time and hence will play an important part in a lifestyle. Valuable lifestyle information could thus be missing in the present research study which again raises the question of the usefulness of the particular lifestyle questionnaire used in this study. Future studies in sport psychology that look at lifestyles need to address the measurement of the work variable carefully.

Another point, made by Miller and Miller (1985) concerning the issue of questionnaires, is that predictions of sport performance obtained from self-report inventories have been met with limited success. It may be more appropriate to include other methods of measurements in the future and not to depend solely on self-report questionnaires.

Taking the above point one step further, it is proposed that significant other persons in the sportperson's life also take part in future research studies as they could reveal pertinent information and give a broader perspective when it comes to the lifestyle of the sportperson. This will also bring in the factor of the significant relationship lifestyle factor which could be very important in terms of a sportperson's performance. This issue was not tapped in the questionnaire used in this research study. This point again suggests that there may be many health or other factors in a sportperson's life that could have a bearing on his/her sport performance that have not been monitored by

the questionnaire used in this research study. At this point it may be necessary to do more qualitative research in this area (such as case studies or more in-depth interviewing) in order to tap these factors, whereupon more quantitative research can be developed.

The qualitative data in this research study did come up with some themes that may also need to be explored further in future studies. For instance, themes that emerged in the two more elite groups, but not to the same extent in the non-elite group were that they have changed their lifestyles, spend more time on their sport, that their lifestyles and sport performances are more interrelated and the relationship between their lifestyles and sport performance are seen to be better. It is these kind of factors of a sportperson's lifestyle that need to be explored further in, for instance, more detailed qualitative research and which could provide important data to which future research studies can develop from.

A point with the present research study is that the results based on the lifestyle questionnaire cannot be put into a context with other studies. This is because no other work was found in the literature that looked at this relationship between lifestyle variables and sport performance. This makes it a little more difficult in determining the appropriateness of the approach, the definition of the term 'lifestyle' and the questionnaire used in the present study.

Although the quantitative data based on the lifestyle questionnaire does not suggest a comprehensive relationship with sport performance, some of the results from the general questionnaire suggest that there is a relationship between lifestyle structures and sport performance. The present study shows that the more elite sportpersons (the elite and sub-elite groups) have a more rigid/regimented lifestyle geared to their sport, as opposed to the non-elite sportpersons who have a more relaxed lifestyle not geared to their sport. These findings on lifestyle structure support the point just made that other lifestyle factors may play a role in a sportperson's life. Further research should look into what exactly is meant by rigid/regimented lifestyles as opposed to more relaxed lifestyles. In other words, what are the important factors that make a sportperson's lifestyle structured or unstructured and how do they relate to sport performance?

These findings on lifestyle structures are supported by the only two studies found that very briefly touch on the issue of lifestyle and sport. An exploratory study by Mahoney and Avener (1977) that looked at the psychology of elite gymnasts implied as part of their findings that relaxed and unstructured lifestyles are associated with lower sport performances. Another study by Highlen and Bennett (1979) that investigated the psychological characteristics of successful and unsuccessful elite wrestlers support this in that they reported that qualifying wrestlers had slightly more organized and structured lifestyles as opposed to non-qualifiers. These two studies were the only studies found that discussed the issue of lifestyles and sport performance at any length.

These two studies each looked at a specific sport. This may be an important issue when interpreting the results of the present research study which looked across a number of sports. Sport involves open or closed skills where Gentile (1972) defines closed skills as occurring when the environmental surroundings remain constant (sport examples include gymnastics and diving) while open skills are defined as skills primarily executed in an ever-changing interactive environment (sport examples include wrestling and badminton). The present study combined sports across this skill division. This could make the interpretations of the results problematical in that different skills in different sports may require or make use of different variables depending on the skill needed in the sport. This situation was not monitored in the present study. This issue may be an important factor to consider in future research despite the study with wrestlers (open skill) by Highlen and Bennett (1979) supporting the study with gymnasts (closed skill) by Mahoney and Avener (1977). Although the present study supports these studies when it comes to lifestyle structures, this skill differentiation could be an important factor when looking at the results of the lifestyle variables assessed from the lifestyle questionnaire of the present study. Lifestyles variables may need to have a varying focus according to the skills required in the sport. This exploratory study suggests therefore that it may be necessary in the future to focus on either only one specific skill in sports, or to focus only on one specific sport. The lifestyle variables used in the present research study may then become more appropriate and useful in showing a relationship between lifestyles and the level of some sport-specific performances.

This present study is the first study known to have focused systematically on the relationship between lifestyle variables and sport performance. Although all the findings in this present study do not show a relationship between lifestyle variables and sport performance, some findings show a relationship between lifestyle structures and sport performance. It has been put forward that there is still much scope in this area of research and that future research can therefore expand on this. This study has therefore provided an important base for future research in sport psychology which specifically looks at the role of lifestyles in sport.

#### **4.2 MOOD FACTORS IN SPORT PERFORMANCE**

The research hypothesis that mood disturbances are negatively related to level of sport performance was not supported by the results of this research study.

Based on the six mood variables (tension, depression, anger, vigour, fatigue, confusion) used in this research study, sportpersons across the three levels of sport performance showed no major descriptive differences and it was not possible to predict level of sport performance. This present research study therefore suggests that more positive/healthier mood profiles are not related to better sport performance.

The findings in the present study do not show more prominent iceberg profiles with the more successful sportpersons and hence also do not support the Mental Health Model

of sport performance. In the present study the most successful sportpersons (the elite group) did not show more positive moods when compared to the least successful sportpersons (the non-elite group) nor was the model in the present study able to predict level of sport performance. Although Morgan (1980) stated that the POMS was the most highly predictive psychological tool that has been used with the sporting population, the present study failed to support this predictive accuracy.

The mood results of this present study are not as encouraging as that of the lifestyle results in this study. The mood results of the discriminant analysis are insignificant, and the classification accuracies for all three levels of sport performance are poor, with the elite group classification accuracy being below the chance criteria.

Although there have been studies, mostly by Morgan, that have supported Morgan's Mental Health Model with the POMS in sport settings (Morgan, 1985; Morgan et al., 1987; a) Morgan et al., 1988; Ungerleider et al., 1989; Newby & Simpson, 1994), there have also been studies, like the present study, that have not supported the model with the POMS (Silva et al., 1981; Miller & Miller, 1985; Craighead et al., 1986; Daiss et al., 1986; Durtschi & Weiss, 1986; Morgan et al., 1987; b) Tharion et al., 1988; Frazier, 1988; McGowan & Miller, 1989; Mahoney, 1989; McGowen et al., 1990; Paulsen et al., 1990; Wughalter & Gondola, 1991 and Meyers, et al., 1994).

Studies with the POMS have therefore shown discrepant results when looking at the

Mental Health Model in sport psychology. It is suggested that a possible reason for this discrepancy in past research studies is that they have failed to differentiate four different time criteria when using the POMS in sport psychology. In past studies with the POMS, sport psychology researchers have not always differentiated whether the respondent's answers were based on mood states or traits and whether the questionnaire was administered pre-selection or post-selection of the sportpersons. One thus has four criteria in terms of the time of answering the questionnaire: State-Pre, State-Post, Trait-Pre and Trait-Post. It is recommended that the definition in the POMS of "state" refers to answers to the instruction 'today' or any time within and "trait" referring to answers to 'yesterday' or any time prior; it is recommended here that "Pre" be defined as pre-selection and "post" as post-selection. It is believed that these four different time criteria are possibly important and could have an impact on results. Comparing across these four criteria may be the reason for contradictory results in previous studies. This point is supported by Kremer and Scully (1994) when they state that the instructions and timing of the POMS in relation to actual performance varies between studies. It is suggested that results in the future be compared within and not across the four time criteria.

This point of time criteria with the POMS is introduced by Morgan who mentioned that a general trait theory is useful in discriminating between sportpersons of differing ability levels (1980) and that mood scores of the POMS are used in a trait-like manner (1985). Again Morgan et al. (1988) mention that in the standard instructional set ("how have

you been feeling the past week including today") the resulting score of the POMS appears to resemble a trait-like construct. Contradictions to this view are found when Morgan and Johnson (1977) mention that states as opposed to traits would be more useful in predicting success in a pre-competitive setting, when Renger (1993) states that the POMS has used state theory when employed to differentiate the successful from the unsuccessful sportperson and when Kremer and Scully (1994) mention that moods are transitory, affective states. It is this confusion of time criteria that, when studies are compared with one another, could play a role in the discrepancy of the results. Likewise, contradictory results may arise when pre-selection and post-selection studies with the POMS are compared with one another. It is suggested that pre-selection mood factors can be different to post-selection mood factors just as state and trait mood factors may be different. It is for this reason that future studies with the POMS in sport psychology be more specific in terms of the four dimensional time criteria put forward in this study. This approach may produce more consistent results.

Sport specification is also an issue that needs to be considered when interpreting results in this area. Studies in the past have compared results across sports and this could be another possible reason for the discrepant results. This aspect is related to the point discussed earlier concerning open and closed skill sports. Cockerill et al. (1991) extend this line of argument when they state that the Mental Health Model has been established in sport which makes aerobic and anaerobic demands on the sportperson and that other sports with different requirements, like golf and archery, may

need an alternative model. It may therefore be necessary in the future to compare results within sport types or sport skills as well as demands, and not just across sport types as has been done in the past. The present study attempted to restrict or specify the sports to Olympic recognized individual sports, but it may be necessary in the future to make further restrictions to specific skills and/or demands or even specific sports.

This approach is supported by Morgan (1974) who put forward that sportpersons from various sub-groups differ on a variety of psychological states and traits. Silva et al. (1985) support this in mentioning that the unique and specific demands of each sport defines, in part, the variables believed to account for performance variation. Cockerill et al. (1991) who suggest that moods of sportpersons will vary according to the nature of the sport itself as well as to the importance of the competition also support this notion.

Cockerill et al. (1991) go on to emphasize the point that the POMS inventory is better suited to the evaluation of an individual subject's emotional state than to those of criterion groups. This can be another factor as to why the present study does not support the model and that there is discrepancy in the findings using this model in sport.

Another issue as to why there is inconsistent support for the Mental Health Model of sport performance could have to do with the definition of the term 'success' used in the

model. It is understood that 'success' used in this model refers to the sport performance level of the sportperson. This will be described in this study as an external criterion. However it is suggested that 'success' may very well refer to how the sportperson sees his/her sport performance i.e. what will be described as an internal criterion. A sportperson playing at a lower level of performance who sees his/her sport performance as successful may display a more positive mood profile (or 'iceberg profile') than a sportperson playing at a higher level who sees his/her performance as unsuccessful. It therefore may not be the external criterion (level of sport performance) but rather the internal criterion (how the sportperson views the performance) that is a discriminating factor in mood profiles. Morgan's (1985) Mental Health Model of sport performance does not take this factor into account. This opinion is supported by Renger (1993) and Nideffer (1990) who state that this is a recurring problem in research that attempts to predict sport success. Miller and Miller (1985) also state that research on the psychological characteristics of successful and non-successful elite sportspersons fails to come up with a criterion that differentiates between the two groups while Prapavessis and Grove (1991) mention that there has been a lack of precision in the manner that performance has been operationally defined in previous studies. This point refers to any variable, including that of lifestyles, looking at the relationship with sport performance levels.

Another issue that may play a role in the contradictory results in this area has to do with the ages of the sportpersons. This issue of age is brought up by Wughalter and

Gondola (1991) when they found in professional tennis players that the older players, but not the younger players, displayed the iceberg profiles. A number of reasons, including experience, why this may be the case were put forward. This finding suggests that age may have a role in mood profiles. In the previous studies that investigated the Mental Health Model with the POMS, there was much variety in the age groups including three studies that did not specify the age of the subjects. The present study did not control for age. It may be for this reason that previous studies, including this present study, produced differing results. This issue of age may have also played a part in the results of the lifestyle factors. Future research in sport performance differentiation may need to control for age.

The sex of the sportsperson may also need to be highlighted when making interpretations in this area of research. Vanden Auweele, De Cuyper, Van Mele and Rzewnicki (1993) have stated that work with the POMS in sport has predominantly focused on males. This is to some degree true, but there have been a number of studies that included female subjects. However, another issue needs to be considered. A study by Morgan et al. (1987b) found that both control and elite female distance runners possessed the iceberg profile while in another study only the elite male distance runners possessed the profile (Morgan 1985). The female runners thus did not support the Mental Health Model of sport performance, while the male runners did support the model. The previous studies in this area did not all focus on either male or females, but like the present study, included both sexes. This lack of sex differentiation

may have thus contributed to the varied findings with the POMS and may have also been a factor with the lifestyle results. Future research therefore needs to look into this situation more closely.

A point made by Vanden Auweele et al. (1993) that work with the POMS has basically only included Americans, needs to be considered. This present study only included sportpersons participating in sport in the Western Cape of South Africa and care therefore needs to be taken when making interpretations and comparisons with the other studies already done in this area.

The point by Morgan (1979) that psychological data alone can never predict success in a highly predictable fashion is also an important consideration when interpreting the results of this study or any other study in this area. While there may be many other factors, such as physiological variables, that could contribute to discriminating levels of sport performance, the results based on this study have only looked at lifestyle and mood factors of the sportperson. Although the present study looked at two factors the point is emphasized by Morgan (1980) who stated that it would be inappropriate to rely on mood factors alone in predicting behaviour because of physiological and additional psychological variables. Some studies that have looked at moods and sport performance have failed to make use of a multi-operational approach. Heyman (1982) has stated that studies in this area were exploratory and only a limited number of variables were considered. Factors not included in these studies may have contributed

significantly to performance. It would thus seem that Morgan's (1985) Mental Health Model of sport performance may be too simplistic for prediction purposes and this may be the reason for inconsistent support for the model.

The above points can be summed up by Vanden Auweele et al. (1993) who state that many researchers in the past have unfortunately not reported relevant information such as skill level, education or ages of the sportpersons. It is these kind of issues that need to be addressed.

#### **4.3 CONCLUSIONS AND RECOMMENDATIONS**

The hypotheses that healthy lifestyles are positively related and mood disturbances are negatively related to sport performance have not been supported by the results of this present research study. Some results have, however, shown that lifestyle structure and sport performance is related.

This present research study is the first study that has systematically investigated the relationship between lifestyles and sport performance and the results have not been convincing. It has been suggested, however, that there is still much opportunity to do further research in this area as there are still many aspects that need to be refined and many lifestyle factors that have not been explored in this present research study. It is recommended that more qualitative as well as quantitative research be carried out

before any conclusive statements can be made about the relationship between lifestyles and sport performance.

This research study has shown that there is no relationship between mood and sport performance, but it is suggested that further research in this area needs to be more specific in terms of the sportperson and the sport being researched. It is therefore recommended that any future sport psychology research looking at moods should introduce and make use of a sport situation-specific model so that results of studies can be compared within sport types rather than across sport types. This approach to research in this area may therefore provide more conclusive results within sports rather than contradictory results across sports.

In conclusion then, it is suggested that much more research can still be done in the two areas covered in this present research study and that future lifestyle research in sport performance be more exploratory in nature, while future mood research in sport psychology be sport situation-specific in nature.

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## APPENDICES

## APPENDIX 1



## Department of Psychology

University of Cape Town · Rondebosch 7700 · South Africa  
Telephone: (021) 650-9111  
Fax No: (021) 650-3726

Dear Sportperson

My name is Richard Vergunst and I am presently completing my Masters Degree in Research Psychology at the University of Cape Town. I am doing research in the field of Sport Psychology looking specifically at the relationship between Lifestyles and Sport Performance and I would therefore very much appreciate it if you would be able to assist me in this study.

This study will not require much time and effort on your part. All I ask is for you to please fill in the three easy-to-complete clear and simple questionnaires and then to return them to me. The questionnaires will be treated with the strictest confidentiality. Should you want to discuss anything or require feedback please feel free to let me know whereupon we can make further arrangements.

Your assistance and contribution to Sport Psychology will be very much appreciated. I thank you for your time.

Yours sincerely

RICHARD VERGUNST

## APPENDIX 2

## LIFESTYLE QUESTIONNAIRE

Please read the following information before completing this questionnaire.

1. The questionnaire will be treated with confidentiality.
2. Please fill in your full name (optional) and todays date in the spaces provided.
3. Please answer the questionnaire as honestly as possible.

Thank you for your time and cooperation.

FULL NAME : \_\_\_\_\_ (optional)

TODAYS DATE : \_\_\_\_\_

PART 1

1. Do you take sugar in your coffee or tea? YES\_\_\_ NO\_\_\_
2. Do you take more than two spoonfuls? YES\_\_\_ NO\_\_\_
3. Do you regularly take aspirin and nonprescription painkillers more than once a week? (Women exclude painkillers for period pains.) YES\_\_\_ NO\_\_\_
4. Do you play, on a regular basis (more than twice a month), any active competitive sport such as tennis, squash, football (but not including golf)? YES\_\_\_ NO\_\_\_
5. If yes, do you play more than once a week? YES\_\_\_ NO\_\_\_
6. If you are a cigarette smoker do you have a morning cough? (Nonsmokers score "NO".) YES\_\_\_ NO\_\_\_
7. Do you use, even occasionally, any illegal drug such as marijuana? YES\_\_\_ NO\_\_\_
8. Do you tend to bolt/gulp down your food? YES\_\_\_ NO\_\_\_
9. Do you walk or jog a minimum of 1,5km every day? (Include golf, but not walking around the house or office.) YES\_\_\_ NO\_\_\_
10. Do you drink (including tea and coffee) at least ¼ a litre of fluid a day? YES\_\_\_ NO\_\_\_
11. When suffering from relatively minor illnesses and infections, do you go to the doctor for antibiotics or other medication as a matter of course rather than try to "ride it out" on your own? YES\_\_\_ NO\_\_\_
12. Do your eating habits frequently give you painful indigestion? YES\_\_\_ NO\_\_\_
13. If you own a bicycle, do you use it whenever you can? ( If you have no bicycle answer "NO") YES\_\_\_ NO\_\_\_
14. Do you find yourself frequently nibbling snacks or chocolates between meals? YES\_\_\_ NO\_\_\_
15. Are you constantly finding that you have to squeeze yourself into clothes? YES\_\_\_ NO\_\_\_
16. Do you have to use pills of any kind to help you sleep? YES\_\_\_ NO\_\_\_
17. Does your diet include regular helpings of salads and fresh vegetables? YES\_\_\_ NO\_\_\_

18. Do you make a point of regularly visiting your doctor and dentist for checkups- say once a year? YES \_\_\_\_\_ NO \_\_\_\_\_
19. Do you tend to skip meals because "you are busy" and substitute filling snacks? YES \_\_\_\_\_ NO \_\_\_\_\_
20. Has anyone ever said to you that you drink too much? YES \_\_\_\_\_ NO \_\_\_\_\_
21. Do you feel that you could, with just a little practice, take up a really strenuous sport such as mountaineering, long distance running or competitive swimming? (Answer "YES" if you already do so.) YES \_\_\_\_\_ NO \_\_\_\_\_
22. When eating out at restaurants or with friends do you frequently end up feeling rather overfull? YES \_\_\_\_\_ NO \_\_\_\_\_
23. Do you tend to have a definite weakness for sweet, sticky foods? YES \_\_\_\_\_ NO \_\_\_\_\_
24. Do you smoke? YES \_\_\_\_\_ NO \_\_\_\_\_
25. Do you regularly smoke more than a pack a day or its equivalent in pipe tobacco? YES \_\_\_\_\_ NO \_\_\_\_\_
26. Do you do regular daily exercises (including exercise machines)? YES \_\_\_\_\_ NO \_\_\_\_\_
27. If you stand in front of a mirror without clothes on, do you notice definite areas of excess fat? YES \_\_\_\_\_ NO \_\_\_\_\_
28. Do you find it a real strain to carry bags or heavy parcels upstairs? YES \_\_\_\_\_ NO \_\_\_\_\_
29. Do you drink alcohol regularly? YES \_\_\_\_\_ NO \_\_\_\_\_
30. Do you ever drink enough alcohol to give you unpleasant side effects of any kind? YES \_\_\_\_\_ NO \_\_\_\_\_
31. Do you tend to keep very late hours, even when you feel physically tired and fatigued? YES \_\_\_\_\_ NO \_\_\_\_\_
32. Do you have any false teeth, other than crowns or cosmetic replacements? YES \_\_\_\_\_ NO \_\_\_\_\_
33. Do you have fresh fruit or fruit juice (not canned) at least once a day? YES \_\_\_\_\_ NO \_\_\_\_\_
34. Do you regularly use tranquilizers or antidepressant drugs as prescribed by your doctor? YES \_\_\_\_\_ NO \_\_\_\_\_
35. Do people tend to comment spontaneously on "how well you look"? YES \_\_\_\_\_ NO \_\_\_\_\_

36. Do you swim regularly (say at least twice a week in the summer months, or at other times when you have the opportunity)? YES\_\_\_\_\_ NO\_\_\_\_\_
37. Do you avoid, wherever possible, fatty foods such as french fries? YES\_\_\_\_\_ NO\_\_\_\_\_
38. If you are a smoker, do you feel uneasy if you do not have cigarettes always at hand or if you find yourself in a place where you cannot smoke? (Nonsmokers score "NO".) YES\_\_\_\_\_ NO\_\_\_\_\_
39. If you do regular exercise, have you been doing so for at least the last two years? YES\_\_\_\_\_ NO\_\_\_\_\_
40. Do you allow clothing styles or fashions to interfere with your physical comfort significantly - for example, uncomfortable shoes or clothing unsuitable for the weather? YES\_\_\_\_\_ NO\_\_\_\_\_
41. Do you regularly eat more than two cooked meals in the day? YES\_\_\_\_\_ NO\_\_\_\_\_
42. Do you plan your own or your family's meals so as to make sure that you or they have a balanced diet? YES\_\_\_\_\_ NO\_\_\_\_\_
43. Is your weight within 5 kg of that recommended for your build? (If you do not know, answer "NO".) YES\_\_\_\_\_ NO\_\_\_\_\_
44. Do you weigh more than 10 kg over the recommended average? YES\_\_\_\_\_ NO\_\_\_\_\_
45. Do you find yourself taking a car for short journeys when you could just as easily have walked? YES\_\_\_\_\_ NO\_\_\_\_\_
46. Do you receive prescription medicines on a regular basis from your doctor? YES\_\_\_\_\_ NO\_\_\_\_\_
47. Do you spread butter or margarine liberally on toast or pastries? YES\_\_\_\_\_ NO\_\_\_\_\_
48. Would you honestly describe yourself as a physically lazy person? YES\_\_\_\_\_ NO\_\_\_\_\_
49. Do you brush your teeth properly and vigorously at least twice a day? YES\_\_\_\_\_ NO\_\_\_\_\_
50. Do you walk or jog over 3 km regularly each day? (Include golf, but not walking around the house or office.) YES\_\_\_\_\_ NO\_\_\_\_\_
51. Do you regularly take alcohol (even a glass of beer) at lunchtime? YES\_\_\_\_\_ NO\_\_\_\_\_

52. Do you tend to eat out more than you eat at home? YES\_\_\_ NO\_\_\_
53. Do you find yourself short of breath after climbing a flight of stairs? YES\_\_\_ NO\_\_\_
54. Has anyone ever said to you that you smoke too much? (Nonsmokers score "NO".) YES\_\_\_ NO\_\_\_
55. When potato crisps, salted nuts and cocktail savories are around, do you find them impossible to resist? YES\_\_\_ NO\_\_\_
56. Would you say that on the whole your life-style leads you to abuse or ill-treat your body? YES\_\_\_ NO\_\_\_

## PART 2

This is the second part of a multifactorial questionnaire, and the instructions for completing it are the same as for Part 1. You will notice that some of the numbered questions in this part are prefixed by an A and some by a B. Others have no prefix at all. Those without a prefix should be answered by everyone taking the questionnaire, those with an A by men and women in full-time employment only, and those with a B by men and women not in full-time employment.

1. Are you taking any part-time study or self-improvement course? YES\_\_\_ NO\_\_\_
2. Would you describe your childhood as having been a happy one? YES\_\_\_ NO\_\_\_
3. (B) Do you feel that your personality has evolved and matured in a satisfactory way since you left school? YES\_\_\_ NO\_\_\_
4. Do you find it difficult to introduce yourself to people and converse with them? YES\_\_\_ NO\_\_\_
5. Are you a good letter writer? YES\_\_\_ NO\_\_\_
6. (A) Do you find your work really enjoyable? YES\_\_\_ NO\_\_\_
7. Do you watch television on average for less than two hours a day (say 15 hours a week)? YES\_\_\_ NO\_\_\_
8. Do you tend to jump from one hobby or pastime to another without ever getting deeply into one? YES\_\_\_ NO\_\_\_
9. Do you have any unusual fears or phobias? YES\_\_\_ NO\_\_\_
10. (A) Would you honestly say that your work gives you the challenge and opportunity which you deserve? YES\_\_\_ NO\_\_\_

11. Would you say that you lead an active social life? YES \_\_\_\_\_ NO \_\_\_\_\_
12. Have you got any domestic hobbies of a practical kind- for example, woodwork, dressmaking, decorating or handicraft of any kind? YES \_\_\_\_\_ NO \_\_\_\_\_
13. Do you have any domestic hobbies of a creative but not necessarily practical kind - for example, painting, stamp or coin collecting, modeling, embroidery? YES \_\_\_\_\_ NO \_\_\_\_\_
14. Do you feel happy and confident most days? YES \_\_\_\_\_ NO \_\_\_\_\_
15. (B) Do you find the things that you do in the course of the day really enjoyable? YES \_\_\_\_\_ NO \_\_\_\_\_
16. Do you have trouble sleeping? YES \_\_\_\_\_ NO \_\_\_\_\_
17. Are you married? If not, do you have a lover or fiance? YES \_\_\_\_\_ NO \_\_\_\_\_
18. If so, would you describe your relationship with this person as a happy one? YES \_\_\_\_\_ NO \_\_\_\_\_
19. (B) If you could give up your present life and take a more interesting job at a reasonable salary, would you gladly do so? YES \_\_\_\_\_ NO \_\_\_\_\_
20. Do you make a point of taking at least one holiday per year when you are two weeks away from your work and usual surroundings? YES \_\_\_\_\_ NO \_\_\_\_\_
21. Do you always seem to be in financial difficulties? YES \_\_\_\_\_ NO \_\_\_\_\_
22. Do financial problems worry you unduly? YES \_\_\_\_\_ NO \_\_\_\_\_
23. (A) Do you tend to push yourself harder than most other people in your working environment? YES \_\_\_\_\_ NO \_\_\_\_\_
24. (B) Would you say that the working aspects of your life - housework, children and so on- provide you with the kind of challenge that really satisfies you? YES \_\_\_\_\_ NO \_\_\_\_\_
25. Do you make friends easily? YES \_\_\_\_\_ NO \_\_\_\_\_
26. Do you tend to find yourself bored and restless when not working? YES \_\_\_\_\_ NO \_\_\_\_\_
27. Have you ever had a nervous breakdown or been treated for severe depression? YES \_\_\_\_\_ NO \_\_\_\_\_

28. Would you prefer an evening watching television or reading to an evening out with friends? YES \_\_\_\_\_ NO \_\_\_\_\_
29. Would you describe yourself as quite a happy person? YES \_\_\_\_\_ NO \_\_\_\_\_
30. Do you enjoy tinkering with your car or motors of any kind? YES \_\_\_\_\_ NO \_\_\_\_\_
31. (B) Do you tend to push yourself harder than most other people in the work that you do? YES \_\_\_\_\_ NO \_\_\_\_\_
32. Do you regularly read books (other than magazines and newspapers)? YES \_\_\_\_\_ NO \_\_\_\_\_
33. If so, would you say that you really enjoy reading? YES \_\_\_\_\_ NO \_\_\_\_\_
34. Do you wish that your sex life was fuller and happier? YES \_\_\_\_\_ NO \_\_\_\_\_
35. Do you sometimes feel that everything is getting to be too much for you? YES \_\_\_\_\_ NO \_\_\_\_\_
36. Would you say that most people think of you as a sociable person? YES \_\_\_\_\_ NO \_\_\_\_\_
37. (A) Do you feel that other people have seriously handicapped you as far as your job or profession is concerned? YES \_\_\_\_\_ NO \_\_\_\_\_
38. Do you enjoy cooking and the serving of food? YES \_\_\_\_\_ NO \_\_\_\_\_
39. Do you enjoy going out to dinner with friends? YES \_\_\_\_\_ NO \_\_\_\_\_
40. Do you regret having missed out on any educational opportunities? YES \_\_\_\_\_ NO \_\_\_\_\_
41. (A) If you were offered a more interesting job than your present one, at three quarters of your existing salary, would you take it? YES \_\_\_\_\_ NO \_\_\_\_\_
42. Do you get unnecessarily anxious and worried about things? YES \_\_\_\_\_ NO \_\_\_\_\_
43. On balance, are you content to do things on your own and be on your own if necessary? YES \_\_\_\_\_ NO \_\_\_\_\_
44. Have you more than one close friend whose company you really enjoy? YES \_\_\_\_\_ NO \_\_\_\_\_
45. Do you enjoy actively listening to music? YES \_\_\_\_\_ NO \_\_\_\_\_

46. (A) Have you made steady progress and advancement in your job - for example, with promotion or business successes? YES \_\_\_\_\_ NO \_\_\_\_\_
47. Do you find it difficult to switch off and relax at the end of the day? YES \_\_\_\_\_ NO \_\_\_\_\_
48. Do you have any regular outdoor hobbies or pastimes, such as playing sports or watching them? YES \_\_\_\_\_ NO \_\_\_\_\_
49. Do you enjoy parties? YES \_\_\_\_\_ NO \_\_\_\_\_
50. Would you describe yourself as sexually attractive? YES \_\_\_\_\_ NO \_\_\_\_\_
51. (B) Do you feel that people or circumstances have prevented you from fulfilling yourself in the way that you would have liked to? YES \_\_\_\_\_ NO \_\_\_\_\_
52. Do you get irritable or short-tempered for no good reason rather more than you would like? YES \_\_\_\_\_ NO \_\_\_\_\_
53. Do you watch television regularly for more than four hours a day, or say 25 hours a week? YES \_\_\_\_\_ NO \_\_\_\_\_
54. Does untidiness and carelessness at work or home trouble you unduly? YES \_\_\_\_\_ NO \_\_\_\_\_
55. Do you really enjoy sometimes just "loafing around doing nothing"? YES \_\_\_\_\_ NO \_\_\_\_\_
56. Have you always got friends or relations who will be glad to have you visit them on a vacation? YES \_\_\_\_\_ NO \_\_\_\_\_

Thank you for completing this questionnaire.

## APPENDIX 3

NAME \_\_\_\_\_ (OPTIONAL) \_\_\_\_\_ DATE \_\_\_\_\_

Below is a list of words that describe the feelings that people have. Please read each one carefully. Then fill in ONE space under the answer to the right which best describes HOW YOU HAVE BEEN FEELING DURING THE PAST WEEK INCLUDING TODAY.

The numbers refer to these phrases 0 = Not at all 1 = A little 2 = Moderately 3 = Quite a bit 4 = Extremely			
	0 1 2 3 4	21. Hopeless. . . .	43. Good natured. . . .
1. Friendly. . . .	0 1 2 3 4	22. Relaxed. . . .	44. Gloomy. . . .
2. Tense. . . .	0 1 2 3 4	23. Unworthy. . . .	45. Desperate. . . .
3. Angry. . . .	0 1 2 3 4	24. Spiteful. . . .	46. Sluggish. . . .
4. Worn out. . . .	0 1 2 3 4	25. Sympathetic. . . .	47. Rebellious. . . .
5. Unhappy. . . .	0 1 2 3 4	26. Uneasy. . . .	48. Helpless. . . .
6. Clear-headed. . . .	0 1 2 3 4	27. Restless. . . .	49. Weary. . . .
7. Lively. . . .	0 1 2 3 4	28. Unable to concentrate	50. Bewildered. . . .
8. Confused. . . .	0 1 2 3 4	29. Fatigued . . . .	51. Alert. . . .
9. Sorry for things done	0 1 2 3 4	30. Helpful. . . .	52. Deceived. . . .
10. Shaky. . . .	0 1 2 3 4	31. Annoyed. . . .	53. Furious. . . .
11. Listless. . . .	0 1 2 3 4	32. Discouraged. . . .	54. Efficient. . . .
12. Peeved. . . .	0 1 2 3 4	33. Resentful. . . .	55. Trusting. . . .
13. Considerate. . . .	0 1 2 3 4	34. Nervous . . . .	56. Full of pep. . . .
14. Sad. . . .	0 1 2 3 4	35. Lonely. . . .	57. Bad-tempered. . . .
15. Active. . . .	0 1 2 3 4	36. Miserable. . . .	58. Worthless. . . .
16. On edge . . . .	0 1 2 3 4	37. Muddled. . . .	59. Forgetful. . . .
17. Grouchy. . . .	0 1 2 3 4	38. Cheerful. . . .	60. Carefree. . . .
18. Blue. . . .	0 1 2 3 4	39. Bitter. . . .	61. Terrified. . . .
19. Energetic. . . .	0 1 2 3 4	40. Exhausted. . . .	62. Guilty. . . .
20. Panicky. . . .	0 1 2 3 4	41. Anxious. . . .	63. Vigorous. . . .
PLEASE MAKE SURE THAT YOU HAVE	ANSWERED EVERY ITEM.	42. Ready to fight.	64. Uncertain about things
		65. Bushed. . . .	

## APPENDIX 4

## **GENERAL QUESTIONNAIRE**

Please read the following information before completing this questionnaire.

1. The questionnaire will be treated with confidentiality.
2. Please fill in your full name (optional) and todays date in the spaces provided.
3. Please answer the questionnaire as honestly as possible.

Thank you for your time and cooperation.

BIOGRAPHICAL DETAILS

1. Full Name : \_\_\_\_\_ (optional)
2. Todays Date : \_\_\_\_\_
3. Date of birth: Y\_\_\_\_\_ M\_\_\_\_\_ D\_\_\_\_\_
4. Age : \_\_\_\_\_Years \_\_\_\_\_Months
5. Sex : \_\_\_\_\_
6. In what sport(s) do you compete in for a sport club or association?
- SPORT 1:\_\_\_\_\_ SPORT 2:\_\_\_\_\_

SPORT 1 DETAILS

7. Do you presently have national colours for this sport?

YES \_\_\_\_\_ NO \_\_\_\_\_

If YES, how long have you had national colours for this sport?

less than six months \_\_\_\_\_  
between six months and one year \_\_\_\_\_  
longer than one year \_\_\_\_\_

8. Do you presently have provincial colours for this sport?

YES \_\_\_\_\_ NO \_\_\_\_\_

If YES, how long have you had provincial colours for this

sport?

less than six months \_\_\_\_\_  
between six months and one year \_\_\_\_\_  
longer than one year \_\_\_\_\_

9. Do you enjoy this sport?

YES \_\_\_\_\_ NO \_\_\_\_\_

10. How long have you been participating in this sport at club or association level?

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11. How long have you been participating in this sport (including before you started playing at club or association level)?

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12. Is there anything else that you would like to add concerning the history of you and this sport?

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13. Has your lifestyle while participating in this sport changed significantly?

YES \_\_\_\_\_ NO \_\_\_\_\_

If YES, please specify.

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14. Has your lifestyle changed at all as you have moved from one level of competition to the next while participating in this sport?

NOT APPLICABLE \_\_\_\_\_ YES \_\_\_\_\_ NO \_\_\_\_\_

15. Are you happy with the lifestyle that you lead while participating in this sport?

YES \_\_\_\_\_ NO \_\_\_\_\_

16. Do you enjoy the lifestyle that you lead while participating in this sport?

YES \_\_\_\_\_ NO \_\_\_\_\_

17. Do you have a specific lifestyle geared for this sport and that you also carry out while participating in this sport?

YES \_\_\_\_\_ NO \_\_\_\_\_

18. Do you consider yourself to have a rigid/regimented lifestyle as opposed to a relaxed/unstructured lifestyle while participating in this sport?

YES \_\_\_\_\_ NO \_\_\_\_\_

19. How do you see the relationship between your lifestyle and your sport performance for this sport?

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20. What would you consider to be an ideal lifestyle for you and this sport?

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If you do not take part in a second sport then you can leave the the following section out.

SPORT 2 DETAILS

21. Do you presently have national colours for this sport?

YES \_\_\_\_\_ NO \_\_\_\_\_

If YES, how long have you had national colours for this sport?

less than six months \_\_\_\_\_  
between six months and one year \_\_\_\_\_  
longer than one year \_\_\_\_\_

22. Do you presently have provincial colours for this sport?

YES \_\_\_\_\_ NO \_\_\_\_\_

If YES, how long have you had provincial colours for this sport?

less than six months \_\_\_\_\_  
between six months and one year \_\_\_\_\_  
longer than one year \_\_\_\_\_

23. Do you enjoy this sport?

YES \_\_\_\_\_ NO \_\_\_\_\_

24. How long have you been participating in this sport at club or association level?

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25. How long have you been participating in this sport (including before you started playing at club or association level)?

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26. Is there anything else that you would like to add concerning the history of you and this sport?

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27. Has your lifestyle while participating in this sport changed significantly?

YES \_\_\_\_\_ NO \_\_\_\_\_

If YES, please specify.

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28. Has your lifestyle changed at all as you have moved from one level of competition to the next while participating in this sport?

NOT APPLICABLE \_\_\_\_\_ YES \_\_\_\_\_ NO \_\_\_\_\_

29. Are you happy with the lifestyle that you lead while participating in this sport?

YES \_\_\_\_\_ NO \_\_\_\_\_

30. Do you enjoy the lifestyle that you lead while participating in this sport?

YES \_\_\_\_\_ NO \_\_\_\_\_

31. Do you have a specific lifestyle geared for this sport and that you also carry out while participating in this sport?

YES \_\_\_\_\_ NO \_\_\_\_\_

32. Do you consider yourself to have a rigid/regimented lifestyle as opposed to a relaxed/unstructured lifestyle while participating in this sport?

YES \_\_\_\_\_ NO \_\_\_\_\_

33. How do you see the relationship between your lifestyle and your sport performance for this sport?

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34. What would you consider to be an ideal lifestyle for you and this sport?

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Thank you for completing this questionnaire.