PHYSIOLOGICAL, PERCEPTUAL AND PERFORMANCE RESPONSES TO COMPETITIVE STRESS IN INDIVIDUAL AND TEAM SPORTS AMONG YOUTH SPORT PARTICIPANTS

BY

KAMILLA SWART

THESIS

Submitted in fulfilment of the requirements
for the Degree Master of Arts

Department of Human Movement Studies
Rhodes University, 1994

Grahamstown, South Africa

ABSTRACT

Due to limited research in the field testing of youth sport, specifically with regard to females, this project was delimited to the examination of the responses of youth participants in relation to the nature of the sport, when participating under conditions of competitive stress. It further attempted to elucidate gender related differences within these responses. Forty four male and female subjects aged 15 - 19 years volunteered to participate in this study; all pupils were First team members who competed in a variety of team and individual sports. Subjects participated in a battery of psychological, physiological and performance tests before and after competing in a practice session and during competitive league matches. The data were statistically analyzed for the various parameters under investigation. The results of the Sport Competition Anxiety Test indicated that the females, and the male team players had the highest competitive anxiety traits (*CTA*). The Task and Ego Orientation in Sport Questionnaire scores showed that most subjects have a general dominance of *task* orientation to sport. The results of the Physical Self-Perception Profile revealed that the females' poorer perception of their physical was not as substantial as their difference in *CTA* compared to males. Team participants, particularly the males had a poorer self-image than individual sport counterparts. Elevated heart rate responses were observed prior to performing in a competitive ambience, with significant increases in team, rather than individual, players. The Evaluation of Task Demands revealed that team players, especially the females, perceived the match demands as significantly higher than the individual athletes. No significant differences were observed in the players' Evaluation of Perceived Strain. Neither were any significant differences observed in the players' ratings of their performance. In conclusion, although differences appear to exist between male and female responses within a competitive ambience, the magnitude of difference was far more notable between team and individual responses to competitive stress, particularly for competitive matches as opposed to practice sessions.

ACKNOWLEDGEMENTS

In completing this study I wish to extend my sincere thanks to the following people:

Professor Pat Scott for her guidance and constant enthusiasm throughout my study.

Professor Jack Charteris for his input and support throughout the duration of this study.

The teachers and pupils of the local schools whose co-operation made this project possible.

To Adrian and my family who have been supportive and helpful throughout my period of study in Grahamstown.

Finally, the financial assistance of the Centre for Science Development, (HSRC, South Africa) towards this research is hereby acknowledged. Opinions expressed and conclusions arrived at are those of the author and are not necessarily to be attributed to the Centre for Science Development.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Children's participation in sport (recreational and/or competitive), is an integral part of the fabric of South African society, and Brustad and Weiss (1987) have argued that internationally it is assuming an increasingly important role in the child's overall development. Despite this, little attention has been paid to field testing in youth sport in general and even less to female participation. With South Africa re-entering the international sports arena on a large scale, increasing numbers of boys and girls spend a substantial part of their days training or competing in sport. Smoll **et al.** (1988) have posed the question of how involvement at this level of intensity affects participants. It is the prime aim of the present project to address this question. However, to put the pressures of competitive sport in perspective, it is necessary to note that it is not only in sport that children in highly competitive Western societies are exposed to stressful demands, for they are faced with diverse sources of stress, including the pressures of academic achievement.

According to Cahill and Pearl (1993) participation in youth sport is reaching an all time high and children are competing at progressively younger ages a concern about the consequences of intense athletic pressure needs to be voiced. Much of the sport

psychology literature has revealed that stress experienced by youth participants may impede their optimal performance (Gould **et al.**, 1987; Burton, 1988). However, this is not a generalised response as it is clear that some children seem to thrive on intense competition while others tend to buckle under the pressure of competitive stress. There is no doubt that a multitude of integrated factors contribute to colouring the child's competitive experience as being positive or negative (Weiss, 1991).

At this stage it would be fitting to define competitive stress. A state of competitive stress occurs when there is an imbalance between perceived demands and perceived ability to meet that demand under conditions where failure to meet demands is perceived as having important consequences (Martens, 1977; Smith and Smoll, 1982; Scott, 1992; Dewe **et al.**, 1993). The individual who is unable to cope with this imbalance experiences strain. The strain experienced will be manifested in both the psychophysiological and behavioral changes which occur in conjunction with the anxiety state of the individual. It is necessary to point out that not all stress needs to be perceived as negative, for it is evident that a certain level of stress will in all probability facilitate superior performance (Scott, 1992). It is only when stress is perceived as excessive that strain is experienced and is likely to elicit a debilitating effect on performance.

As the competitive process is an evaluative one it may be potentially stressful to the participants as they are expected to display their athletic ability which is a highly valued attribute amongst children. This is especially so at a high school level where it is an indication of athletic prowess. Watson (1984) pointed out that as school children are aware that their performance will be evaluated, self-esteem and social prestige are immediately threatened in a competitive situation. Excessive competitive stress results in anxiety being an inevitable component of competition as it involves the evaluation of ability relative to others under conditions of great uncertainty and this is perceived as a threat to self-esteem. The tendency to perceive competitive situations as threatening is mediated by factors such as personality dispositions, attitudes, abilities (physical and mental) and other intra-personal factors (Martens **et al.**, 1990). Furthermore, the same authors propose that two factors - competitive trait anxiety (CTA) and low self-esteem, are instrumental in causing heightened anxiety state responses to competitive situations. Another dispositional factor which has been proposed as mediating the stress-performance relationship is that of achievement orientation (Scanlan and Passer, 1978; Duda, 1993a). It has been suggested that a focus on ego-oriented goals, ie the desire to win and to demonstrate greater skill than one's peers, seem to be associated with higher levels of anxiety in the athletic setting (Duda, 1989; Lewthwaite, 1990). It is evident that competitive stress cannot be perceived within a social

vacuum, and as Passer (1988) cautions, competition must be viewed within the larger context of children's socialization. In view of this, family and/or cultural background and situational factors should be accounted for as children may perceive even greater pressure to perform well due to their performance being evaluated by 'significant others' such as the parents, head teacher and coach.

An important inter-personal factor in competitive sport that needs to be examined is the gender of the individual. A recent concern of some researchers has been the apparent lack of self-confidence of females in physical performance when compared to males (Lirgg, 1991). Research findings have demonstrated that females score higher than males on sport specific trait anxiety (Martens, 1977) and that males' expectations and perceived competence are higher than that of females (Rudisill, 1988). Andersen and Williams (1987) suggested that this scenario occurs because sports have always been perceived as arenas for masculine behaviour and as such, the traditional socialization of the sexes has favoured males in terms of preparation for athletic competition. With the increasing opportunities for girls in sport, one would suspect that gender related differences in self-confidence would be slowly disappearing. However, contemporary researchers contend that although competition does not seem to play a major role in confidence differences between males and

females, it is clear that a difference does exist and suggest that it should be further examined (Lirgg, 1991).

A clear understanding of the competitive process as it relates to stress is the first step in reducing the amount of strain experienced; there is therefore a need to identify all possible sources of stress. One such factor is the nature of the activity itself which has to be considered as a potential source of stress. Field studies conducted by Simon and Martens (1979) indicate that athletes of individual sports exhibit greater pre-competitive state anxiety than team sport athletes. However, the results of a recent study conducted by Scott and Swart (1993) indicated that hockey players, as team sport participants, tended to perceive more pressure and consequently experienced more strain due to hockey being more highly valued by 'white' South Africans compared to the individual activity of squash. It is the author's contention that cultural background may be a significant factor which may influence the results of the present project.

This project was undertaken as a small step towards making a meaningful contribution to the enhancement of youth sport in South Africa. Coaches need to be more sensitive to the individual's unique needs by being aware of idiosyncrasies in physiological and psychological responses within the sporting milieu in order to enhance performance. Coaches also need to

concern themselves with which type of sport may be more inherently stressful. Furthermore, as most of the competitive stress research has focused on males (Scanlan and Passer, 1979), the purpose of the present study will be to extend the existing knowledge of competitive stress to include female athletes and in fact to identify possible gender related differences.

A further objective of this study was to examine the stress-performance relationship. As Jones and Hardy (1989) noted, although it is widely recognised that stress can have significant effects on athletic performance, the debate over the nature of the stress-performance relationship continues. Furthermore as the majority of performance testing under conditions of stress has been conducted on isolated, and often single tasks in the laboratory setting (Scott, 1990), an *in field* investigation was deemed appropriate in eliciting a 'natural' strain response as opposed to an artificial one, as reflected in the individual's affective and somatic responses within a competitive sporting situation. Duda (1993a), who has done extensive work in the area of youth sport, recently acknowledged the void of field work and recommends that more field studies which may determine the effects of goals and perceived ability on performance in real life contexts, are warranted.

It should be borne in mind that many of the complex questions concerning children in sport are influenced by an intricate

interaction of psychological, physiological and kinesiological factors (Gould, 1982). Therefore, the approach in examining competitive stress should be one of a multi-disciplinary nature. Passer (1988) notes that when stress is viewed as a process-model it provides a useful framework for examining the stressful demands associated with youth sport. According to this model the stress process involves situational demands, appraisal processes, aversive emotional responses as well as their consequences. Smoll and Smith (1989) reiterate this point by emphasising the need to undertake a psychophysiological analysis of competitive stress in an attempt to elucidate the relationship between the situation, the individual's cognitive appraisal and his/her ability to cope with the demanding situation. A holistic approach to the analysis of stress is in line with the eclectic application of the Centre M model proposed by Charteris **et al.** (1976) in order to fully understand the nature of stress on human performance.

A psychophysical evaluation of stress involves physiological responses which are from within the organism's internal environment and psychological responses which are embodied in the behavioral output in the situation as it is experienced (Froehlich, 1978). Similarly, Borg (1978) suggests that there are three different kinds of stress indicators, these being physiological, perceptual and performance. The psychophysical assessment of the individual's responses to a stressful

competitive sporting situation in the present study will therefore include the monitoring of heart rate, an evaluation of the player's subjective feelings regarding the degree of strain experienced as well as an evaluation of the player's standard of performance. This conceptualisation should help determine the potential factors mediating the stress-performance relationship.

STATEMENT OF THE PROBLEM

The present study will attempt to investigate changes in physiological, perceptual and performance responses between the less stressful demands of practice sessions and the relatively more stressful demands of competitive matches on youth sport participants in relation to the nature of the sport, specifically individual and team sports. Furthermore, it will attempt to elucidate gender related differences within these responses.

RESEARCH HYPOTHESIS

The general hypothesis proposed in the present study was that competitive stress associated with inter-school sport would have a substantial effect on the psychological and physiological responses of children and as such may be responsible for impaired performance. It is proposed that there will be gender related differences, as well as sport-type related differences in these responses.

It was deemed appropriate to establish base-line responses during a non-competitive practice session, to enable comparisons to be made between base-line norms and the responses assessed under the stressful demands of competition.

In order to address this problem the following overall null hypothesis was adopted:

> It was hypothesized that no difference exists in the physiological, perceptual and performance responses of premier individual and team youth sport participants when participating under conditions of competitive stress.

STATISTICAL HYPOTHESIS

1 A H_o: $\mu_{mt} = \mu_{mi} = \mu_{ft} = \mu_{fi}$ (physiological)

H_a: $\mu_{mt} \neq \mu_{mi} \neq \mu_{ft} \neq \mu_{fi}$ (physiological)

B H_o: $\mu_{mt} = \mu_{mi} = \mu_{ft} = \mu_{fi}$ (perceptual)

H_a: $\mu_{mt} \neq \mu_{mi} \neq \mu_{ft} \neq \mu_{fi}$ (perceptual)

C H_o: $\mu_{mt} = \mu_{mi} = \mu_{ft} = \mu_{fi}$ (performance)

H_a: $\mu_{mt} \neq \mu_{mi} \neq \mu_{ft} \neq \mu_{fi}$ (performance)

Assessed by means of physiological, perceptual and performance parameters where:

m = Male subjects
f = Female subjects
t = Team sport participants
i = Individual sport participants

DELIMITATIONS

The sample for the present study was confined to 40 schoolchildren between the ages of 15 and 19 years who participated in First team premier school sports. Twenty two males and 18 females participated in the study. The premier team and individual sports identified by the schools were rugby, hockey, squash, tennis and athletics. The eleven male team participants competed in rugby whereas their female counterparts participated in hockey. Eight males participated in squash, while two played tennis and one competed in athletics. Amongst the female individual participants, six participated in squash, two played tennis and three competed in athletics. The male subjects took part in either a team or individual sport compared to some female subjects who participated in both team and individual sports. One female subject took part in hockey and athletics, another competed in hockey and squash, while a third subject participated in tennis, hockey and squash. In the present sample all the subjects were first team participants, with 24 being provincial representatives. Ten of the provincial representatives were males and 14 of them were females. Three of the males represented their respective provinces in rugby, while seven of the male subjects represented their respective provinces in squash. Six of the female subjects represented Eastern Province in hockey and four represented Eastern Province in squash, one of whom represented Eastern Province in both hockey and squash.

Another female subject represented Eastern Province in both hockey and athletics.

The battery of tests consisted of the following psychological measures; the Sport Competition Anxiety Test (SCAT), the Task and Ego Orientation in Sport Questionnaire (TEOSQ), the Physical Self-Perception Profile (PSPP), and the Perceived Strain Scale (PSS). The physiological measures included heart rate, specifically *reference*, *initial*, *average*, *highest* and *anticipatory* heart rates; with performance being assessed by means of match results and a performance rating scale.

Data were collected on the subjects during each of five testing sessions. The first session was allocated to collecting general demographic data, a psychological profile, base-line physiological data and to explain the general protocol to subjects. The second session was used to establish base-line responses (physiological, perceptual and performance) during a non-competitive practice session. The following three testing sessions involved *in field* matches of a highly competitive ambience which were selected in view of eliciting strain responses, reflected in the individual's affective and somatic responses.

The approach undertaken for the present study was a holistic one as the interaction of intra-personal and environmental variables in the naturalistic youth sport field setting were investigated.

LIMITATIONS

1) It was not possible to control for other factors which may also impose stress on the child such as academic pressure or personal pressure (from parents or coaches) to which the subjects may have been exposed to during the course of the research period and which might have influenced the individual's physiological and perceptual responses.

2) Although all the subjects were First team players they varied in their standard of performance. This diversification in ability and experience would in all probability affect their perceptions of the degree of competitive stress imposed upon the players.

3) As the amount of strain experienced varies with the perception of the opposition and because the opposition could not be controlled for, they (the opposition) may be viewed as a confounding variable. For example, the opposition may be strong or weak, or an old 'rival', and this will in all likelihood influence the amount of strain perceived for a particular match. However, the advantage of

in field testing is that the intra-personal and environmental variables in the naturalistic youth sport field setting may be investigated.

4) An attempt to assess the most important competitive matches was made, however it was not always possible to monitor certain subjects in their crucial rugby games due to the reluctance of certain coaches and players. Thus many of the rugby matches were of lesser importance, and this in all likelihood, influenced the amount of strain perceived by subjects participating in these matches.

5) Home and away matches may in all probability account for differences in the individual's physiological and perceptual responses as well as in the standard of performance. Players performing on 'home ground' will in all likelihood have an advantage by having more crowd support, as well as the players being familiar with the grounds (courts) used for the pending match.

6) Although heart rate appears to be one of the most sensitive psychophysiological measures, it is very difficult to separate and identify the main cause behind the excitation or inhibition of the heart rate response; it is nevertheless well documented by McArdle **et al.** (1986) as being a good

monitoring device for the overall activities of the organism.

7) As the preparation times varied for different sports one had to standardize the amount of time for heart rate recordings prior to the pending match or athletic event according to the time taken for the respective warm-ups. The physical warm-up of the rugby and hockey players and the athletes lasted approximately for 30 minutes whereas the squash and tennis players warm-up generally took about 15 minutes. This difference in the amount of time taken for the physical warm-up would in all probability affect heart rate responses.

CHAPTER II

REVIEW OF RELATED LITERATURE

INTRODUCTION

To the individual who lives in today's society - one of a highly competitive nature - stress related problems are all to apparent. Although the experience of stress is universal, the definition is not so. Central to the problem in stress research is that the concept of stress is ambiguous because it is poorly defined (Cox, 1986; Sutherland and Cooper, 1990; Dewe **et al.**, 1993). However, as stress is an integral part of the natural fabric of life (Spielberger, 1977), a clear account of our knowledge of stress is essential. It is therefore necessary in a project of this nature to begin by tackling the central problem, that of the nature and definition of stress (Cox, 1986).

CONCEPT OF STRESS AND STRAIN

In reviewing the literature on stress, one is overwhelmed with the proliferation of research on stress over the past few decades. At the same time, one is struck by the controversies about key concepts which abound. An attempt will therefore be made to identify the various approaches to stress research. One of the main reasons for the lack of consensus as to the actual meaning or interpretation of the word arises from the fact that

stress has been viewed as both a dependent (medico-physiological approach) and an independent (engineering approach) variable. After examining these approaches to stress it would be more appropriate to view stress, not as any one of these components, but as the situation-person interaction as suggested by McGrath (1976), Lazarus and Folkman (1984) and Cox and Ferguson (1991).

Selye's 1956 notion of stress as a non-specific response marks the beginning of stress being viewed as a dependent variable, that is, the response to a stressor agent. He proposed the General Adaptation Syndrome (GAS) to explain the body's adaptive reactions to "some demand". Closely associated with this approach is that stress is a physiological state that prepares the organism for action (Levi, 1971). This view is centred around a straightforward response-based definition of stress.

Selye's central focus was on the body's physiological response to stressors, paying less attention to the role of psycho-biological processes. While one acknowledges Selye's pioneering contribution to stress research, more recent research has challenged Selye's notion of non-specificity (Lacey, 1967; Mason, 1975). Mason (1975) for example suggests that there are some noxious physical conditions which do not produce the general adaptation syndrome as proposed by Selye (1956). In addition, Hobfoll (1988) points out that Selye's relative lack of insight into psychological phenomena which accompanies the stress process and his lack of

attention to individual differences that might be products of the psychological process, limit his relevance to current thinking on psychosocial stress.

In contrast, another approach to the study of stress is the stimulus-based model of stress which is based on the engineering analogy. Froehlich (1978) defined stress as that which signifies forces in a given system due to load. Stress is thus defined as an external force exerted which results in a demand or load being placed on the person or some noxious element of the environment which causes deformation or strain. Consistent with this perspective, stress may be tolerated up to a point after which permanent physiological and/or psychological damage is likely to occur as a result of the strain experienced which may exceed the "elastic" limit of man (Cox, 1986; Sutherland and Cooper, 1990). Cherry (1978) points out that this model is useful in distinguishing the external factors (stressors) and the individual's internal reaction, or response to stress, viz strain. The major weakness of this model is that there is no simple way of deciding where the limit of tolerance is or at what point a level becomes stressful (Fisher, 1986).

The same can be said for the straightforward response-based model of stress. Despite a certain popularity, these approaches have been judged to be inadequate, as Cox and Ferguson (1991) point out that, essentially they fail to take account of individual

differences which are so obvious in relation to stress, and the perceptual cognitive processes which underpin such differences. One has to accept some intervening psychological process, viz perception, which mediates the outcome of the stress-strain relationship.

While a mere fusion of the stimulus-based and response-based approaches would appear to be fairly simple, Cox (1986) points out that it would overlook the active role of the person in stressful situation. Thus a comprehensive model of the nature of stress requires a transactional, process-oriented rather than an interactive model (Lazarus, 1966; McGrath, 1970; Cox, 1986; Sutherland and Cooper, 1990).

Central to this perspective is that stress is an individual perceptual phenomena (Lazarus, 1966; Spielberger, 1977; Cox and Mackay, 1985; Sutherland and Cooper, 1990). Lazarus and Folkman (1984) clearly depart from Selye's tradition of a unifold response by all persons. According to this approach, stress is defined as a particular transaction between the person and the environment in which the situation is appraised by the person as taxing his/her well being (Lazarus and Folkman, 1984). Spielberger (1977) pointed out that when an individual appraises a situation as being physically or psychologically dangerous it becomes a threat, while the same event may be experienced as a challenge to another individual. It is therefore apparent that

Borkovec's (1981) simple observation that stress is a subjectively defined event must be taken cognisance of.

It is thus speculated that a state of stress arises when there is an imbalance between perceived demand and perceived ability to meet that demand (Lazarus, 1975; Cox, 1986; Sutherland and Cooper, 1990; Scott, 1992). It is evident that needs, desires, past experience and immediate arousal levels will all influence the way that a demand is perceived (Fisher, 1976).

Whether or not a stressful situation is apparent, a stress response depends not only on how a person interprets that situation but also on the individual's coping skills (Fisher, 1976; Cox, 1985). Furthermore, the individual must believe that the discrepancy between the levels of demand and the person's ability to cope is significant and that the consequences of failure to cope are important to the individual (McGrath, 1970; Sells, 1970). Clearly Welford's (1974) definition of stress reiterates this approach as he defines stress as the resultant imbalance between the demands made on the organism and the individual's capacity to cope with, or adjust to, them.

Cox (1986) defines coping as the homeostatic mechanism that comes into play to reduce psychological imbalance. Successful coping restores balance, but unsuccessful coping culminates in the appearance of symptoms of exposure to stress (Sutherland and

Cooper, 1990). These emotional symptoms are in turn accompanied by changes in the physiological state, and cognitive and behaviourial attempts to reduce the stressful nature of the demand (Cox, 1986). It is apparent that these psycho-physiological changes exhibit the response to stress (Sutherland and Cooper, 1990). These symptoms are normally an indication of anxiety - another somewhat nebulous term discussed in detail later.

It therefore makes sense to distinguish the physiological and behaviourial changes which occur as a result of the perception of situational demands as stressful by using the term 'strain' instead of 'stress response' to prevent confusion with the term 'stress' which is used to denote the external demands imposed on the individual. In this study strain will be used to describe the individual's response to a stressful situation. This may be measured by the heightened arousal, reflected in physiological and behaviourial responses which arise as a result of the perception of excessive demand and uncertainty of being able to cope with the demand(s).

Golberger and Breznitz (1982) suggest that while absence of consensus is the state of the art in stress research, it nevertheless reflects the rapid expansion of stress research in many divergent directions which may be more conducive to future theorizing. The present author, on the other hand contends that

clarifying the existing knowledge related to stress research may be just as instrumental to impending theorizing.

COMPETITIVE STRESS IN YOUTH SPORT

Children's participation in sport has long been considered as an important part of their overall development (Bressan, 1992). Recognising the universal importance of physical activity for the child, researchers have begun to examine the cultural, environmental and personal variables that affect children's participation and performance of physical activities (Gould and Weiss, 1987). Moreover Gould (1993) points out that the effects of competitive stress is one of the most important concerns to be examined by paediatric sport scientists. As a dominant form of physical activity in South African schools is competitive sport, the central focus of the present study will be directed towards understanding the effect of competitive stress on performance, specifically amongst youth sport participants.

Clearly the general concept of imbalance which forms the basis of the transactional model of stress provides a useful framework for the examination of competitive stress in youth sport. A degree of tension is inevitably created by the competitive nature of school sport at inter-school and inter-provincial levels. This is not necessarily harmful, for a moderate level of stress in childhood serves to prepare the individual for the stress she or

he must encounter in adult life (Leary, 1990). However, there is a concern that the increasing professionalization of youth sport has led to an overemphasis on winning at the expense of fun involvement (Orlick and Botterill, 1975). The importance of athletic achievement is evident as one enters most school foyers where the first sight to greet visitors is the trophy case. It is of interest to note that the emphasis placed on athletics in schools was recorded as early as the sixties where athletics was found to be more highly valued by high school students than academic achievement (Coleman, 1961; Coddington, 1972). In South Africa the trend is moving towards increasing supervision of children's sporting programmes by specialists outside the realm of schools. More than a decade ago Peters (1983) voiced a concern about youngsters who are urged to compete for provincial and national colours from a very early age. It is when a 'win-at-all-cost' orientation is imposed on those children who are psychologically unable to cope with the pressures placed upon them that athletic competition becomes stressful. Under these circumstances athletes are likely to experience strain. Thus competitive sport has the potential to be stressful and poses a problem for some players in some situations (Smoll and Smith, 1989; Martens, 1993).

The influence of the peer group in sport exerts itself powerfully and differentially for boys and girls between the ages of 10 and 13 years (Weiss, 1991). She identifies athletic competence as

being clearly related to peer acceptance and popularity for boys, whereas a more general social approval from the peer group seems to be the dominating factor for girls. Nevertheless, the influence of the peer group in both males and females is consistent with most research concerned with the precursors of competitive state anxiety which found the competitive situation to be potentially threatening (Martens **et al.**, 1990). For as Horn and Hasbrook (1987) indicated, a major source of perceived competence is peer comparison particularly during the adolescent age. A common thread throughout this review is that of social approval. It is central to the understanding of the complex competitive process and it will be discussed later as a key component of this process.

It is evident that competitive stress cannot be perceived in a social vacuum. Cultural and family background are very important factors that have to be considered in a school situation. One should be aware of the fact that the geography, history, ideology, culture and psycho-social make-up of a group will influence the degree to which sport itself may be a significant part of society and which sports, in particular, will ultimately be emphasised in schools (Boutilier and San Giovanni, 1992).

'Significant others' may well provide supportive networks, but there is also evidence that they may be a source of distraction and indeed, added and unnecessary, pressure within a competitive

ambience. From a young age children learn that personal worth is largely dependent on high achievement in their sport and the effect of parental perfectionism on the child is emotionally a heavy price to pay (Thornton, 1991). Clearly it is the child's perception of adults' behaviours and expectations which determines whether the child will experience added pressure to perform well.

Whether the child will succumb to the pressures associated with competition depends on a multitude of integrated factors. Weiss (1991) articulates this idea succinctly with her concept of the "wheel of child development". Firstly, the child in sport is influenced and characterized by a number of individual differences; these include factors such as physical (body size; strength), biological (maturity status), psychological (self-esteem, motivation) and social (peer acceptance) developmental areas. Secondly, the child is influenced by a number of contextual factors which include 'significant others' (parents, peers), socio-cultural attributes (gender, race, economic background) and the sports structure (elite level, leisure sport). Finally, the "child development wheel" represents an open system whereby continuous reciprocal interaction can occur between and among individuals and the social context. All these factors combine to distinguish children's responses to sport and contribute to colouring their experience as being positive or negative (Weiss, 1991).

A similar approach to that of Weiss' (1991) will be undertaken in an attempt to understand competitive stress among youth sport participants as the child's vulnerability to stress varies with his/her personality strengths (Ogilvie, 1979) which are in turn influenced by various other factors. In order to assess competitive stress, insight into the competitive situation itself is critical. A review of the intra-personal and situational determinants of stress for youth sport focuses on the sources of stress and on state anxiety experienced prior to, during, and following competition (Scanlan and Passer, 1979; Scanlan and Lewthwaite, 1984).

Martens (1977) views competition as a process consisting of four components - the objective competitive situation (OCS), the subjective competitive situation (SCS), responses and consequences. In a similar vein, competitive stress has been conceptualized as a three stage sequential process involving the competitive demand which is manifested in the OCS, a perceived demand/response discrepancy (threat) and an overt response in the form of state anxiety. As these two processes are inextricably linked they will be discussed simultaneously.

The OCS is the actual environmental demand.

> "It is based on social evaluation and it includes a situation in which the comparison of an individual's performance is made with some standard in the presence of at least one other who is aware of the criterion for comparison and can evaluate the comparison process" (Martens, 1976:p14).

The comparison standard may include one's past performance level, an idealized performance level or another individual's performance (Martens **et al.**, 1990). The implications of these demands to youth sport participants is potentially stressful. Passer (1988) notes that much involvement in the competition process occurs during the age period when the social evaluation process is particularly intense and important. Furthermore, the specific ability being appraised - motor ability - is of central importance to the developing youth (Passer, 1988). Smoll and Smith (1989) include the several features of the external circumstances which may be stressful such as the behaviour of coaches, teammates, opponents and parents, the nature of the task demands on the child and the closeness of the score. They also include the internal demand as part of the actual demand stating that it encompasses desired goals, personal performance standards, memories of similar past situations and anticipation of future consequences. After reviewing all these demands that are considered as important to young athletes, it comes as no surprise that the social evaluation potential in the OCS is contended to be high.

Critical to the stressful situation is the perception of the social evaluation in the OCS which is reflected in the subjective competitive situation (SCS). It is the perceived demand and it includes how the child perceives, accepts and appraises the OCS (Martens **et al.**, 1990). Clearly this is the base from which the

child operates. How the child is inclined to cognitively appraise the situation will determine the nature and intensity of the strain experienced. The perceived pressure from self (intrinsic motivation) and others (extrinsic motivation) to do well places a great burden on the child (Cohn, 1990). The individual who is unable to cope with this critical imbalance experiences strain. Thus strain is found to occur when children perceive the task requirement to be too demanding for their response capabilities (Smoll and Smith, 1989). Scanlan and Passer (1978) refer to this as "perceived threat". Perceived threat will also occur when children consider it crucial to meet the situational demands (Passer, 1982; Smith, 1986; Martens **et al.**, 1990). Lewthwaite (1990) reiterates this conception by adding that the more personally important the goals that are endangered, the greater the perception of threat. Another important factor related to the perception of threat is the uncertainty individuals have about the outcomes of competing. The more uncertain individuals are about being able to meet the demands of the competitive situation, the greater the perception of threat and, in all probability, the strain experienced. The uncertainty of outcome is linked to one's coping resources - a critical factor interceding the SCS (Smith, 1986) which has previously been eluded to. Two factors which Smith (1986) identifies as falling into the category of general coping behaviour and which may influence the amount of strain experienced are worth mentioning -

they are general self-esteem and, if the athlete is a pupil, study skills.

Although various emotional states can serve as indicators of stress, a common emotional state associated with stressful competition is anxiety. Children's anxiety responses to competition seem to be the central focus of youth sport researchers.

State anxiety is the manifestation of perceived threat and it is an immediate and negative affective response, defined as subjective consciously perceived feelings of apprehension and tension, accompanied by, or associated with, the activation of the autonomic nervous system (Spielberger, 1966). Thoughts centred on worry or self-doubt are associated with these negative emotions, and anxiety may manifest itself in negative statements to oneself, as well as physical reactions such as "butterflies in the stomach", shaking and nervous sweating (Passer, 1988). The attentional and physiological changes that may be associated with cognitive appraisal of an anxiety-provoking situation can act as feedback information for the continual appraisal and reappraisal of the external environment and one's performance (Nideffer, 1983; Smith, 1986). The cognitive appraisal of demands, resources and consequences may be said to be in reciprocal relation to physiological and attentional changes that occur.

The SCS is interceded by a number of other factors, such as personality dispositions, motivation and physical abilities which may act as mediators of stress responses to athletic competition (Smoll and Smith, 1989; Martens **et al.**, 1990). Two intra-personal factors, competitive trait anxiety (CTA) and low self-esteem, have been proposed as important mediators (Passer, 1988; Martens **et al.**, 1990; Gould, 1993). Martens (1977) defines CTA as a personality disposition that reflects individual differences in the tendency to perceive threat and to experience strain during competition. By definition, CTA may be seen as the tendency to experience competitive anxiety, i.e. A-state which is commonly assessed by the Sport Competition Anxiety Test (SCAT) proposed by Martens (1977). Seemingly, individuals with high CTA have generally experienced more failure and negative social evaluation in past competitive situations (Scanlan and Passer, 1978; Gould **et al.**, 1983; Brustad and Weiss, 1987). This judgement is not experienced by the child as a statement confined to a single physical attribute but as an inference of his/her total worth, resulting in a low level of self-esteem and, consequently, in a negative self-image (Ogilvie, 1979).

In undertaking a psycho-physiological model of competitive stress an attempt was made to accentuate the relationship between the situation, the individual's cognitive appraisal and personal ability to cope with it, physiological arousal and behavioral responses to the situation (Smoll and Smith, 1989; Martens **et**

al., 1990). It is worthwhile noting that this model may provide the athlete an enhanced occasion for success in so far as the factors influencing performance can be made specific and modifiable. In a similar vein, an eclectic application is needed to fully understand the nature of stress on human performance.

SELF-CONCEPT AND SELF-ESTEEM

There is no doubt that personality and motivational factors influence the degree of stress the child experiences during the competitive situation. One of the most important issues facing youth sport researchers is an understanding of why some children perceive sport competition as potentially threatening to the self. The central construct in relation to this topic is that of the 'self'. The 'self' has been expressed in various forms of hyphenated constructs such as self-concept, self-esteem and self-confidence which has often resulted in conceptual and methodological confusion (Wells and Marwell, 1976). Many researchers have delimited the variables representing personality to that of self-concept (Balugon, 1987).

Self-concept has traditionally been viewed as a description or label that an individual attaches to him- or herself (Weiss, 1987). Burns (1982) refers to this as self-image, whereas Rogers (1965) defined self-concept as an organised configuration of perceptions of the self which are admissible to awareness.

Similarly, Shavelson **et al.** (1976) defined it, generally, as an individual's perception of himself. Furthermore, self-concept is not only a function of processes emanating from within the individual but external factors such as feedback from 'significant others', which is especially prevalent in a youth sport setting, and is of equal importance in the development of the child's self-concept.

Weiss (1987) and later Caruso and Gill (1992) point out that the terms "self-concept" and "self-esteem" are often used interchangeably as it is difficult to describe oneself without experiencing self-evaluations. Self-esteem is considered to be the evaluative and affective facets of one's self-concept (Burns, 1982; Weiss, 1987; Caruso and Gill, 1992). Rosenberg (1965) and Waite **et al.** (1990) add that it is the evaluation of the self especially in terms of competence and worthiness. Clearly self-esteem is an important issue associated with the mental health of children, and Biddle (1993b) reports that it appears to have become the latest educational "buzz word".

Due to the increasing professionalization of youth sport and the frequent opportunity for evaluation of competence in competitive sport, the sport experience can sometimes have a negative effect on a person's self-concept (Coakley, 1982). This is conceptually important to the present study in terms of the relationship

between self-esteem and the performance of youth sport participants across a variety of sports.

Studies of children's self conceptions have tended to focus on self-esteem (Wylie, 1979; Harter, 1983). A number of theories have emerged in an attempt to explain the development of self-esteem. In view of the large number of theories that have developed, this section will be limited to a consideration of the common themes of these theories which have particular relevance for physical activity and sport settings.

Weiss (1987) has identified five common principles emanating from the self-esteem literature. Firstly, self-esteem is the outcome of social interactions. There are two ways in which social interactions have an impact on the development of the child's self-esteem, viz reflected appraisals and social comparison (Weiss, 1987). Reflected appraisals refer to the approval or disapproval of the child's behaviours and performances in the eyes of 'significant others'. In addition, children will compare their standard of performance to those of their peers, which is once again an influence of social interaction on self-esteem. Social comparison processes are especially appropriate when discussing sport and physical activity because competition by its very nature includes the comparison of one's skills relative to others (Scanlan, 1982). The child's dependence on the

reflections of others is well supported by Mead as early as 1934 and as recently by Weiss (1993).

Secondly, and of critical importance to the conceptualization of self-esteem, is the multidimensionality of self-esteem (Weiss, 1987; Biddle, 1993b). Caruso and Gill (1992) point out that the semantic confusion between the constructs of self-concept and self-esteem is not responsible for the lack of progress in self-esteem research. Rather, they emphasize that the inadequate conceptualization of self-esteem as a unidimensional construct is the main problem. This aspect will be discussed in greater depth when reviewing the development of self-report models.

Thirdly, affect seems to be a central aspect in self-esteem development (Rosenberg, 1979; Harter 1981), yet little attention has been paid to the role of affect in self-esteem development (Weiss, 1987). A review of the literature would seem to indicate that the joy which accompanies success, or the disappointment associated with failure, will influence self-esteem development and future motivated behaviour (Scanlan and Passer, 1979; Gould **et al.**, 1983; Scanlan and Lewthwaite, 1984). Scanlan (1984) considers the impact of affect on self-esteem when she describes the stress response as the negative emotional reaction a child feels when his or her self-esteem is threatened. Wankel and Kreisel (1985) found enjoyment to be intrinsically dominant amongst 7 to 14 year old baseball, hockey and soccer players.

Thus enjoyment of the sporting experience appears to be instrumental in the growth of a healthy self-esteem.

A fourth dimension which Weiss (1987) distinguishes is the salience of an activity to the individual which will influence the extent to which success or failure affects one's self-esteem within a particular domain. Sport participation is generally important to most adolescents and therefore success in mastering skills will often play an important role in determining self-concept (Paterson, 1992). However, Weiss (1987) cautions one to be aware of the difference in importance attached to activities by the individual. For example, a child who does not value physical competence as important for being successful will not experience a negative effect on total self-esteem as a consequence of low perceived competence in physical skills (Weiss, 1987). Similarly, Rosenberg (1979) notes that the individual's overall evaluation of self-worth is strongly related to the importance of a specific self-concept component. For example, some children may all display favourable global self-esteems but they may each arise from distinct judgemental criteria such as academics, athletics and music. Thus the construct of salience of a particular achievement domain has great implications for understanding self-concept development of adolescents in the physical activity domain.

Finally, self-esteem is viewed as having a motivational influence on behaviour. There are two basic views in this respect. Firstly, individuals are seen to preserve their already acquired esteem and secondly, individuals are seen to enhance or develop their self-esteem (Weiss, 1987). It has been asserted that the effort displayed by an individual to achieve success will be determined by his or her self-esteem (Bandura, 1977). It would appear that individuals low in self-esteem tend to exert little effort or tend to give up, whereas individuals with high self-esteem seem to persist in their efforts. Thus it may be argued that self-esteem can influence subsequent behaviour substantially.

PERCEIVED COMPETENCE AND SELF-ESTEEM DEVELOPMENT

Perceived competence is delineated as a central construct in most self-concept theories (Shavelson **et al.**, 1976; Harter, 1983; Weiss, 1987). Perceived competence refers to one's domain-specific self-esteem as it relates to the competence dimension of self-esteem (Weiss, 1987).

The dynamics of competence and its relation to self-esteem and achievement was originally expressed by White (1959) in his competence motivation theory. White (1959) believed that individuals are motivated to have an effect on their environment

and to engage in mastery attempts. When these attempts result in a successful performance, the individual experiences an intrinsic pleasure which, in turn, enhances the urge toward competence. Interestingly, Weiss (1987) notes that continued research from a competence motivation theoretical perspective challenges one to uncover further patterns regarding self-esteem and physical achievement in youth sport. Weiss (1987) acknowledges that the link between future achievement and self-esteem is the child's perception of reality regarding what is responsible for his/her successful and unsuccessful endeavours. At present a rather substantial theoretical and empirical base supports the notion that a child's physical self-esteem in the form of perceived competence (ability) is a major determinant of future motivated behaviour in sport (Duda, 1987; Horn and Hasbrook, 1987; Weiss **et al.**, 1990).

SELF-ESTEEM INVENTORY MODELS

A critique of the traditional view of self-esteem which was eluded to earlier will be discussed and the consequent development of the Physical Self-Perception Profile (Fox and Corbin, 1989).

The conceptualization of self-esteem as a unidimensional construct is largely responsible for weak theoretical foundations, methodological shortcomings and subsequent poor quality instrumentation used in the assessment of self-esteem

(Shavelson et al., 1976; Harter, 1983; Sonstroem, 1984). Furthermore, this single focus conceptualization of self-esteem failed to account for differential weightings and relationships among factors contributing to global self-esteem (Caruso and Gill, 1992).

In an attempt to overcome some of the problems inherent in a unidimensional conceptualization of self-esteem, Shavelson and co-authors (1976) casted self-esteem into a multifaceted, hierarchy of dimensions with global self-esteem at its apex. This model features a general construct of self-esteem at the apex, followed by representations of the self in the academic, social, emotional and physical domains. Physical self-concept was further sub-divided into self-concepts of physical ability and physical appearance. Marsh and Shavelson (1985) concluded that the self-concept cannot be adequately understood if its multidimensionality is ignored. Fox and Corbin (1989) point out that this model is attractive as one can infer that activities in different domains may modify global self-esteem. However, they caution that this model is not applicable to the sport and exercise setting as an independent physical self-concept has not been systematically applied to self-perception within the physical domain. Consequently, the main situational contributors to the physical self have not been adequately identified (Fox and Corbin, 1989). These same authors further state that the Tennessee Self-Concept Scale (Fitts, 1965), the Physical

Estimation Scale (Sonstroem, 1976) and the Physical Self-Efficacy Scale (Ryckman **et al.**, 1982) have had similar problems associated with them as unidimensional scales.

In view of these theoretical inadequacies, Fox and Corbin (1989) developed a self-esteem scale, the Physical Self-Perception Profile (PSPP), that would permit the application of recent advances in self-esteem theory to the study of self-perception in the physical domain in a far more rigorous way. They contend that this theory-grounded instrument allows simultaneous measurement of several different sub-domains of the physical self as well as providing a means for identifying important antecedents to the development of self-esteem and consequent factors.

The application of the Physical Self-Perception Profile (PSPP) was deemed appropriate to the present study as it is based on a multidimensional and hierarchical structure of self-concept and assesses self-perceptions in four dimensions of the physical self: sports competence, physical strength, physical condition, body attractiveness, in addition to an overall physical self-worth component. This infusion of interactionism into the self-esteem theory produces a more adequate representation of self-esteem content. It does also, according to Harter (1985) provide a more informative way of plotting change in self-esteem.

It would appear that the PSPP presently offers the most effective insight into how youth sport participants perceive themselves in relation to physical activity due to its situational-specific and multidimensional qualities. In so doing, the use of this model may provide a greater understanding of the relationship between the perception of personal competence in sport, so necessary for the development of self-esteem in a physical setting, and competitive stress which is an inevitable component of the competitive process.

MOTIVATION

It is evident that a person's self-concept will have a motivational influence on behaviour. Thus it could be argued that the two concepts are inextricably linked; particularly when one considers their mediating influence on the degree of stress the child experiences during the competitive situation. When attempting to comprehend why individuals respond differently to the same situations cognisance should be taken of one's motivational structure. It has been well documented that motivation influences and determines the behaviour of an individual in various situations. Of particular relevance to the present study is the effect of motivation on optimal and sustained performance, as well as performance debilitation in competitive youth sport. Specifically, an investigation will be conducted to identify the type of motivational goals which may

influence the degree of competitive stress experienced by the child, and consequently whether it has an enhancing or debilitating effect on performance.

The concept of motivation has often been used synonymously with that of motives. Motives can be described as relatively stable characteristics that induces a person to participate in particular activities (Bakker **et al.**, 1990). For example, the achievement motive or the need to excel is dominant in the domain of sport which is a classic achievement-oriented context (Roberts, 1984). When motives are actualized there is talk of motivation. Closely related to the concept 'motive' are the personal goals that an individual sets and his or her expectation about the actions necessary to achieve these goals (Bakker **et al.**, 1990). Duda (1993a) argues that sport research has indicated that personal goals are a crucial organising principle guiding the child's perception of, and psychological and behavioral responses to, the domain of athletic achievement and thus an investigation into these goals forms a crucial aspect of the present project.

TRADITIONAL THEORIES OF MOTIVATION

Historically, motivation in sport has been investigated from a number of perspectives. Weiner (1992) notes that human motivation has been analyzed from the perspective of "people as machines" (drive theory), personality (some achievement motivation

theories) and social cognition (attribution theories, self-efficacy, achievement goals). According to Weiner (1992) there has been a paradigmatic shift in human motivation research from a drive or instinct perspective to a more social perception and cognitive perspective. Biddle (1993a) found that the most frequently researched topics in motivation and sport were attributions, self-confidence and achievement motivation, which included goal orientations.

The approach adopted in the study of achievement motivation has witnessed a major change in direction. Early research in sport psychology focused on the theoretical perspectives associated with 'need' for achievement and expectancy value theories of Mc Clelland (1961) and Atkinson (1964). In contrast, the work of Maehr and Nicholls (1980) represents a major change of direction in the study of achievement motivation. Contemporary theories reinforce the motivational relevance of goals of action, particularly as they interact with perceptions of ability (Duda, 1993b). The adoption of a goal orientations perspective in recent research is evident (Biddle, 1993a), and it will be the central focus of the following section.

GOAL PERSPECTIVE THEORY OF ACHIEVEMENT MOTIVATION

Roberts (1984) and Duda (1987) have argued for the relevance of Nicholls' conceptualization of a goal perspective theory of achievement motivation to the sport context. This theoretical

framework assumes that there are two predominant goal perspectives operating in achievement settings which relate to how people define success and judge how competent they are at particular activities (Duda, 1993b). In other words goals are important determinants of human action. It is assumed that the achievement goal of the athlete determines whether a person demonstrates motivation in any competitive context (Nicholls, 1984). Nicholls (1984) argued that different goals give rise to different perceptions of success and failure, hence the essential component of this conceptualization is clearly the achievement goal of the individual (Maehr and Nicholls, 1980).

A critical component of Nicholls' theory which has been mentioned is the two major achievement goals, viz ego and task orientation goals. In the case of ego-involved goals, subjective success entails that he or she has shown his or her athletic ability to be superior relative to that of others (Nicholls, 1984; Duda, 1993a). In respect to task-involved goals the subjective experience of improving one's performance results in feelings of competence and perceived success (Nicholls, 1984). Duda (1993b) proposes that goal perspective theory predicts that task involvement will lead to desirable achievement patterns regardless of whether an individual thinks that he or she is competent or incompetent at a particular activity. In contrast, only ego-involved individuals with high perceived ability will tend to perform well. This implies that at least some children

will perceive themselves as incompetent. Duda (1993b) cautions that emphasis on ego-involved goals, even among the currently confident, is hypothesized to lay the basis for consequent achievement-related difficulties, and in all probability stress-related problems.

There is no doubt that evaluation and competition against others is at the heart of most sporting endeavours. As social comparison and inter-personal competition is implicit in competitive sport (Scanlan, 1982), the competitive sport context is especially ego-involving, making Nicholls' (1984) theory especially applicable to the realms of children's sport. Of conceptual importance to the present study is Treasure and co-authors' (1992) results which support the theoretical predictions of goal perspective theory that maladaptive behaviours, cognitions and emotional responses will be revealed when individuals with low perceived ability are placed in an ego-involving situation.

MOTIVATION-RELATED CORRELATES OF GOALS

Nicholls (1984) argues that the goals one tends to prefer vary as a function of cognitive maturation, personal disposition and situational factors. Recent research on the socialization of goal orientations seem to indicate that 'significant others' such as the parent and coach play a substantial role in shaping the goal orientation of the athlete (Duda, 1993a). Once again it is argued that it is perception which determines the outcome of the

experience. Research supporting the position of Nicholls (1984) reveals that task- versus ego-involved goal preference may differ as a function of the athlete's gender, culture and age. This is of importance to the present study, specifically the gender related differences in goal orientation which have been found amongst junior high, senior high and college students (Ewing, 1981, cited in Duda 1993a).

TASK AND EGO ORIENTATION IN SPORT QUESTIONNAIRE (TEOSQ)

The Task and Ego Orientation in Sport Questionnaire was developed by Duda and Nicholls (1992) to assess individual differences in the emphasis placed on task- and ego-involved goal perspectives in sport. Subjects are requested to think of when they have personally felt successful in sport and then indicate their responses to 13 items reflecting task- and ego-involved goals when completing the TEOSQ (Duda, 1993a).

In summary, recent empirical research has provided support for the predicted effect of differences in goal perspectives on performance. This research has suggested that goal perspectives influence the motivational processes of individuals competing in sport activities. In other words, differences in task- and ego-involvement (as a result of varying dispositional orientations or the perceived motivational climate) have a significant impact on how children think and feel while engaged in sports (Duda, 1993b). It is the author's contention that this conceptual

framework of goal perspective theory will lead to a greater understanding of competitive stress in youth sport settings.

PERCEPTION

Because man reacts to the world as he perceives it and not as it really is (Borg, 1970), an investigation into perception is of critical importance to a deeper understanding of the competitive process. Many coaches are now taking cognisance of the fact that there is a need for a greater understanding of the mental and emotional make-up of the athlete in order to enhance performance (Watson, 1984). Williams and Eston (1986) argue that physical performance cannot be viewed as a function of metabolic processes only but involves perceptual and cognitive processes as well. Gamberale (1985) points out that there appears to have been a general neglect of the subjective response when attempting to ascertain the degree of stress experienced by the individual as the individualized perceptual responses have been difficult to define and measure. Nevertheless there is a need to attain some measure of a child's perception of stress imposed by the competitive situation. Indeed, the same sporting competition will in all probability be perceived very differently by different children. Moreover Petrie (1967) suggests that the manner in which humans interpret sensory information, think and feel, is closely linked with personality.

While there is agreement to the uniqueness of an individual's perceptions, man is inclined to aggregate stimuli into more or less similar categories in order to cope with the everchanging barrage of stimuli in his environment (Carroll and Wish, 1974). Cognisance must therefore be taken of the relative significance which individuals attach to the competitive situation. It has been suggested that differences in focus of attention and sensitivity arise as a result of genetic differences as well as the particular developmental history of the individual (Carroll and Wish, 1974). Furthermore it is important to recognise that individual differences such as sex, self-esteem and achievement orientation mediate the frequency and intensity of an individual's response to stress. It was therefore deemed necessary to include such variables in a study of this nature. It is because of idiosyncrasies in these perceptual responses that results of intra- and inter-individual comparisons have been equivocal. This has nevertheless challenged researchers to continue to delve into the elusive element of man's subjective evaluation of situational demands. A question frequently raised, according to Scott (1990), is whether in fact it is possible to objectively quantify subjective states. However she, as well as various other authors (Nideffer, 1976; Martens, 1977) argue that if careful consideration is given to possible impinging factors then an individual's subjective response can be assessed.

Psycho-physical methods have been applied in general studies of perception (Borg, 1978). Borg developed a category scale for Ratings of Perceived Exertion (RPE) (Borg, 1970). This scale was formulated for the purpose of assessing the amount of physical stress experienced by an individual participating in a physically demanding situation. Thus Borg (1970) devised a method to quantify a person's subjective symptoms in response to a physical demand.

Although Borg's scale represents a step forward in developing a tangible method of evaluating psycho-physical judgements of physical demands one must be aware of individuality of perceptual interpretation of environmental demands. As Borg focused exclusively on the physical demands of the task at hand, Scott (1994) deemed it appropriate to develop an assessment tool which would take cognisance of the external demands as well as the internal personal response to those demands when assessing the amount of strain an individual experiences under stressful conditions. The concept behind this is similar to other approaches taken to predict individual differences in anxiety which postulate that individual perception may be more important than an objective assessment of the demands themselves (Martens, 1977; Cox, 1985). Scott (1992) proposed the Perceived Strain Scale (PSS) as a psycho-physical rating scale which offers a tangible means of evaluating the amount of strain perceived by an individual in varying situations.

PERCEIVED STRAIN SCALE (PSS)

Two crucial elements considered in the development of the PSS were the external demands of the task itself and the individual's perception of the ability to cope with these demands, ie the internal response. Hence the PSS may be viewed as a dual component evaluative tool being made up of two rating scales, the one pertaining to the task and the other related to the individual. Scott (1990) emphasises that it is only when these two essential components are viewed in combination that any worthwhile measure of the individual's level of strain experienced will be a valid one. The rating of the task demands **(td)** are reasonably objective and similar for all individuals as the inherent task conditions are external to the performer. In contrast, the rating of personal ability to cope **(pac)** is far more subjective and hence will vary substantially among individuals due to it being influenced by personal factors such as past experiences, performance capabilities and the importance attached to the successful completion of the task (Scott, 1990).

Two scores are attained from the PSS chart presented in Figure 1 (see Chapter III, p83), viz Evaluation of Task Demands (ETD) and an overall Evaluation of Perceived Strain (EPS). They are tangible measures of the amount of strain encountered by the individual in a particular situation. The ETD gives an indication of the athlete's perception of how demanding the situation is and the score may vary from 1-10. The EPS gives an indication of

whether the individual is confident of coping with the task demands (score of greater than 1.0) or if the situation is perceived as demanding and the individual is experiencing a certain amount of strain (score of less than 1.0). Scott (1992) recognises the need for individuals to experience some strain in order to produce superior performance thus the ideal score is unlikely to be 1.0.

The PSS is an objective assessment which quantifies the self-perceived level of strain experienced. As such it allows for intra- and inter-individual comparison which has thus far attested to be elusive (Scott, 1990). Through the repeated use of PSS an awareness of stressful demands prior to performance can be established and by relating these perceptions to the consequent standard of performance, it will enable the individual to develop an awareness of his/her optimal level of strain and by implication an ideal level of arousal, in order that appropriate coping strategies may be used in preparation for the pending match.

PHYSIOLOGICAL PARAMETERS

Although changes accompanying the experience of stress may have both immediate and long-term consequences (Cox, 1988), the focus of this study will be on the immediate or fairly short-term, elastic responses. Cox (1988) pointed out that much of the

response to stress is well within the limits of homeostatic control and as such may not threaten the integrity of the system. However when these limits are exceeded, and the body's equilibrium is threatened by stress, of whatever nature, there is no doubt that profound changes may occur in the physiological processes of the organism as it attempts to cope with the demands placed upon it. Cannon (1929) referred to this process as the "energy mobilising" aspects of the body. Similarly, Weiner (1982) pointed out that under high levels of stress, strain becomes apparent, resulting in physiological deviations from the norm.

As the response to stress is an integrated reaction involving the central and autonomic nervous systems, modern researchers such as Froehlich (1978) and Frankenhaeuser (1991) emphasise the need to take this into account when assessing the resultant processes considered to be related to stress coping mechanisms. Although it is important to take an integrated approach to neural and hormonal responses to stress, the psychological responses to stressful events must not be neglected. It is essential to point out that various authors (Oxendine, 1970; Cox, 1985; Sutherland and Cooper, 1990) all agree that the response to stress includes both physiological and psychological manifestations. While Cox (1985) emphasised that there can be no direct physiological measure of stress due to it (stress) being an individual psychological state, Borg (1978) noted that although the

biological cost for certain psychological activities may not be possible to estimate, all psychological events have corresponding physiological activities. What is evident then is that there is agreement amongst researchers on the concomitant psychological reaction to a physiological response with the latter being more reliably measured.

Traditionally, studies of the physiological response to stress have focused on neuro-endocrinal activity and on electro-physiological measures (Cox, 1985). Pancheri and Benaissa (1978) point out that some of the most frequently studied physiological correlates of emotional arousal are autonomic activity and biochemical changes.

Although Smith **et al.** (1988) argued for a "battery approach" to the assessment of physiological responses to stress, the present author weighed up the potential benefits and disadvantages of assessing possible variables *in field* in comparison to a laboratory setting. It was the author's contention that the benefits of eliciting a 'natural' strain response during the ambience of competition far outweighed the "battery approach" which would have been more appropriate had the study been carried out in a laboratory. Due to the limitations placed upon the author by the nature of match conditions, heart rate was the single physiological variable measured as it was the least evasive to ascertain.

CARDIAC ACTIVITY

The interdependence of the neural and chemical activities in the extrinsic regulation of the heart emphasises the interaction of the autonomic and endocrinal systems, a point which is well documented by McArdle **et al.** (1986), thus making the heart a good monitoring device for the overall activities of the organism. Siddle and Turpin (1980) have reviewed cardiac activity extensively as a psycho-physiological measure. Similarly, Franks (1984) notes cardiovascular variables as one of the components of strain that may be measured. In assessing state anxiety and stress responses among youth sport participants, Passer (1988) mentions physiological recordings as another method of evaluation, including in this category measures of cardiovascular responses, for example, heart rate.

Sharpley **et al.** (1989) refer to the tendency of some individuals to exhibit elevated heart rates beyond that which is required by the motor responses; this being triggered by the stressor, as heart rate reactivity. As early as 1911, Cannon and de la Paz suggested that the use of heart rate was an acceptable objective index of a generalized physiological response. Cannon (1929) used the term "excited blood" to refer to the energy mobilizing aspects of the body. The sympathetic nervous system dominates activity in excessively demanding situations. It initiates the release of neural hormones, collectively termed catecholamines, which results in an acceleration of the heart rate - also known

as tachycardia. These responses originate in the cardiovascular centre of the medulla. Thus the cardiovascular response to stress originates in the activation of the sympatho-adreno-medulla system (van Doornen and van Blockland, 1992). This immediate cardiac response is said to prepare the body's physiological state in order to assist the increased behavioral drive (Siddle and Turpin, 1980). Scott and Candler (1989) put across this idea very simply by pointing out that these neural and hormonal intrinsic factors modify the heart's inherent rhythmicity in response to external demands.

While heart rate is one of the most commonly measured physiological parameters, a cautionary note must be sounded as it is one of the most sensitive responses and as such it is very complex and difficult to separate and identify the main cause behind the excitation or inhibition of the heart rate response. Variations in the individual's emotional state significantly effect cardiovascular responses and make it difficult to obtain "true" values for resting heart rate (McArdle **et al.**, 1986). Similarly, Astrand and Rodahl (1986) point out that although the heart's response to physical work is generally fairly linear in nature, this relationship may vary to a great extent as a result of emotional stress. Emotional factors, nervousness, anxiety and apprehension may even affect the heart rate at rest (de Vries, 1980; Astrand and Rodahl, 1986; McArdle **et al.**, 1986). Strømme and associates (1978) regard this "additional heart rate" as a

useful indicator of psychological activation. In an *in field* investigation Hanson (1967) found that the average heart rate for Little League baseball players before going to bat was 166 $b.min^{-1}$ while the highest recorded heart rate was 204 $b.min^{-1}$. Although critics may argue that there are simply no absolute standards by which to judge how great a physiological response must be to conclude that athletic competition is too stressful for a particular child (Martens, 1978), one must at the same time be aware that this is an example of the effect of anticipatory anxiety which may tend to cause some children to experience impaired performance as well as other immediate and long-term adverse effects from competitive stress.

The importance of the emotional and psychological characteristics of the child would therefore explain why parameters such as heart rate tend to vary at rest from individual to individual and within the same individual from one observation to another under similar circumstances (de Vries, 1980). The reciprocal importance of heart rate as an objective physiological measure is attested to by Scott (1990) who pointed out that no matter how valid qualitative responses as measured by tests such as the PSS may prove to be, it is important to make every effort to support these subjective ratings with more tangible physiological measures such as reference (or base-line) and anticipatory heart rate measures. There is a need to take note of the amount of

elevation prior to participation in a pending event, thereby establishing a recognisable pattern between the individual's perception of strain and personal physiological arousal state under demanding situations (Scott, 1990).

COMPETITIVE STRESS/PERFORMANCE RELATIONSHIP

> "..the relationship between stress and sports performance is an extremely complex one and involves the interaction between the nature of the stressor, the cognitive demands of the task being performed and the psychological characteristics of the individual performing it" (Jones and Hardy, 1989:p41).

The above quote bears testimony to the equivocal research findings concerning the relationship between stress response (experienced as heightened arousal) and performance. The equivocal findings reflect a complex interaction of many and diverse compounding factors of which cognisance should be taken of when addressing the question of level of arousal and standard of performance (Scott, 1990).

The first problem one encounters in the analysis of the arousal-performance question is that the terms arousal, stress and anxiety are often used interchangeably and confused with each other (Oxendine, 1970). He then proceeds to define arousal as one's level of alertness which may be placed on a continuum from deep sleep at the low activation end to excited states at the

high activation end. In contrast, emotions such as fear and joy can both cause an increase in physiological arousal, while fear is associated with a negative affect (ie anxiety) and joy with a positive affect (ie eustress) (Oxendine, 1970). Thus anxiety may be seen as the negative emotional feelings experienced as a result of heightened arousal of the autonomic nervous system (Landers, 1980).

To clarify, it has been established that stress refers to the external demands imposed on the individual. In order to meet these demands the person responds with an increase in arousal level. The same individual will in all probability experience the negative emotional response of state anxiety. Thus the anxiety-performance relationship is mediated by a psychological response (A-state) whereas the arousal-performance relationship is mediated by a physiological response (increase in arousal). In other words when discussing the effects of arousal on performance, cognisance must be taken of the negative emotional feelings which are usually experienced in terms of anxiety.

Martens and his associates (1990) present an extensive review of recent *in field* studies examining the arousal level of sport participants before and during performance, and the consequent performance levels. They strongly emphasise the reciprocity of personality, situational and behavioral factors when addressing this question.

Intra-personal factors which affect performance include personality characteristics, self-esteem, motivation, competitive trait anxiety (CTA) and other individual difference factors such as age, sex, ability and experience. Porat and co-authors (1989) found that female gymnasts who revealed high self-concepts appeared to perform better in competition.

Relevant to the present study is the investigation of goal orientation as a mediator between the relationship of competitive stress and sport performance. A number of researchers have suggested that a focus on ego-involved goals tend to be associated with higher levels of anxiety in the athletic setting (Lewthwaite, 1990; Boyd **et al.**, 1991, cited in Duda, 1993a). Furthermore these same authors found a strong ego-orientation together with a low perceived competence to be linked to higher competitive anxiety among high school football players. In contrast children who are primarily motivated by task-involved goals generally perceive less competitive stress than ego-oriented children. Duda (1993a) suggests that much more research is needed in this area as an abundance of studies have demonstrated that acute and chronic anxiety may well have deleterious effects on optimal performance and continued participation in sport.

Individuals experiencing high CTA tend to perceive greater threat in competitive situations than individuals with low CTA,

consequently they worry more about not performing well and feel that their nervousness more often than not hurts their performance (Scanlan and Passer, 1978; Gould **et al.**, 1983). However, the relationship between CTA and performance remains unclear, and it is important to remember that anxiety relates differently to performance depending on the type of task which will be discussed later (Oxendine, 1970). It is of interest to note that the most critical factor in examining the anxiety-performance relationship seems to be the measurement of performance (Ebbeck and Weiss, 1988; Martens **et al.**, 1990). Contemporary researchers (Burton, 1988; Martens **et al.**, 1990) have found that studies which employ intra-individual performance measures provide a greater level of measurement sensitivity and so enables one to more accurately identify the influence of discrete task demands on performance. This approach will be applied to the present study.

The recent conceptual distinction of state anxiety as a multidimensional construct (Borkovec, 1976; Jones and Hardy, 1989) as opposed to an oversimplified unidimensional notion of anxiety will in all probability lead to a greater understanding and a more precise link between anxiety and performance. According to this view anxiety is seen as consisting of two components, viz cognitive anxiety and somatic anxiety.

In competitive sport, cognitive A-state is most commonly manifested in negative expectations about performance whereas somatic A-state refers to the physiological and affective elements of the anxiety experience that develop directly from autonomic arousal (Martens **et al.**, 1990). Somatic A-state is reflected in such responses as rapid heart rate, shortness of breath, clammy hands, 'butterflies in the stomach' and tense muscles. In other words somatic A-state is physiologically based.

Wine (1980) has collected substantial evidence that cognitive A-state inhibits performance by disrupting attentional process such that individuals become "overconcerned" with the possibility of failure and do not pay sufficient attention to the task at hand. One of the most prevalent views concerning this issue is that proposed by Easterbrook (1959) in which he suggests that the observed effects on performance are due to the effects of arousal upon attentional selectivity. His Cue Utilisation Theory is based on the premise that as arousal increases so attention narrows to a point where relevant areas are shut out, resulting in a sub-optimal execution of performance. Similarly Bird and Horn (1990) pointed out that poor performance during competition as opposed to practice is most commonly associated with a heightened arousal response and, consequently, an increase in mental errors. Hence one can observe the interaction between psychological and physiological responses to excessive demands of a situation imposed upon an individual. Without going into the detail of

Welford's (1974) Information Model Theory, it is evident that if the demands are excessive, for whatever reason(s), there will be disorganisation in the central processing stage with an inappropriate response being selected, consequently resulting in poor performances. In other words, the effects of arousal may impair one's performance by interfering with one's capacity to process information (Landers, 1980).

The most common interpretation of the stress-performance relationship are based upon traditional arousal theories (Jones and Hardy, 1989). Although it is beyond the scope of this project to discuss the validity of the long accepted symmetry of the Inverted-U model of arousal and performance, it is interesting to note that contemporary researchers are criticising the eighty-year old theory for its gross oversimplification (Booth, 1985; Kerr, 1985; Jones and Hardy, 1989; Krane, 1992). Booth (1985) as well as Jones and Hardy (1989) criticise the symmetry of the performance curve which implies that when an individual is "over-stressed", all he/she has to do is lower the stress (or arousal) until peak performance is achieved. These researchers note that this description is extremely unlikely to occur and propose a performance catastrophe curve which indicates:

> "that under low levels of stress and physiological arousal performance should improve as stress increases up to a certain critical threshold. At this point the performer begins to perceive an imbalance between the demands of the situation and his/her capability to match them. Anxiety and performance suddenly and dramatically fails, causing a discontinuity in the graph" (Jones and Hardy, 1989:p46).

It is worth noting that although Martens **et al.** (1990) refer to the anxiety-performance relationship, and Jones and Hardy (1989) review the stress-performance relationship, they both pay attention to the all-important matter of the individual's appraisal of the situation. Martens and associates (1990) recognises this important factor in discussing the subjective evaluation of the objective task demands by the individual. They further argue for an anxiety-performance hypothesis, which has been eluded to earlier, based on the multi-dimensional anxiety theory, and which predicts that cognitively based measures such as cognitive A-state and state self-confidence will show linear relationships with performance, whereas an Inverted-U relationship is hypothesized between physiologically based somatic A-state and performance. The Inverted-U relationship between somatic anxiety and performance is based on previous research with predominantly physiological variables (Klavora, 1978; Sonstroem and Bernado, 1982). Furthermore it has been pointed out that somatic A-state is physiologically based and hence its connection with arousal. In conclusion, it could be argued that one has to examine both the arousal-performance and anxiety-performance relationships of the individual in order to determine how successfully he/she will perform.

CATEGORY OF PHYSICAL ACTIVITY

When considering the effects of competitive stress on performance one needs to consider the nature of the sport. Field studies

conducted by Griffin (1972) and Simon and Martens (1979) indicate that individual sport participants manifest greater A-state than do team sport participants, as the threat of evaluation is maximised and the diffusion of responsibility for errors is minimised when performing alone. Not only do individual sport participants elicit higher A-states but also when the focus is on an individual participating in a team sport such as a key player in the team. No difference was found between contact and non-contact sports (Martens **et al.**, 1990).

The results of a study conducted by Martens and co-authors (1990) indicate that individual sport athletes were significantly higher in somatic A-state than were team sport athletes. As the team sports used in this comparison (volleyball, basketball) seem to demand moderate levels of arousal for optimal performance, whereas the individual sport performers (swimming) seem to need higher arousal levels Martens **et al.** (1990) suggested that the significant differences in somatic anxiety in their investigation may simply reflect the differential arousal demands of the sports chosen rather than meaningful differences between these sport types.

Although it seems as if the trend is for individual sport participants to exhibit greater pre-competitive anxiety due to the greater evaluation potential that exists when performing alone, one cannot ignore Boutilier and San Giovanni's (1992)

observations that team sports, like rugby and hockey, are more "culture-bound", more implanted into society's distinctive historical, geographical, socio-economic and ideological constitution. It is the present author's contention that this may be a significant factor influencing sport performance in South African schools as has been indicated previously by Scott and Swart (1993).

Three variables frequently acknowledged as mediators of the arousal-performance relationship are individual differences, the level of evaluation potential in each situation and task characteristics (Ebbeck and Weiss, 1988). Various authors agree that the level of arousal experienced by an individual is a major contributing factor to subsequent performance (Oxendine, 1970; Ebbeck and Weiss, 1988; Scott, 1992). Oxendine (1970) classified sports skills on the basis of optimum arousal levels required for maximal performance. He argued that optimal performance in gross motor activities involving strength, speed and endurance required high levels of arousal. In contrast in tasks requiring fine motor activities such as coordination and steadiness, low levels of arousal was essential. In reference to task characteristics, Landers and Boutcher (1986) identified task duration and task complexity as two critical variables mediating the relationship between arousal and performance. It was hypothesized that performance in discontinuous tasks, that is tasks that involve a series of separate, relatively short duration performances, is

likely to be more influenced by somatic A-state levels than more continuous tasks required in activities such as hockey, volleyball and squash. However, overall task duration results were equivocal.

Landers and Boutcher (1986) have recently used task complexity as the basis for a model to determine the optimal level of arousal for different sports. They suggested that task complexity consists of three primary factors: a) decision characteristics, b) perceptual characteristics and c) motor response characteristics. They concluded that the more complex the overall task is, the lower the arousal level that is optimal for best performance. This conclusion has been generally acknowledged in the literature (Oxendine, 1970; Cox, 1986). Landers and Boutcher (1986) cite archery and golf as examples of low complex tasks whereas the tasks in the present study (squash, tennis, rugby, and hockey) except athletics are all examples of highly complex tasks. It is interesting to note that the former groups may be considered as representative of closed skills whereas the latter involves open skills. Hence it may be argued that as more cues are available in the open skill environment, this may contribute to the differential arousal requirements for different sports. Although the previously mentioned authors suggested that under or overarousal can inhibit performance at all complexity levels, one can infer that tasks high in complexity have a narrow optimal range. Therefore performance of high complexity tasks are likely

to be impaired by excessive cognitive A-state as it slows or inhibits perceptual processing, decision making and response production (Broadhurst, 1957). In support, Oxendine (1970) proposed that when complex skills are performed under excessive stress, the resultant high level of arousal interferes with fine muscle movement, co-ordination and general concentration. Gould **et al.** (1987) provided support for this line of research by demonstrating that pistol shooting performance was more related to somatic anxiety than cognitive anxiety. Similarly, Jones and Cale (1989) report somatic anxiety to be a potential source of performance variance. What is evident is that somatic and cognitive state anxiety influences performance to a greater or lesser extent depending on the task characteristics.

Two related findings concerning the impact of task demands on the relationship between somatic A-state and performance are of importance. Firstly, in a recent comparison study of sprinters and distance swimmers task complexity rather than task duration predictions were reported (Martens **et al.**, 1990). It is the present author's contention that task duration may be an important factor to be noted in the present study as all the sports investigated differed in duration. Some sports had a fixed duration, eg hockey and rugby, whereas the squash and tennis matches and the athletic events could vary in length. Secondly, research by Martens and his associates (1990) also indicated that sprint and distance swimmers have different types of A-state

problems. Sprinters tend to get too physiologically aroused whereas distance swimmers suffered more from problems of under-arousal (Martens et al., 1990).

Many studies have attempted to delineate the relationship between stress, arousal and performance, however results are varied and sometimes contradictory. These equivocal research findings reflect the complex interaction of diverse compounding factors which should be recognised when attempting to elucidate the relationship of level of arousal and standard of performance. Although these results do not allow any cause-and-effect inferences, it does suggest that some athletes may benefit from techniques designed to help them psyche up for their activity whereas others may benefit from techniques which help them to relax and lower their cognitive and/ somatic A-state. As Oxendine (1970) pointed out, in order to enhance the motor performance of an individual it is critical to understand the optimal level of arousal for each individual in each activity. It is also important that an individual be assisted in obtaining and maintaining an appropriate personal level of arousal, and so be able to restore and then maintain a balance between task demands and the ability to cope (Scott, 1990). For, as Harrison and Feltz (1981) indicated the key to superior performance is contingent, not on the complete dispensation of heightened arousal, but on the ability to maintain arousal at an optimal level without allowing it to become a debilitating element. This

point is reiterated by Ebbeck and Weiss (1988) who suggest that the level of arousal which an athlete experiences is a major contributing element to ensuring performance in terms of the quality of movement as well as the quantity of outcome.

GENDER RELATED DIFFERENCES IN SPORT

The gender of the individual is acknowledged as an important inter-personal factor in competitive sport (Gill, 1988). Gender is sometimes inaccurately confused with biological sex. To clarify, while sex refers to the physical differences of the body which are genetically determined, gender concerns the psychological, social and cultural differences between males and females. As the focus of the present study was concerned with the influence of attitudes towards physical activity, particularly competitive youth sport, it was deemed necessary to use the term gender as opposed to sex in order to distinguish the cultural from the biological.

There seems to be a sparsity in research in reference to potential gender related differences in factors that may influence perception of strain in competition. Furthermore a shortcoming of most of these studies is that researchers have failed to recognise the need to employ both males and females in their studies with the result that these researchers tended to

overgeneralize their results of predominantly male subjects to females (Lirgg, 1991).

The perception of one's ability has been previously mentioned as a mediating variable in achievement settings and a psychological factor affecting athletic performance. Constructs of self-efficacy (Bandura, 1977), perceived competence (Nicholls, 1984; Harter, 1985) and physical self-perception (Fox and Corbin, 1989) have all been proposed as measuring an individual's perception of personal ability. In other words competence has been operationalized in many ways (Feltz, 1988).

Traditionally it has been accepted that female sport participants tend to display less confidence than males, regardless of the method by which it is measured (Maccoby and Jacklin, 1974; Stewart and Corbin, 1988; Lirgg and Feltz, 1989). Bandura (1986) postulates that a lack of confidence decreases the tendency to choose activities in a particular area and this may lead to a decrease in persistence and effort, thus limiting opportunities for improved performance. Lenney (1977) on the other hand suggested that females tend to display less confidence than males in only three situations, ie a) when the task is male-oriented, b) when the situation is competitive or comparative, and c) when feedback is ambiguous. Lirgg (1991) conducted a meta-analysis of studies in this area in an attempt to warrant an acceptance or rejection of Lenney's claims. It was found that the sex-type of

the task appears to be related to gender related differences in confidence within the sporting milieu. The more masculine the task was considered, the greater the difference in confidence between males and females (Lirgg, 1991). This is of particular interest to the present study as competitive sport has long been perceived as an arena for masculine behaviours (Andersen and Williams, 1987). Despite this Lirgg (1991) cautions that the manner in which authors sex-type tasks needs to be addressed before further investigating tasks on the basis of sex-type.

According to Lirgg's meta-analysis, competition does not seem to play a major role in confidence differences between males and females, even when masculine tasks were employed. However, a difference does exist which suggest that females do not experience the same degree of confidence as males (Lirgg,1991). With increasing opportunities for girls in sport one would expect that these differences in confidence would be slowly disappearing, yet this meta-analysis revealed that differences exist which should be further examined. However Lirgg (1991) cautioned that although there appears to be an apparent lack of self-confidence amongst female sport participants, possible biases in research (such as ignoring feminine tasks, employing different confident measures, using sex-typing practices that seem questionable) may be contributing to the appearance of gender related differences.

Gender related differences have been found to be a factor associated with variations in goal orientations (Duda, 1989, Newton and Duda, 1993, White and Duda, 1994). Once again, differences in perceived competence have been pointed out as a critical factor mediating the goal orientations which the child selects (Nicholls, 1984). Consistent with previous research (Gill, 1988; Ewing, 1981, cited in Duda 1993a), males were more ego-oriented in sport than females, who were found to be more task-oriented (Duda, 1989). Reiterating Nicholls' (1984) point of view, Duda (1989) suggests that perhaps these results indicate that male and female high school athletes tend to construe their level of competence and process their success and failure experiences somewhat differently. Thus adolescent males were more likely, than adolescent females, to have competitive orientations and to emphasize winning in sport.

Furthermore, males perceived the major purpose of athletics as being highly competitive and highlight the importance of winning-at-all-costs (Duda, 1989). On the other hand, females accentuated the significance of trying one's best more so than males (Duda, 1989). Marsh and Peart (1988) suggest that females in particular drop out of sporting programmes due in part to the competitive orientation of most of these programmes as it results in feelings of inadequacy toward sports involvement. This seems to support past and present findings that athletic involvement is a major criteria underlying recognition and popularity among adolescent

males only, despite the increased participation of females in competitive sport in Western society (Coleman, 1961; Duda, 1989). Gill (1986) points out that inter-personal competition is the most dominant sport form today, thus low levels of competitiveness may well be a psychological barrier to sport participation.

Studies suggesting gender related differences for expectations of success and failure have provided equivocal results. Crandall (1969) reported boys' expectations of success to be generally higher than that of females. In contrast, Rudisill (1988) found female subjects to have expectations of future success similar to their male counterparts. Furthermore she contends that these results seem to indicate that differences in perceived competence for males and females are changing, with females appearing to be more confident than they have been in the past.

According to Andersen and Williams (1987) gender related differences in expectancies of success or failure may be an important factor in determining competitive anxiety. Competitive anxiety has been found to be directly related to underlying perceptions of self-worth and personal ability in the achievement domain of competitive sport (Martens **et al.**, 1990). Research investigating gender related differences in CTA is equivocal (Martens, 1977; Smith, 1983; Gill, 1986). Martens **et al.** (1990) suggest that these equivocal results may be explained by

accounting for intra-personal factors and differences in socialization, whereas Andersen and Williams (1987) point out that a possible reason for this is that the subjects' competitive sport experience were not assessed. They add that previous research in this area has generally suffered from a lack of employment of social desirability scales. They recommend that future research needs to examine previous competitive history in conjunction with one's sex in order to determine a child's sport competitive anxiety.

Research by Jones and his associates (1991) revealed that different factors predicted cognitive and somatic anxiety and self-confidence in males and females. 'Think win' and 'match importance' were significant predictors of cognitive anxiety and self-confidence for males. In the case of females, cognitive anxiety and self-confidence were predicted by 'perceived readiness' and 'individual importance' (Jones **et al.**, 1991). A possible explanation for the emergence of 'perceived readiness' and 'individual importance' as predictors for females, and not for males, may be attributed to gender related differences in sport orientation and reasons for participation which has been eluded to previously. Gill (1988) suggested that females seem to focus more on personal goals and standards whereas males tend to focus more on inter-personal comparison and winning.

Various explanations have been offered to account for these differences in correlates of competitive stress responses. Traditionally sport has been perceived as an arena for masculine behaviours as the traits required for athletic participation tend to fall into the traditional masculine realm of behaviours (Andersen and Williams, 1987). Similarly, Williams and Best (1982) noted that the traditional view of athletes as strong and assertive is consistent with the stereotypical view of masculinity. Andersen and Williams (1987) thus argue that gender related differences in variables such as competitive anxiety and perceived competence occur because traditional socialization of the sexes has favoured males in terms of preparation for athletic competition in that they are exposed to, and taught, a competitive orientation to life more so than females.

"Fear of success" has been suggested as an additional factor to be considered in reference to the behaviour of women in competitive achievement situations (Horner, 1968, cited in Rudisill, 1988). This term has been described as the personality trait women tend to have when they experience the motive 'to avoid success'. She further suggested that females experience this motive especially during competitive achievement situations as they are typically viewed as masculine in nature. Negative consequences such as the threat of social rejection and loss of femininity are also thought to be associated with the anticipation of success in achievement settings (Horner, 1968,

cited in Rudisill, 1988). Rudisill (1988) however, argues that this "fear of success" is not as evident today as it was twenty years ago. Perhaps the increased exposure of women to sport has influenced women's psychological processes, and directly influencing achievement motivation.

It is evident that definition and measurement problems complicate the interpretation of results pertaining to the relationship between girls' involvement in sport and their self-concept, leading to equivocal research findings (Marsh and Peart, 1988). Most reports are consonant with the assumption that sports are generally seen as masculine endeavours and are customarily considered important for males, yet increasing numbers of girls are becoming involved in competitive youth sport. It does seem however that the basis of these differences are related to the way individuals encode and organise information about the self and the world in terms of the culture's definition of masculinity and femininity (Andersen and Williams, 1987). On the basis of this review it is the present author's contention that a current re-examination of gender related differences in correlates of competitive stress amongst youth sport participants is required.

In summary, numerous factors which may influence the responses of youth sport participants to competitive stress have been highlighted. Consequently, it was the author's contention that the approach in examining competitive stress should be an integrated analysis of physiological, perceptual and performance responses under competitive conditions.

CHAPTER III

METHOD

SUBJECT CHARACTERISTICS

First team male and female youth sports participants involved in team and individual sports were required for the project. Consequently, the competitive demands were similar and all *in field* testing was conducted at inter-school competitions.

RESEARCH PROTOCOL

INFORMED CONSENT AND SUBJECT CONSENT FORM

An initial letter and information sheet (Appendix A) was sent to the Headteacher of various schools informing them of the purpose of the study. A general outline of the requirements of the subjects was given as well as details of the data to be collected during testing sessions.

The letter was followed up with a personal meeting with each of the Headteachers to provide them with additional information with respect to the project, and to answer any queries they may have had. The Headteachers were assured that the schools' and the subjects' anonymity would be preserved and that the subjects would be free to withdraw at any stage.

As the subjects for the study were minors, the Headteachers were requested to sign the informed consent form (Appendix A) on behalf of the pupils, once they had agreed to the pupils' of their respective schools participation in the research project.

PILOT TESTING

The battery of tests, both psychological and physiological, except for the Task and Ego Orientation in Sport Questionnaire (TEOSQ) and the Physical Self-Perception Profile (PSPP) were used by the present author in a previous study (Scott and Swart, 1993) and this served as the pilot study for the present study. In order to establish the appropriate protocol for the administering of the PSPP and TEOSQ, a pilot study using these two questionnaires was conducted to a group of undergraduate students. It was found to be easily administered and understood by all. Thus the author was familiar with the testing procedures and equipment, consequently ensuring that data were collected reliably and consistently.

PSYCHOLOGICAL INDICES

Given the near infinite complexity of the human mind, Scott (1990) proposed that when making an attempt to comprehend why individuals respond differently to the same situation cognizance should be taken of each person's psychological make-up. Likewise Williams and Eston (1986) point out that when undertaking and completing a physical task, in this case competitive sport, it

may be as much a function of how one feels and how hard one perceives the task to be, rather than just its energy requirements. It was therefore deemed necessary to employ four psychological evaluative tools in an attempt to quantify the psychological make-up of the subjects and their responses to competitive stress.

The four scales were:

1) Sport Competition Anxiety Test [SCAT] (Martens,1977).
2) Task and Ego Orientation in Sport Questionnaire [TEOSQ] (Duda and Nicholls, 1992).
3) The Physical Self-Perception Profile [PSPP] (Fox and Corbin, 1989).
4) Perceived Strain Scale [PSS] (Scott, 1992).

1) Sport Competition Anxiety Test [SCAT] (Martens, 1977)

Children's anxiety responses to competition seems to be the central focus of youth sport researchers. Martens (1977) developed the SCAT to measure trait anxiety which is specific to the competitive sports situation. Competitive trait anxiety (CTA) is a personality disposition that reveals the propensity to perceive competitive situations as threatening to self-esteem (Martens, 1977; Scanlan, 1984). SCAT has been used extensively in youth sport research as an instrument to assess individual differences in CTA (Scanlan and Passer, 1978; Martens **et al.**, 1990; Martens, 1993).

There are no time limits to administering SCAT and it generally took not more than five minutes for the completion of the test.

The SCAT was administered standardly as the Illinois Competitive Questionnaire (Appendix B) for adults in order to minimise socially desirable answers. It was deemed appropriate to use the adult form of the questionnaire as opposed to the child's form as the majority of subjects were senior pupils. This questionnaire consists of 15 items. It was important to ensure that the subjects respond to how they generally feel in competitive sport situations. As suggested by Martens **et al.** (1990), the anti-social desirability instructions were standardly applied when administering the inventory to minimise distortion. No information concerning the purpose of the inventory was given and an effort was made to ensure that the instructions were completely understood, and that responses were a true reflection of the individual.

2) Task and Ego Orientation in Sport Questionnaire [TEOSQ]

(Duda and Nicholls, 1992)

Biddle (1993a) acknowledges that there has been a major change in direction in the study of achievement motivation, with the focus on goal orientations within the athletic domain. Duda (1993a) argues that sport research has indicated that personal goals play a mediating role in the child's perception of competitive stress and sport performance. The TEOSQ (Appendix B) is an instrument developed by Duda and Nicholls (1992) to assess individual differences in the emphasis placed on task- and ego-involved goal perspectives in the athletic domain. Recent empirical research

has indicated that a focus on ego-involved goals tend to be associated with higher levels of anxiety in the athletic setting (Lewthwaite, 1990; Duda **et al.**, 1992).

The TEOSQ consists of two orthogonal scales which has been found to possess strong psychometric properties in studies of American youth (Duda, 1993b). Further support for this instrument has been accrued in research on British (Duda **et al.**, 1992) and German (Rethorst and Duda, 1993) children and adolescents.

The individuals' proneness toward task and ego involvement was assessed using the 13-item questionnaire. When completing the questionnaire, subjects are requested to think of when they have personally felt successful in sport, then indicate their agreement (on a 5 point Likert-type scale; 1 = strongly disagree, 5 = strongly agree) with the items reflecting task-involved (eg I learn a new skill by trying hard) and ego-involved (eg I can do better than my friends) criteria. A mean score was calculated for the task and ego orientation sub-scales with a low score of 1 and a high score of 5. Brief instructions were given to subjects before administering the test in order to ensure that responses were a true reflection of the individual. It generally took no longer than 5 minutes to complete the questionnaire.

3) The Physical Self-Perception Profile [PSPP] (Fox and Corbin, 1989)

Coakley (1987) cautions that the competitive sport experience can sometimes have a negative effect on a person's self-concept due to the frequent opportunity for evaluation of one's competence in the competitive sport arena. *In field* studies conducted in children's sport settings have operationalized self-esteem as a domain-specific measure of perceived physical competence (Weiss **et al.**, 1990). Fox and Corbin (1989) point out that the PSPP appears suitable to investigate the origins and mechanisms involved in the emergence of gender related differences in self-perception in the physical domain. It has also been shown to be sensitive to a wide of individual differences. Sonstroem **et al.** (1992) note that Fox and Corbin's (1989) Physical Self-Perception Profile represents the most complete analysis of perceived competence to date.

The PSPP is an instrument used to measure the perceptions of the physical self. It provides a multidimensional representation of an individual's self-rating along four salient sub-scales within the physical domain. The four specific physical self sub-domains are: perceived sport competence (*Sport*); attractiveness of figure/ physique (*Body*); physical strength and musculature (*Strength*); and physical conditioning and exercise (*Condition*). In addition to these four sub-domain sub-scales, a fifth sub-scale represents a global measure of physical self-worth (*PSW*).

Within this sub-scale items are included which avoid reference to any sub-domain content but reflect feelings of pride, respect and satisfaction with the physical self.

The PSPP consists of five 6-item sub-scales (Appendix B), with item scoring ranging from 1 to 4. As each scale is composed of 6 items, scale scores can range from 6 to 24. Items from each of the sub-domains are placed in sequence within the complete profile. A four-choice structure item alternative is used in order to avoid socially desirable responses (Fox, 1990). Subjects are presented with two contrasting descriptions of people (eg people with unattractive bodies vs people with attractive bodies) and are asked which description is most like themselves and whether the description they select is "sort of true" or "really true" for them.

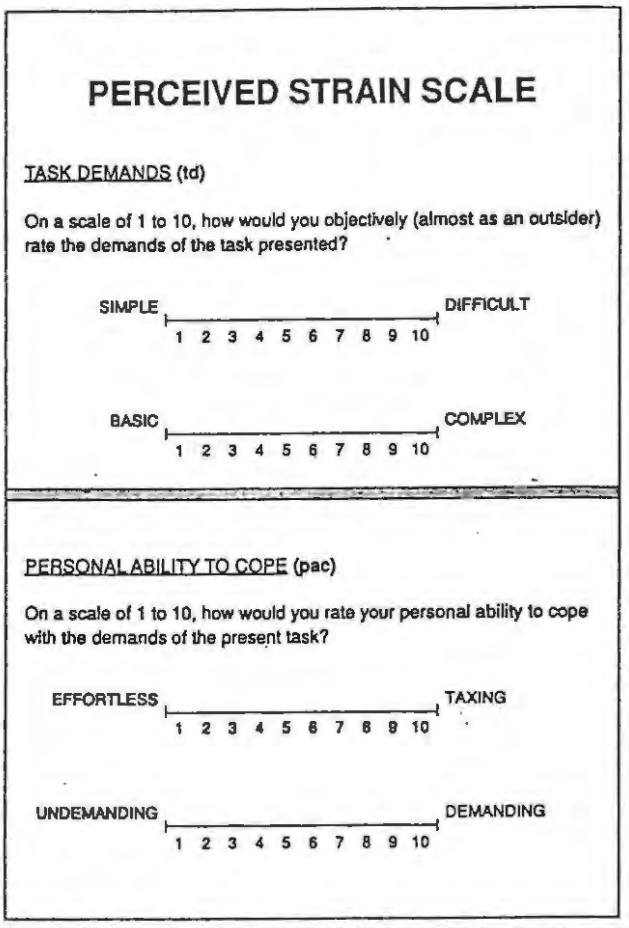
The instrument has been designed for ease of administration, with brief but precise instructions on how to complete the questionnaire to be found at the start of the instrument. In order to ensure that subjects did not make the error of checking a box on both sides of each set of statements, instructions were read out to the group as a whole. It generally took not more than twenty minutes for the completion of the questionnaire.

4) Perceived Strain Scale [PSS] (Scott, 1992)

Various authors postulate that individual perception may be more important than an objective assessment of the demands themselves when attempting to predict differences in the response to stressful demands. In order to attain some measure of a child's perception of stress imposed by the competitive situation, Scott (1992) proposed the Perceived Strain Scale which may be used to quantify the perceptual response to competitive stress. In other words it is a measuring tool designed to obtain an objective measure of how the individual subjectively perceives him/herself to be capable of coping with the demands of the task. In a previous study by Scott and Swart (1993) South African youth sport participants tended to perceive more strain when competing in team sports compared to their performance in individual sports.

PSS consists of different ratings on two sub-sections, one focusing on the task and the other on the individual, with both having numerical values from 1 to 10 (see Figure 1A). Subjects were asked to give an overall assessment of the pending match immediately prior to participating in the competition.

A



B

$$ETD = \frac{[td_1 + td_2}{2} + pac_1 + pac_2] \div 3$$

$$EPS = \frac{[td_1 + td_2}{2} \div \frac{pac_1 + pac_2]}{2}$$

Legend
- td_1 = 1st rating of task demands
- td_2 = 2nd rating of task demands
- pac_1 = 1st rating of perceived ability to cope
- pac_2 = 2nd rating of perceived ability to cope
- ETD = Evaluation of task demands (represented numerically 1.0 - 10.0)
- EPS = Evaluation of Perceived Strain (represented numerically < > 1.00)

FIGURE 1: (A) Perceived Strain Scale; (B) Formulae used to calculate Evaluation of Task Demands (ETD) and Evaluation of Perceived Strain (EPS).

The first rating, task demands **(td)**, comprised of the subject's objective rating of the perceived difficulty of the task.In this sub-section of the scale, the first axis ranged from 1 (simple) to 10 (difficult); the second axis ranged from 1 (basic) to 10 (complex). In the present study, the task was the pending league match or athletic event. For individual sport participants the demands of the task was the pending squash or tennis match or athletic event, whereas hockey or rugby served as the demands of the task for team sport participants. Although hockey and rugby are team games the emphasis was specifically on the individual's perception of the demands of the match at hand.

The second rating, personal ability to cope **(pac)**, comprised the subject's rating of what he/she perceived his/her personal ability to achieve the task in question. In this sub-section of the scale the first axis ranged from 1 (effortless) to 10 (taxing); the second axis ranged from 1 (undemanding) to 10 (demanding). Here again the task being rated was the pending match; and again in the team matches the emphasis was on the individual's ability to cope and not on the team's ability.

To calculate the overall measure of the subject's Evaluation of Task Demands (ETD) and the overall Evaluation of Perceived Strain (EPS), the ratings for task demands (td) and the ratings of personal ability to cope **(pac)** were substituted into the formulae presented in Figure 1B.

These two evaluations enabled one to obtain single measures of the individual's perception of the match and also the amount of strain experienced by the subjects prior to competition. The PSS is therefore a simple and useful measuring tool which will assist in the attainment of the optimal level of arousal for each individual in varying situations. PSS has purposefully been designed for ease of administration, demanding little time of the user or administrator.

PHYSIOLOGICAL INDICES

Heart Rate

Cardiac activity has been used extensively as a psychophysiological measure (Siddle and Turpin, 1980). In an *in field* investigation in the youth sport setting Hanson (1967) found heart rate to be a reliable means of measuring the degree of emotional strain on individuals. Furthermore based on Strømme and co-authors (1978) "additional" heart rate methodology, Turner (1989) suggests that change in heart rate readings may provide a good approximation of "additional" heart rate values.

Treiber and associates (1989) advocate the use of a portable heart rate monitor for *in field* assessment as ECG telemetry and Holter monitoring devices are not feasible due to cost and complexity of the operation. They add that the latter is especially problematic for children, who are not likely to

tolerate wearing obtrusive monitoring devices. Research has indicated that the Sport Tester (Polar Electrode OY, Finland), which is a similar heart monitoring device as the one used in the present study (Uniq Heart watch, Polar Electrode OY, Finland), provides valid readings of children's heart rates across a wide range of exercise including upper- and lower-body movements (Treiber **et al.**, 1989; Armstrong and Bray, 1991).

In addition to its validity, the Sport Tester has other benefits that makes it practical for field use. Treiber and associates (1989) found that the Sport Tester was less likely to lose heart rate due to malfunctioning (such as electrode detachment due to sweating and/ body movement) compared to the ECG event recorder during *in field* testing. Relevant to the present study is the fact that the Sport Tester was readily tolerated by children, and many reported that they enjoyed observing the continuous display of their heart rate on the receiver. Furthermore, Treiber and co-authors note that the inter-face and software package produced by Polar Electrode is an efficient means of inputting the heart rate data into a computer for analysis. The software package also provides printouts and a graph of heart rate as a function of time. It has thus been found to be a practical, non-intrusive and inexpensive means of accurately assessing heart rate in children across a number of settings with many types of physical exercise (Treiber **et al.**, 1989; Armstrong and Bray, 1991).

Heart rate was measured by means of a telemetric Uniq heart-watch which is a wireless portable heart rate monitor. It consists of a transmitter with electrodes; and a receiver/microcomputer, which is worn as a watch. The transmitter is attached to the electrode strap which was placed around the subject's chest at the level of the inferior border of the pectoralis major muscle. The 'watch' which was attached to the subject's arm for 30 minutes prior to the match, displayed the subject's heart rate in beats per minute.

The following heart rate measures were recorded: *reference* heart rate, *initial* heart rate, *average* heart rate, *highest* heart rate and *anticipatory* heart rate. *Reference* or *base-line* heart rate was established during the first data collection session. Because of normal variability in resting heart rate, Durant and associates (1992) suggest that three measures of resting heart rate are needed to achieve a reliability of > 0.90. On this basis three *reference* heart rate recordings were taken, and the mean was used in the analyses. All other heart rate measures were established at the site where the activity took place and were collected as close as possible to the subject's actually participating in the practice or league game. As the preparation times varied for different sports one had to standardize the amount of time for heart rate recordings prior to the pending match or athletic event. *Initial* heart rate was recorded immediately upon attachment of the heart-watch to the subject.

Average and *highest* heart rates were monitored during the preparation build-up prior to the match, ie during the warm-up session. *Anticipatory* heart rate was measured immediately before subjects went on to the field or court for the actual match. As the physical warm-up of the rugby and hockey players, and the athletes lasted approximately 30 minutes whereas the squash and tennis players' warm-up generally took about 15 minutes, heart rate recordings were limited to these times respectively. The data collected on the heart-watch were then taken to the laboratory for further computer analysis.

A printout of the subject's pulse rate curve and pulse listing was obtained from the data collected on the heart-watch (Appendix C). *Initial, average* and *anticipatory* heart rate responses were obtained from the pulse rate curve. *Highest* heart rate measures were obtained from the pulse rate listing.

PERFORMANCE RATING

Ebbeck and Weiss (1988) point out that the measurement of performance is critical to the understanding of the relationship between stress and performance. Although it is well reported that win-loss outcome affects an individual's perception of his/her performance, it was deemed appropriate to use a Performance Rating Scale which employs intra-individual measures, thus providing a greater level of measurement sensitivity. This enables one to more accurately predict the influence of discrete

task demands on performance (Burton, 1988). For example the hockey or rugby team may have lost the match but an individual player may have played exceptionally well.

The actual match result was recorded as well as a performance rating for match performance. An examination of the results in terms of win-loss outcome were completed on the following basis: win = 3, draw = 2, and a loss = 0. In order to obtain a measure of the subject's standard of performance immediately after the game both coach and player were required to give two ratings on the subject's standard of performance. The first rating was a rating of performance on a scale from 1 - 5 where 1 = very poor and 5 = very good. The second rating was a rating of the player's expectations of his/her performance, which was either as expected or above or below their expectations for a particular match (see Appendix B). In an attempt to quantify the expected performance the following scoring method was used: 'well below expectations' = 1, 'below expectations' = 2, 'as expected' = 3, 'above expectations' =4 and 'well above expectations' = 5.

PROCEDURE (TESTING PROTOCOL)

There were five testing sessions. During the first testing session subjects were given a brief verbal explanation of the objectives of the research project. As the subjects were minors they read the informed consent information sheet which was then

signed by their respective Headteachers. General demographic data and base-line data were collected during the first testing session.

The general demographic data included the name, age, sex, race, sport and standard of performance of each subject. The base-line data comprised of SCAT, TEOSQ and PSPP. Instructions were given with regard to the above-mentioned tests (Appendix B). The principles of the PSS and the Performance Rating Scale were explained to subjects (Appendix B). A *reference* heart rate was obtained while the subjects were filling out the various forms. The first session took approximately one hour.

The next four sessions occurred *in field*. Landers (1985) suggests that in order to gain a better understanding of the psychophysiological parameters involved in sport performance, actual sport performance rather than laboratory analogues to real-life sport activities should be examined. Furthermore Duda (1993a) acknowledges the void of field work in youth sport research and recommends that more field studies are warranted to determine the effects of stress on performance in real life contexts. The present author deemed an *in field* study as more beneficial compared to a laboratory investigation as intra-personal and environmental variables in the naturalistic youth sport field setting could be investigated.

The first *in field* session comprised of a practice session in order to establish baseline norms, to enable comparisons to be made between base-line responses and the responses assessed under the stressful demands of competition. Inter-school matches of a highly competitive ambience were selected for the next three sessions. Pre-match and post-match data were collected for each match. Pre-match data included the physiological (the various heart rate measures) and perceptual (PSS) parameters. The heart-watch was put on subjects before the warm-up. *Initial* heart rate was recorded immediately the heart-watches were attached to subjects. *Average* and *highest* heart rates were recorded during the warm-up session, while *anticipatory* heart rate and PSS measures were obtained within minutes prior to the pending match. The overall time during which heart rate measures were recorded before participation in the match was 30 minutes for rugby and hockey players and athletes, and 15 minutes for squash and tennis players. The administration of PSS took approximately two minutes.

After the game the actual match result was recorded. However as there was no control over the opposition, (the opposition may have been strong or weak, or an 'old rival' and this would in all probability have influenced the amount of strain perceived for a particular match) the standard of performance was ascertained by means of a performance rating scale whereby participants themselves, and their respective coaches, rated the standard of

performance, irrespective of the outcome of the match. The standard of performance was rated immediately after the completion of the match on hand, and took approximately two minutes.

STATISTICAL ANALYSIS

Basic descriptive statistics were concluded to acquire general demographic data on the group as a whole, as well as separate male and female groups and team and individual groups.

Two-factor analysis of variance (Ferguson, 1981) was used to test the null hypotheses, that there were no differences between the sexes (Factor A) or between the type of sports (Factor B) for each of the physiological, perceptual and performance parameters under investigation. Tukey's post hoc analyses were run to identify specific areas of differences.

Two-factor analysis of variance was then used to evaluate the responses across the practice and match conditions. The three matches were analyzed separately due to players competing in matches of varying standards. It is the author's contention that the results would in all probability be masked if the matches had been pooled together, especially since some of the rugby players participated in less significant matches.

A "STATSGRAPHICS" computer package (Plus *Ware Product, STSC) was used to carry out all statistical analyses and examples of print-outs are presented in Appendix C.

STATISTICAL CONFIDENCE LEVEL

The 0.05 level of probability was employed throughout the statistical treatments in this study to test the significance of differences and relationships within data collected. The probability of rejecting the true hypotheses was set at 0.05. Thus there were five chances out of a hundred that a Type 1 error could be committed. Due to there being so many possible impinging factors in a project of this nature the level of significance was set at 0.05 as the probability of committing a Type 2 error is lower at this level than at a higher level of confidence.

CHAPTER IV

RESULTS AND DISCUSSION

The major objective of this study was to examine the relationship between the stressful demands of competitive sport on school children in relation to the nature of the sport. A further objective was to identify possible gender related differences associated with these responses. A holistic model, evaluating physiological, psychological and perceptual parameters of school athletes participating in premier team and individual sports was used in an attempt to investigate the aforementioned relationships.

The data are organised and presented in two main sections: General descriptive data of subject characteristics and their psychological profiles, followed by detailed *in field* physiological, perceptual and performance responses; the ensuing discussion attempts to integrate the findings of this project. A further *in field* investigation was conducted to analyze possible changes in these responses between a practice session and competitive matches on youth sport participants.

GENERAL DESCRIPTIVE DATA

SUBJECT CHARACTERISTICS

Forty subjects participated in the study, of which 22 were males and 18 were females. The subjects were recruited from five schools in the Eastern Cape region. The premier team and individual sports identified by the schools were rugby, hockey, squash, tennis and athletics. The eleven team participants all participated in either rugby (males) or hockey (females), whereas individual participants were involved in various sports. Eight males participated in squash, while two played tennis and one took part in athletics. Amongst the female individual athletes, six participated in squash, two played tennis and three competed in athletics. The male subjects participated in either a team or individual sport in comparison to some female subjects who competed in both team and individual sports. One female subject participated in hockey and athletics, another competed in hockey and squash, while a third female subject participated in hockey, tennis and squash.

Subject selection was based on an individual's level of participation in premier school sports, therefore those subjects who were participants at school First team and preferably provincial level were selected. In the present sample all the subjects were First team sport participants, with 24 being provincial representatives. Ten of the provincial representatives

were males and 14 of them were females. Three of the males represented their respective provinces in rugby (two subjects represented Eastern Province and one subject represented Border), while seven of the male subjects represented their respective provinces in squash (three subjects represented Eastern Province and four subject were Border representatives). Six of the female subjects represented Eastern Province in hockey and four represented Eastern Province in squash, one of whom represented Eastern Province in both hockey and squash. Another female subject represented Eastern Province in both hockey and athletics.

For ease of reference subjects were divided into four groups designated as follows: male subjects (*M*), female subjects (*F*), team sport participants (*T*) and individual sport participants (*I*). These groups were further sub-divided into *male team* participants (*MT*), *male individual* participants (*MI*), *female team* participants (*FT*) and *female individual* participants (*FI*).

All subjects participated in other sports on a regular basis, with cricket, swimming and hockey being cited most frequently for the male subjects. The females cited swimming most frequently, while the *FT* group also participated regularly in tennis and athletics. The average number of hours of 'physical' involvement in the main sport by the *M* group was 5.8 $h.wk^{-1}$ in comparison to

5.7 $h.wk^{-1}$ by the *F* group. All team participants appeared to have a greater 'physical' commitment to the main sport (6.5 $h.wk^{-1}$) in relation to 4.9 $h.wk^{-1}$ involvement by those involved in individual sports. The *MT* group had the greatest 'physical' commitment to rugby (6.8 $h.wk^{-1}$) in comparison to the 4.8 $h.wk^{-1}$ involvement of the *MI* group. The overall female commitment to the main sport was in fact similar for both team and individual sports. The average number of hours of 'physical' hockey commitment was 6.3 $h.wk^{-1}$ while the average number of hours of individual sport commitment was 6.0 $h.wk^{-1}$. The number of hours spent at the main sport varied between 2 - 8 $h.wk^{-1}$ for the *M* group while 'physical' commitment to the main sport by the *F* ranged between 4 - 7.5 $h.wk^{-1}$. Commitment to the main sport by the *T* group varied between 5 - 8 $h.wk^{-1}$ in comparison to the 2 - 7 $h.wk^{-1}$ range presented by the *I* group.

The mean age of the sample was 16.9 years (SD 0.9); the youngest being 15 years and the oldest 19 years. The mean age of the *M* group was 17.3 years (SD 0.9) whereas the mean age of the *F* group was 16.6 years (SD 0.7). The mean age of the *T* group was 17.2 years (SD 0.9) in comparison to the mean age of the *I* group which was 16.6 years (SD 0.8). The *MT* group represented the oldest group ($\bar{X}$ 17.7 years, SD 0.9) while the *FI* group depicted the youngest group ($\bar{X}$ 16.4 years, SD 0.8).

From these data it is evident that the male participants were older than their female counterparts in general. Furthermore the *T* group was older than the *I* group, with the *MT* group being significantly older than the *FT* and *FI* groups.

The average educational standard of schooling for the males was Standard 10, with four of the subjects being Postmatrics. The mean educational standard for the females was Standard 9. The mean educational standard for the *T* group was 9.7 (SD 0.6), while the *I's* group mean was nominally lower at 9.5 (SD 0.8). The *MT* group and the *MI* group depicted the smallest ranges, with subjects' educational standard varying from Standard 9 to Postmatric. In contrast to this the range of the educational standard for the female group was from Standard 7 to Matric. The *FT* group presented a range from Standard 8 to Matric, and the *FI* group ranged from Standard 7 to Matric. Once again it is evident that the *MT* group represented the oldest group. A summary of the relevant subject data is presented in Table I.

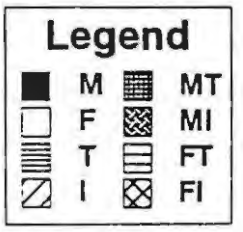
Reference Heart Rate

Mention has already been made of the fact that it has been generally accepted that the strain experienced in a stressful situation will manifest itself in physiological parameters such as an elevated heart rate. Thus it was deemed appropriate to attain a base-line heart rate measure; the parameter used being *reference* heart rate, as a true 'resting' heart rate was clearly

LEGEND

The following abbreviations of the various groups under investigation are used through the text, tables and figures.

M = Male subjects
F = Female subjects
T = Team sport participants
I = Individual sport participants
MT = Male team participants
MI = Male individual participants
FT = Female team participants
FI = Female individual participants



Antic = Anticipatory heart rate ($b.min^{-1}$)

TABLE I: Subject characteristics: means and standard deviations for all groups.

GROUP	AGE (years)	MAIN SPORT ($h.wk^{-1}$)	SCHOOL STANDARD	REFERENCE HR ($b.min^{-1}$)
M	17.3 (0.9)	5.8 (3.2)	9.8 (0.5)	71.7 (4.4)
F	16.6 (0.7)	5.7 (3.8)	9.4 (0.8)	68.7 (11.2)
T	17.2 (0.9)	6.5 (1.8)	9.7 (0.6)	70.2 (9.2)
I	16.6 (0.8)	4.9 (0.9)	9.5 (0.8)	70.2 (7.7)
MT	17.7 (0.9)	6.8 (1.8)	9.7 (0.5)	73.5 (4.8)
MI	16.8 (0.8)	4.8 (4.6)	9.9 (0.5)	69.9 (3.3)
FT	16.7 (0.5)	6.3 (3.9)	9.6 (0.7)	66.9 (11.8)
FI	16.4 (0.8)	6.0 (3.8)	9.2 (0.9)	70.5 (10.8)

BAR indicates a significant difference at $p < 0.05$

The female team participants had nominally lower heart rates ($\bar{X}$ 66.9 b.min^{-1}, SD 11.2) than their individual counterparts ($\bar{X}$ 70.5 b.min^{-1}, SD 10.8). The reverse trend was observed for the males. The results are presented in Table I. The *MT* group had a significantly higher heart rate ($\bar{X}$ 73.5 b.min^{-1}, SD 4.8) than the *MI* group ($\bar{X}$ 69.9 b.min^{-1}, SD 3.3). It is of interest to note that this physiological trend is reflected in the subjects' attitudinal responses to the *Condition* sub-scale of the PSPP - a point discussed in more detail later. The *FT* group scored significantly higher on the *Condition* sub-scale compared to the *MT* group; and they recorded significantly lower heart rates than their male counterparts. Furthermore the *MI* and *MT* groups showed a similar trend, with the *MI* group scored nominally higher than the *MT* group on the *Condition* sub-scale. Thus it appears that the females in the present study, irrespective of the type of sport they participate in, appeared to be in a better physical condition than the male subjects.

PSYCHOLOGICAL PROFILE

A battery of psychological tests used included several tests in an attempt to establish an overall psychological profile. The results of these tests are presented in isolation with the overall implications discussed more fully.

SPORT COMPETITION ANXIETY TEST (SCAT)

SCAT is an inventory used to assess an individual's competitive trait anxiety (*CTA*). It is evident from the results of SCAT which are presented in Table II and Figure 2 that the *F* group as a whole had a significantly higher sport anxiety trait ($\bar{X}$ 24.7, SD 4.1) in comparison to the *M* group who presented an average of 21.4 (SD 4.1). It is of interest to note that this mean is substantially higher than the mean for female high school pupils in the United States which Martens **et al**. (1990) report as being 22.5 (SD 4.4).

Although research tends to indicate that females have a higher competitive trait anxiety than males (Martens **et al.**, 1990), several authors have noted that investigations into gender related differences in *CTA* are equivocal (Smith, 1983; Gill, 1986; Martens **et al.**, 1990). A study conducted by Brustad (1988) revealed that team participants (basketball) had a lower *CTA* ($\bar{X}$ 19.8, SD 5.0) compared to the findings of Scanlan and Lewthwaite (1984) who found a mean of 20.9 (SD 4.4) among youth wrestlers (an individual sport). In the present study the overall *T* and the *I* groups' *CTA* were virtually the same; the results are presented in Table II. In contrast, the *MT* group was found to have a significantly higher *CTA* ($\bar{X}$ 23.6; SD 3.0) in comparison to the *MI* group who revealed a mean of 19.2 (SD 4.7).

TABLE II: SCAT and TEOSQ scores: means and standard deviations for all groups.

GROUP	SCAT	TEOSQ	
		TASK	EGO
M	21.4 (4.1)	4.2 (0.5)	2.9 (0.7)
F	24.7 (4.1)	4.4 (0.5)	3.1 (1.1)
T	23.3 (3.9)	4.3 (0.5)	2.8 (1.0)
I	22.8 (4.9)	4.3 (0.5)	3.2 (0.8)
MT	23.6 (3.0)	4.3 (0.5)	2.7 (0.8)
MI	19.2 (4.7)	4.1 (0.5)	3.1 (0.5)
FT	23.0 (4.7)	4.4 (0.6)	2.9 (1.2)
FI	26.4 (2.6)	4.5 (0.5)	3.3 (1.0)

BAR indicates a significant difference at $p < 0.05$

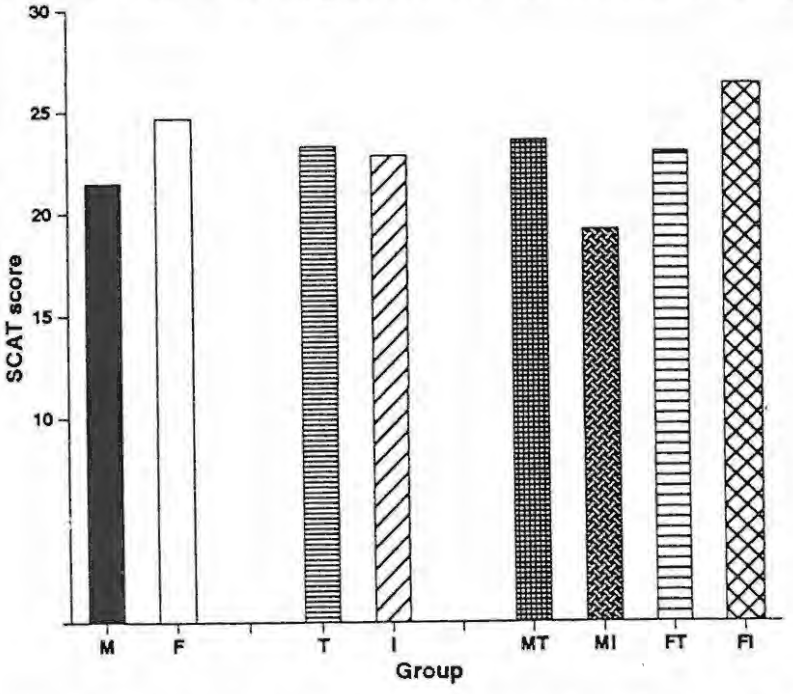


FIGURE 2: Mean scores of Sport Competition Anxiety Test (SCAT) for all groups.

It should be noted that this finding is contrary to the social evaluation theory which hypothesizes that *CTA* would be higher for individual than for team participants due to the greater evaluation potential that exists when performing alone (Martens **et al.**, 1990). However, the female individual participants in the present study scored a higher mean of 26.4 (SD 2.6) in relation to the team players ($\bar{X}$ 23, SD 4.7), thus supporting the previously mentioned theory. These results are depicted in Figure 2.

A further analysis of the scores reveals a wide range of responses where all groups presented a high variability. The *F* group's scores ranged from a low score 13, indicating a low anxiety trait, to the highest score of 29 which demonstrated a high *CTA*. The *M* group's scores ranged from 14 to 27. The *T* group's scores ranged from 13 to 29, with the *I* group's scores showing a similar trend (range 14 - 29). The highest score (29) was recorded for female subjects, irrespective of the type of sport.

TASK AND EGO ORIENTATION IN SPORT QUESTIONNAIRE (TEOSQ)

The results of the TEOSQ demonstrated that there were little difference in the responses of males and females; with both groups scoring significantly higher in *task* orientation. The data are presented in Table II and Figure 3.

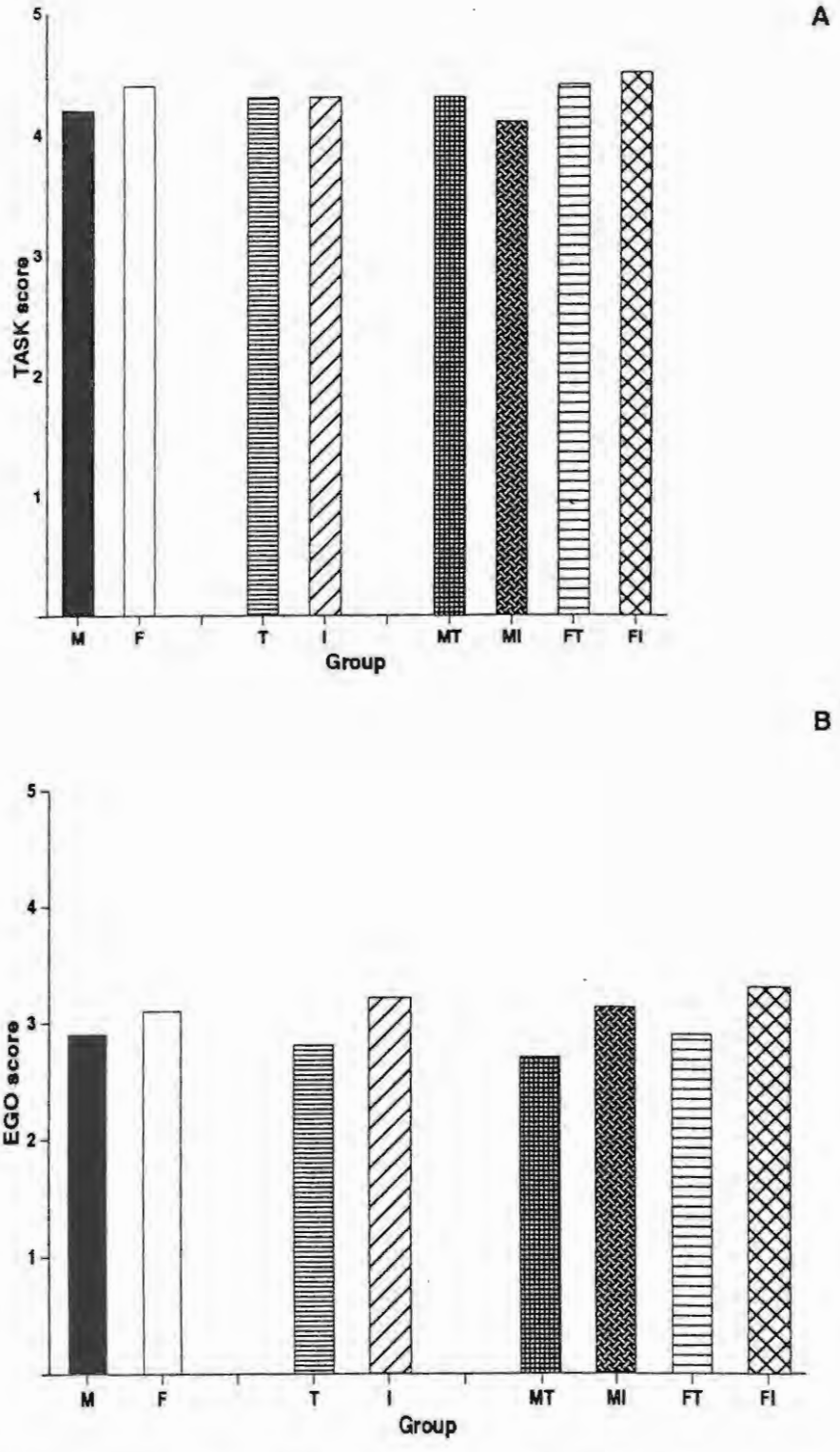


FIGURE 3: Mean scores of Task and Ego Orientation in Sport Questionnaire (TEOSQ) for all groups. (A) Task scores; (B) Ego scores.

While the female responses are similar to that of Gill (1988) and White and Duda (1994) who found females to be more *task*-oriented than males who appeared to be more *ego*-oriented than females; the responses of the male subjects are contrary to the results of the same authors.

In the present study there was no difference in TEOSQ scores of team and individual participants, with both groups scoring significantly higher in *task* orientation. It is apparent from the data presented in Table II that although both groups tend to be high in *task* orientation, the *I* group was slightly more *ego*-oriented than the *T* group.

There was virtually no difference between the *MT* and the *MI* groups' scores on the *task* scale. However, the *MI* group exhibited a nominally higher mean of 3.1 (SD 0.5) compared to the *MT* group who had a mean of 2.7 (SD 0.8) on the *ego* scale. Similarly, the *FI* group appeared to be more *ego*-oriented ($\bar{X}$ 3.3, SD 1.0) than the *FT* group who had a mean of 2.9 (SD 1.2), with little difference between their scores on the *task* scale. In summary the results of all four sub-groups are reflective of a general dominance of *task* orientation.

The results of *task* orientation for individual participants (athletes, squash and tennis players) in the present study were similar to those reported by Newton and Duda (1993) on adolescent

tennis players' orientations to sport. Newton and Duda's study revealed a mean of 4.3 (SD 0.6) for female tennis players and a mean of 4.0 (SD 0.5) for male tennis players. In the present study the female individual participants revealed a mean of 4.5 (SD 0.5) whereas their male counterparts scored 4.1 (SD 0.5) on the *task* orientation scale. In the same study, the male tennis players revealed a higher mean of 3.0 (SD 0.9) compared to their female counterparts who revealed a mean of 2.7 (SD 0.8) on the *ego* scale. However, in the present study there was practically no difference between the male and female individual participants' scores on the *ego* orientation scale.

THE PHYSICAL SELF-PERCEPTION PROFILE(PSPP)

The PSPP is an inventory which permits the evaluation of the concept of the physical self in a multi-faceted fashion by utilising five sub-scales; *Sport*, *Condition*, *Body*, *Strength* and *Physical Self-Worth (PSW)*.

When one compares the sub-scale scores of the two sex-groups, an interesting result is observed. On two of the sub-scales, *Condition* and *Strength*, the females scored significantly higher than the males which is contrary to a previous study undertaken by Davies (1993) on South African high achievers participating in traditional school sport. The results of the present study are depicted in Table 3 and Figure 4. Davies (1993) results revealed that males were nominally higher than females on the *Condition*

sub-scale, while there was little difference in their strength perceptions. In the present study the results of the male subjects revealed a higher *Body* perception as well as a higher *PSW* which is similar to the trend found by Davies (1993).

According to Fox (1990) *Condition* is an evaluation of the individual's perception of his or her level of physical conditioning, stamina and fitness, the ability to maintain exercise and confidence in the exercise and fitness setting. One would expect that elite sportsmen would have a higher perception of their physical condition by virtue of competitive sport being long perceived as an arena for masculine behaviours (Andersen and Williams, 1987). Similarly, one may contend that males will have a higher perception of their physical strength, yet the reverse trend was observed for elite youth participants in the present study. The rugby players in this study presented lower scores on these two sub-scales in comparison to male individual participants. It is the author's contention that the rugby players in the present study possibly compared themselves with the National rugby squad and did not perceive themselves to match up to the 'macho' image traditionally portrayed by rugby players. This perception is based upon the author's qualitative assessment of the rugby players in the present study who did not generally appear to be immensely muscular and bulky; characteristics which are normally associated with elite rugby players. Similarly, in the context of societal's expectations of first team rugby

players, it is not surprising that they perceive their level of physical conditioning to be lower than what was expected.

Despite these variations in the perceptions of *Condition* and *Strength* for males, elite female athletes in the present study had a comparatively lower perception of their *Body* image as well their *Physical Self-Worth* compared to their male counterparts. This finding of a lower perception of *Body* image is not surprising as females, in general, tend to live up to society's expectations of the ideal female, who is invariably portrayed in the media as someone tall and slim (Tinning, 1991). Furthermore, Lirgg (1991) suggests that females do not experience the same degree of confidence as males. The lowered sense of *PSW* of females in the present study, although not as substantial as their *Body* image, nonetheless illustrates that the realm of competitive sport may no longer be perceived as somewhat inappropriate for elite female participation as in the past, despite the general gender expectations of society to the contrary (Hall, 1990).

The results of PSPP revealed that individual participants in the present study have a nominally higher perception of their physical self as compared to their team counterparts. Table 3 and Figure 4 illustrate these results. It is the author's contention that this trend is not surprising as there is greater pressure on teams to perform well.

TABLE III: Physical Self-Perception Profile (PSPP): means and standard deviations for all groups.

GROUP	SPORT	CONDITION	BODY
M	18.9 (2.4)	17.6 (3.1)	14.5 (3.2)
F	18.1 (1.9)	19.7 (2.0)	13.5 (3.8)
T	17.9 (2.1)	18.7 (2.8)	13.3 (2.9)
I	19.0 (2.1)	18.6 (2.8)	14.6 (3.9)
MT	18.2 (2.0)	17.6 (2.8)	13.4 (2.0)
MI	19.6 (2.5)	17.7 (3.0)	15.6 (3.8)
FT	17.6 (2.2)	19.9 (1.6)	13.3 (3.7)
FI	18.5 (1.6)	19.5 (2.4)	13.7 (4.0)
GROUP	**STRENGTH**	**PSW**	**TOTAL**
M	15.2 (3.5)	17.9 (2.7)	84.7 (9.5)
F	18.4 (2.3)	16.8 (3.3)	86.6 (10.7)
T	16.5 (2.9)	16.6 (3.0)	83.7 (8.9)
I	17.1 (3.8)	17.9 (3.0)	87.6 (11.1)
MT	14.8 (2.8)	17.2 (2.5)	82.6 (6.7)
MI	15.4 (4.1)	18.6 (2.8)	86.8 (11.7)
FT	17.9 (2.2)	16.1 (3.5)	84.8 (10.8)
FI	18.9 (2.3)	17.6 (3.1)	88.1 (10.9)

BAR indicates a significant difference at $p < 0.05$

Team sports bear greater significance to the traditional South African school sporting ambience in comparison to individual sports as evidenced by the greater commitment to team sport in the present study (see Table I). It has been pointed out that the

team players, particularly the male participants, appeared to have a comparatively higher competitive trait anxiety (*CTA*) (see Table II), and Martens **et al.** (1990) point out *CTA* has been found to be directly related to underlying perceptions of self-worth in the achievement domain of competitive sport. It is therefore not surprising that team sport participants perceived themselves as having a lower perception of their sporting and athletic ability and suppressed feelings of *Physical Self-Worth* and *Body* image than their individual counterparts as revealed by the *Sport*, *PSW* and *Body* sub-scale scores respectively (see Table III and Figure 4).

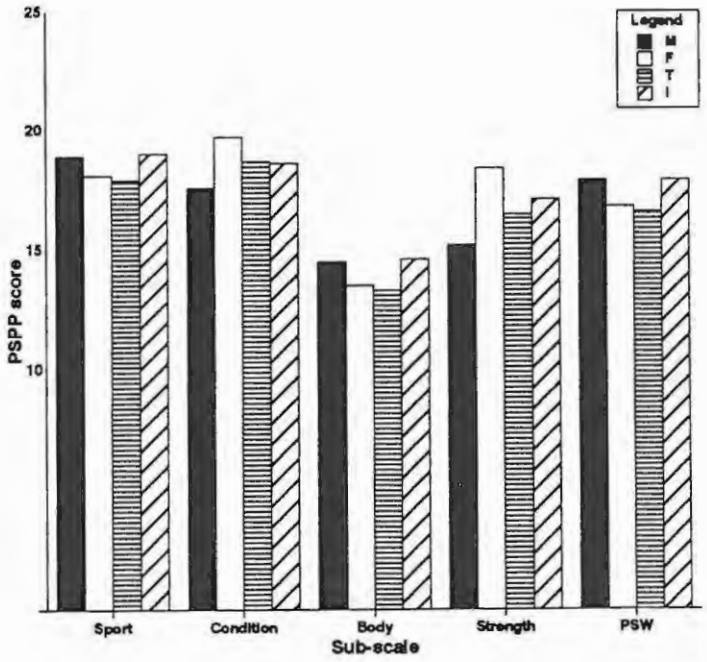


FIGURE 4: Mean scores for Physical Self-Perception Profile (PSPP) of Males and Females and Team and Individual participants.

It is evident from the results presented in Table III that the same trends may be observed for the *MT* and *MI* groups and the *FT* and *FI* groups. The male individual players scored higher than their respective team players on all five sub-scales of the PSPP; the *FI* group scored higher than the *FT* group on four of the sub-scales. Moreover the *FT* and *FI* groups scored significantly higher than the *MT* and *MI* groups, respectively on the *Condition* sub-scale, while only the *FT* group scored significantly higher than the *MT* group on the *Strength* sub-scale.

The *MT* and *MI* groups scored nominally higher than the *FT* and *FI* groups respectively on both the *Body* and *PSW* sub-scales. These results illustrate that females, irrespective of the type of sport, have an elevated perception of their *Condition* and *Strength* compared to males in this study; yet they tend to emulate society's expectations of a poorer self-perception of their *Body* and a lowered sense of *Physical Self-Worth* in relation to males.

IN FIELD RESULTS

Although many of the complex questions concerning children in sport are influenced by an intricate interaction of psychological, physiological and kinesiological factors (Gould, 1982), for comprehensibility and usefulness in presentation of the data, the results of the "performance triad" (Borg, 1978) of

physiological, perceptual and performance factors were critically analyzed in isolation and are presented separately. In attempting to provide gestalt understanding of performance under competitive stress, the results are integrated in the discussion thereafter. In order to ascertain the overall group response and identify any important trends in the results, basic descriptive statistics were run on all variables under investigation. However, in order to gain greater insight into the possible nature of the sport differences as well as gender related differences Two way ANOVA's were run. Due to the high probability of diverse unaccountable factors impinging in a project of this nature, several statistical significant differences as well as qualitative trends will be discussed, to aid in a greater understanding of the complexity of an individual's behavioral response to performing in a competitively stressful ambience.

PHYSIOLOGICAL RESPONSES

An assessment of the physiological measures included indicate that there was an increase in physiological activity of the subjects as represented by heart rate responses, prior to performing in a competitive ambience. Due to *in field* testing the only physiological parameter used was heart rate, however four heart rates were recorded prior to the match. They include *initial, anticipatory, highest* and *average* heart rates and will be discussed separately.

Heart Rate

Initial heart rate was the parameter used to observe heart rate responses before the competition. This heart rate was obtained prior to the physical warm-up. The fact that team sport participants had significantly higher *initial* heart rates ($\bar{X}$ 91.3 $b.min^{-1}$, SD 16.2) than their individual counterparts ($\bar{X}$ 80.3 $b.min^{-1}$, SD 10.1) is of particular relevance, since there was no significant differences in their *reference* heart rate responses (see Table I). It is the author's contention that the subjects, having been through the whole procedure during a practice session, were not apprehensive about being 'connected up' to the instrumentation. Therefore the rise in heart rate could not be justifiably be ascribed to the testing procedures, but was rather a true reflection of the response to the competitive ambience. Furthermore the mean *initial* heart rate of the *FT* group ($\bar{X}$ 89.9 $b.min^{-1}$, SD 18.3) was significantly higher than the *FI* group ($\bar{X}$ 82.1 $b.min^{-1}$, SD 11.4). The males in the present study revealed the same trend, with team participants recording significantly higher *initial* heart rates ($\bar{X}$ 92.7 $b.min^{-1}$, SD 13.9) than their individual counterparts ($\bar{X}$ 78.4 $b.min^{-1}$, SD 8.4). The results are presented in Table IV and Figure 5. It has already been mentioned that physiological recordings such as heart rate represent a method of assessing the extent of state anxiety. Thus the *initial* heart rate measures that were obtained contradict the reports that individual sport participants generally have higher levels

of state anxiety prior to competition than players in team sports (Griffin, 1972; Simon and Martens, 1979).

It is of interest to note that exposure to a team-game situation increased the heart rate responses by 21 $b.min^{-1}$, whereas the heart rate of the individual group increased only by 9 $b.min^{-1}$ prior to individual sport performances. Furthermore the *FT* group recorded the greatest increase in heart rate prior to competition (23 $b.min^{-1}$), followed by the *MT* group who recorded an increase of 19 $b.min^{-1}$. It is the author's contention that the *MT* group did not experience a similar level of strain as the female team participants, as indicated by their lower heart rate responses, due to the reticence of rugby coaches to allow the author to investigate the responses of the team sport participants during key rugby matches. This reluctance of certain rugby players and their respective coaches to permit the monitoring of responses during key matches is merely a further indication of the amount of pressure put on schoolboys to perform well. The elevated levels of *initial* heart rates in the present study support the findings of Smith et al. (1988) who reported significant increases in heart rate responses prior to competition.

Anticipatory heart rates were obtained immediately prior to the start of the actual match. Hence this measure will have been influenced by the physical warm-up, to a greater or lesser

extent. The *anticipatory* heart rates of the subjects followed the same trend as their *initial* heart rate recordings. Once again team sport participants recorded significantly higher *anticipatory* heart rates ($\bar{X}$ 136.4 b.min^{-1}, SD 23.2) in comparison to their individual counterparts ($\bar{X}$ 126.3 b.min^{-1}, SD 10.1). The *MT* group recorded significantly higher heart rates ($\bar{X}$ 135 b.min^{-1}, SD 24) than the *MI* group ($\bar{X}$ 123.3 b.min^{-1}, SD 12.1). Although there were no significant differences in the *anticipatory* heart rate responses of female team and individual players, their results nevertheless followed the same trend, with the *FT* group recording higher heart rates ($\bar{X}$ 137.9 b.min^{-1}, SD 22.6) than the *FI* group ($\bar{X}$ 129.3 b.min^{-1}, SD 19.4).

From the above results it is evident that team sport participants experienced a considerable elevation in their heart rates in comparison to individual participants. It is well documented that emotional factors such as nervousness, anxiety and apprehension may affect heart rate responses (de Vries, 1980), and therefore the elevation experienced by participants in the present study may well be an indication of what Strømme **et al.** (1978) refer to as "additional heart rate". Once again it may be argued that team sport players in the present study experienced greater pre-competitive anxiety state levels prior to competition.

TABLE IV: Heart rate (HR) responses as measured under conditions of competitive stress: means and standard deviations for all groups.

GROUP	INITIAL HR ($b.min^{-1}$)	ANTICIPATORY HR ($b.min^{-1}$)	HIGHEST HR ($b.min^{-1}$)	AVERAGE HR ($b.min^{-1}$)
M	85.6 (13.5)	129.1 (19.8)	156.2 (19.1)	117.2 (12.9)
F	86.0 (15.7)	133.6 (21.4)	165.1 (18.5)	126.9 (15.8)
T	91.3 (16.2)	136.4 (23.2)	169.2 (16.3)	122.0 (17.5)
I	80.3 (10.1)	126.3 (16.4)	152.1 (18.2)	122.1 (12.7)
MT	92.7 (13.9)	135.0 (24.0)	168.0 (12.2)	114.9 (14.2)
MI	78.4 (8.4)	123.3 (12.1)	144.3 (17.5)	119.6 (11.2)
FT	89.9 (18.3)	137.9 (22.6)	170.4 (19.7)	129.0 (17.7)
FI	82.1 (11.4)	129.3 (19.4)	159.8 (15.6)	124.7 (13.6)

BAR indicates a significant difference at $p < 0.05$

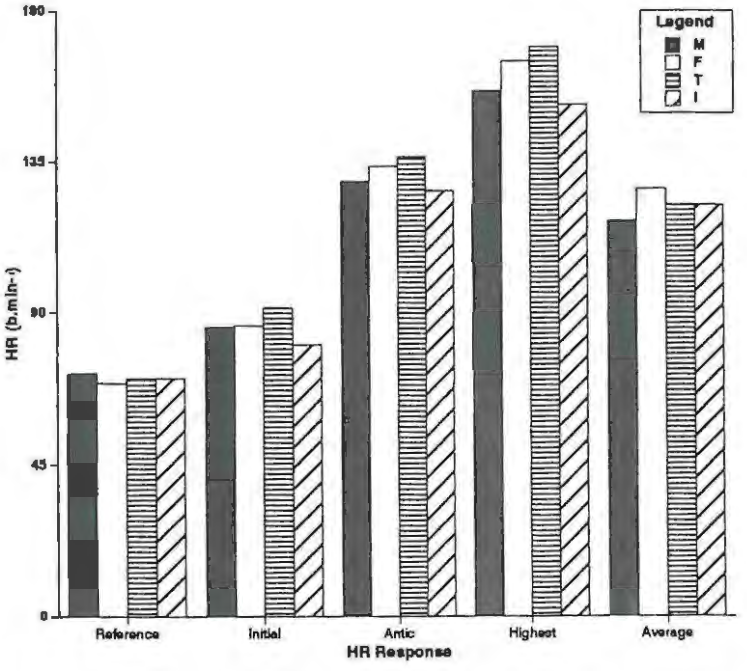


FIGURE 5: Heart rate responses at various intervals of data collection for Males and Females and Team and Individual participants.

When one compares the *initial* and *anticipatory* heart rates for the two sex-groups, there were no significant differences for the males and females as a whole. However, a significant difference in their *highest* heart rate responses was observed. The females generally had significantly higher *highest* heart rates than males. The results are depicted in Figure 5. It is the author's contention that the contributing factor is more of a physical than a psychological nature. It may be argued that females in this study experienced a greater physiological strain as a result of the physical demands of the warm-up. These findings are in accordance with McArdle **et al's.** (1986) conclusion that females experience more physiological strain as demonstrated by heart rates higher than males for any given exercise intensity. Once again team sport participants recorded significantly higher *highest* heart rates ($\bar{X}$ 169.2 $b.min^{-1}$, SD 16.3) compared to individual participants ($\bar{X}$ 152.1 $b.min^{-1}$, SD 18.2). Again it is argued that the physical demands of the warm-up outweighed the psychological factors associated with competitive stress. During the hockey and rugby warm-up, the activities included sudden bursts of speed which in all probability caused the elevation in heart rate that was not observed in the individual players (athletics, squash and tennis) who did not include sprinting in their warm-up. The warm-up of the sprinters consisted of stretching exercises and running at a moderate pace whereas field athletes completed stretching exercises with minimal running. The

squash and tennis players performed stretching exercises and a court warm-up prior to competition.

Examination of the *average* heart rates recorded also reveal significant differences between the two sex-groups, with the females recorded a higher *average* heart rate ($\bar{X}$ 126.9 b.min^{-1}, SD 15.8) compared to males ($\bar{X}$ 117.2 b.min^{-1}, SD 12.9). The results are presented in Table IV and Figure 5. It is the author's contention that the females in the present study experienced more physiological strain due to the physical demands of the warm-up as mentioned previously. There were no significant differences in *average* heart rate recordings for team and individual participants as a whole, however female team participants recorded significantly higher *average* heart rates ($\bar{X}$ 129 b.min^{-1}, SD 17.7) than their male counterparts ($\bar{X}$ 114.9 b.min^{-1}, SD 14.2). This may be attributed to a less intense warm-up by some of the rugby players who were monitored during less important games in comparison to the hockey players who were only observed during key matches.

The overall elevated heart rate response to stress by the group as a whole is illustrated in Table 4, and as a generalization appears to completely contradict the pattern in the majority of past literature on youth sport (Griffin, 1972; Simon and Martens, 1979; Mahoney **et al.**, 1987; Martens **et al.**, 1990) which states

that team sport participants experience less pre-competitive A-state, and consequently have lower heart rate responses compared to individual sport participants. It would appear that the main differences in the heart rate responses between the two sex-groups was related to the physical demands of the warm-up, with females tending to experience greater physiological strain than males. However, all group responses tend to follow the pattern of elevated arousal as reported in the literature (Cannon, 1922; Hanson, 1967; Passer, 1988) in which there is general consensus that heart rate is a highly sensitive measure of the body's adaptive response to any external demand, be they of a physical or psychological nature.

PERCEPTUAL RESPONSES

Perceived Strain Scale

The subject's perceptions of the degree of stress imposed by the competitive situation were analyzed by investigating the Evaluation of Task Demands (ETD) and the Evaluation of Perceived Strain (EPS) over one practice session and three matches played during the season. Thus it must be borne in mind that the results presented are the mean values taken from players who were involved in matches of differing standards and the range of responses is likely to vary greatly due to this factor.

Evaluation of Task Demands (ETD)

ETD gives a tangible measure of the individual's perception of the amount of stress imposed by a particular task on hand (viz the pending match) and it is calculated from the formula on page 83. A two-way analysis of variance revealed that there were no significant differences between the two sex-groups in the evaluation of task demands, however a significant difference was observed between team and individual participants. The results are presented in Table V and Figure 6. Team players rated the task demands significantly higher ($\bar{X}$ 7.4, SD 1.4) compared to individual players ($\bar{X}$ 6.4, SD 1.6). This could be attributed to the fact that far more importance is attached to winning a rugby or hockey game for the sake of the school's name than compared to the individual sports (athletics, squash and tennis). Rugby and hockey are more highly valued sports amongst 'white' South African schools when one considers the support, both at practices and matches, which is given to these players. Many supporters of the respective schools, including the Headteacher and some parents, were present at the rugby and hockey match, while only the players and their coaches attended the individual-type matches. However, the great variation in the evaluation of the task demands by players was masked by the pooling of the results. Team sport participants responses ranged from a moderately low 3.7 to a maximal 9.8, while their individual counterparts' responses ranged from a minimal 2.5 to maximal 9.8.

Evaluation of Perceived Strain (EPS)

The method of calculation for EPS is described on page 83. EPS gives a tangible measure of the level of strain being experienced, in addition to giving an indication as to whether or not the subject perceives him/herself able to cope adequately with the demands. A score less than 1.0 is indicative of a certain degree of strain, while a result of 1.0 points to a balance between the demands of the task and the ability of the individual to cope. Any score greater than 1.0 is symptomatic that the individual believes that it is within his or her capabilities to cope with the demands of the task. The EPS scores (Table V and Figure 7) indicate that there were no significant differences in the perception of strain between the two sex-groups, nor between team and individual players. Female players scored 0.98 (SD 0.2), indicating a certain level of strain was being experienced, while the males, with an EPS score of 1.0 (SD 0.2), demonstrated a balance between the demands of the match and their ability to cope with these demands. It therefore appears that female participants in the present study were perceptibly under more strain. It is the author's contention that a contributing factor to these results was the fact that some of the rugby players were not evaluated during key matches and therefore appeared to have greater confidence in playing in relatively easier matches. A similar argument may be put forward for the differences in the perception of strain for team and individual participants.

The *T* group appeared to feel that they could cope with the demands (EPS = 1.0), while the *I* group demonstrated substantially more strain (EPS = 0.9). When one compares the EPS scores of the male and female team participants, it is evident that it is the males' score of 1.0 which is contributing to the elevated ability to cope by team players as their female counterparts demonstrated an increase in the perception of strain by scoring less than unity (0.9). It is interesting to note that the females, irrespective of the nature of the sport, appeared to be somewhat strained by the demands of the matches. Both the *FT* and the *FI* groups scored 0.9. It is the author's contention that the females may have perceived greater pressure to do well as there were more female provincial players than males.

TABLE V: Pre-match Evaluation of Task Demands (ETD) and Evaluation of Perceived Strain (EPS) scores: means and standard deviations for all groups.

GROUP	ETD	EPS
M	6.8 (0.2)	1.0 (0.2)
F	7.0 (1.4)	0.9 (0.2)
T	7.4 (1.4)	1.0 (0.2)
I	6.4 (1.6)	0.9 (0.2)
MT	7.6 (1.9)	1.0 (0.2)
MI	6.3 (1.5)	1.0 (0.3)
FT	7.3 (1.3)	0.9 (0.1)
FI	6.7 (1.5)	0.9 (0.2)

BAR indicates a significant difference at $p < 0.05$

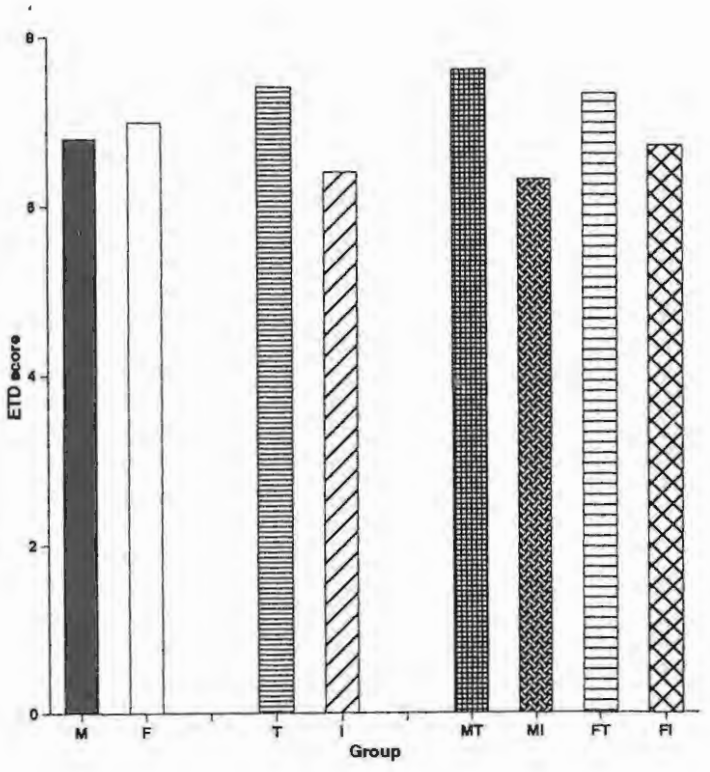


FIGURE 6: Evaluation of Task Demands (ETD) for all groups.

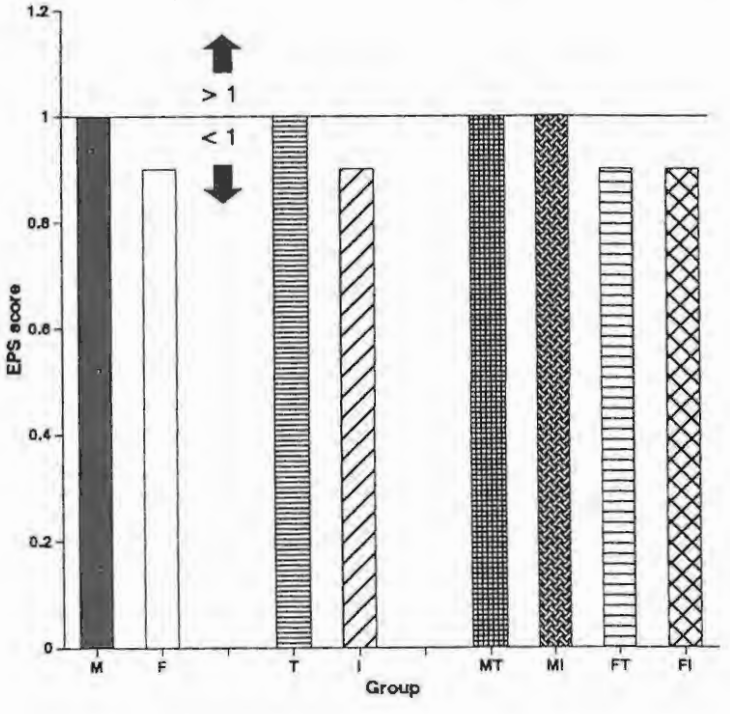


FIGURE 7: Evaluation of Perceived Strain (EPS) for all groups.

In comparison both the male team and individual players demonstrated a balance between the demands of the match and their ability to cope with these demands. Both the *MT* and the *MI* groups scored 1.0. Thus it appears that the females in general were not overly confident about coping adequately with the demands of the matches. This apparent difference in confidence between males and females may be due to competitive sport being long perceived as an arena for masculine behaviours as suggested by Andersen and Williams (1987).

The fact that there was no significant difference between the amount of strain perceived by team and individual participants could be attributed to the fact that the evaluation potential is dissipated when performing within a team as proposed by Scanlan (1978), and this results in greater confidence amongst team sport participants. However, it could also be due to the fact that key players in a team game may perceive greater degrees of strain as a result of the high expectations that are imposed upon them from 'significant others' as well as from within themselves as suggested by Scanlan and Lewthwaite (1984).

PERFORMANCE EVALUATIONS

Results

An analysis of the results in terms of win-loss outcome were completed on the following basis: win=3, draw=2 and a loss=0. The

male players scored significantly higher ($\bar{X}$ 2.3, SD 1.2) than the female players who scored 1.9 (SD 1.3), indicating that the males won more matches than the females. Arguably, the male team participants generally played relatively easier matches and therefore experienced more wins, thus elevating the male group's score as a whole. However, it may also be argued that the female participants perceived a greater inability to cope with the task demands than the males, and may well have experienced an increase in tension prior to the match which may consequently have had a deleterious effect on performance.

TABLE VI: Match results in terms of win-loss outcome: means and standard deviations for all groups.

GROUP	RESULT
M	2.3 (1.2)
F	1.9 (1.3)
T	2.2 (1.2)
I	2.1 (1.3)
MT	2.5 (1.1)
MI	2.2 (1.3)
FT	2.0 (1.3)
FI	1.9 (1.4)

BAR indicates a significant difference at $p < 0.05$

There were no significant difference in the win-loss outcome for team and individual participants, although the team results across all groups were more successful than the individual results. The results are depicted in Table VI. However, it must be pointed out once again that the rugby players had the highest win-loss outcome of 2.5 (SD 1.1) which may have been the consequence of relatively easier matches for some of the rugby players.

Match Performance

In an attempt to acquire some tangible assessment of the actual performance of specific players during matches, both players and their respective coaches were asked to rate the standard of performance immediately after the match and to express whether this was as expected, or above/below expectations (see Chapter III for more details). The results of this evaluation of performance are presented in Table VII and Figure 8.

On a scale of 1-5 the male athletes rated themselves nominally higher ($\bar{X}$ 3.3, SD 0.8) than the female players ($\bar{X}$ 3.0, SD 0.9). It therefore appears that the players' ratings of their performance may be affected by the win-loss outcome of the matches. As the female players had fewer wins (see Table VI), they possibly rated their performance as 'average' compared to the males who had more wins and consequently may have felt more confident about their performances.

The team participants in the present study rated their performance as slightly 'above average' ($\bar{X}$ 3.2, SD 0.7) in relation to their individual counterparts who rated their performance as 'average' ($\bar{X}$ 3.0, SD 0.9). This could be attributed to the fact that team players feel more confident about their performance as they are within a team situation whereas the individual participants feel less confident as they are evaluated in isolation. The male team players were the only group who rated their performance closest to 'good' ($\bar{X}$ 3.5, SD 0.7, and therefore appear to display the most confidence in evaluating their performance. However, one cannot overlook the fact that on the whole rugby players competed in relatively easier matches and this may be contributing to an artificially elevated confidence level for the male team players. It is interesting to note that both the *MT* and the *MI* groups' performance evaluations appear to be affected by the win-loss outcome of their matches. For the males it appears as if better performances are associated with more wins (see Table VI).

However, the reverse trend is observed for female participants in this study. Both the *FT* group and the *FI* group rated their performance as 'average' despite the fact that the female team players experienced more wins than their individual counterparts. It may be argued that the team players' ratings could have been affected by the perceived pressure from the self to do well, an important factor, proposed by Cohn (1990), and consequently they

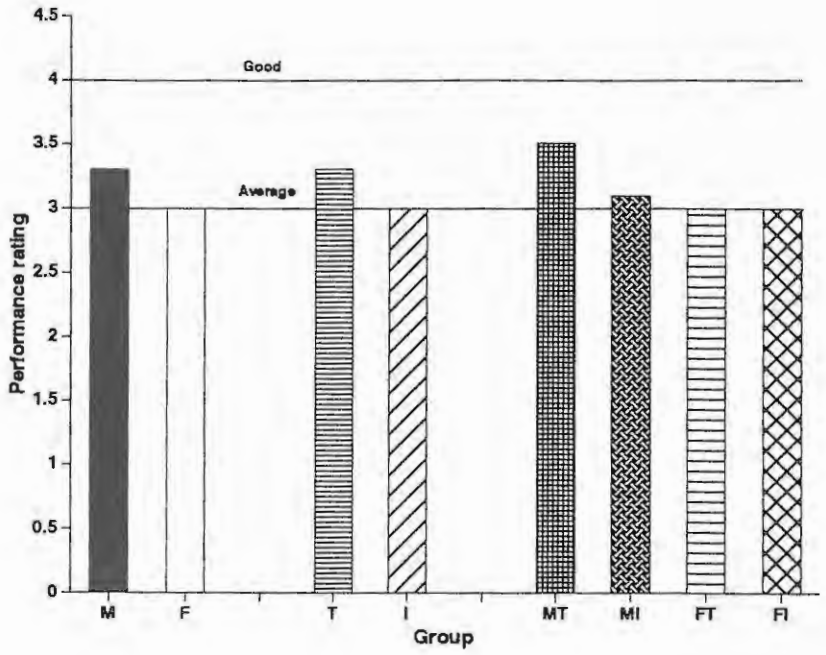
are rarely satisfied with their performance. Alternatively, it may be contended that the performance ratings of the female individual players appear less likely to be affected by the outcome of their games.

It is interesting to note that the coaches' ratings of their respective players' performances were elevated in comparison to the players' ratings of themselves. The ratings are presented in Table VII. The coaches rated the performance of both the male and female athletes as 'above average'. The coaches' performance ratings of team players were significantly higher ($\bar{X}$ 3.9, SD 0.8) than that of individual players ($\bar{X}$ 3.5, SD 1.0).

TABLE VII: Post-match rating of the standard of performance by player and coach: means and standard deviations for all groups.

GROUP	PERFORMANCE			
	ACTUAL		EXPECTED	
	PLAYER	COACH	PLAYER	COACH
M	3.3 (0.8)	3.7 (0.9)	2.7 (0.8)	2.9 (0.7)
F	3.0 (0.9)	3.7 (1.0)	2.6 (0.8)	2.9 (0.7)
T	3.2 (0.7)	3.9 (0.8)	2.6 (0.7)	3.0 (0.6)
I	3.0 (0.9)	3.5 (1.0)	2.8 (0.9)	2.8 (0.6)
MT	3.5 (0.7)	4.1 (0.7)	2.7 (0.7)	3.0 (0.6)
MI	3.1 (0.9)	3.3 (1.2)	2.8 (0.9)	2.8 (0.8)
FT	3.0 (0.7)	3.9 (0.8)	2.5 (0.7)	2.9 (0.7)
FI	3.0 (1.0)	3.7 (0.9)	2.7 (0.8)	2.8 (0.6)

BAR indicates a significant difference at $p < 0.05$



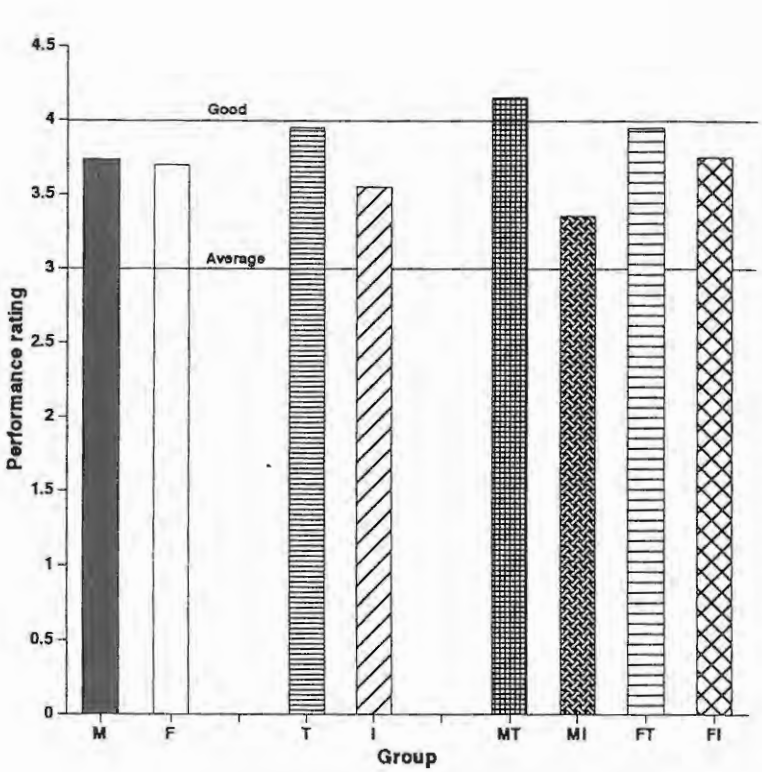


FIGURE 8: Post-match rating of Actual performance on a 5 point scale for all groups by (A) Players; (B) Coaches.

Thus it seems that irrespective of the win-loss outcome coaches rate the standard of their players' performance as 'above average'. Once again the performance ratings of female players by their respective coaches reveal that there was little difference in their performance ratings, despite the fact that team players won more matches (see Table VI and VII and Figure 8). However, a significant difference is noted in the coaches ratings of the performance of the *MT* and *MI* groups. The team players' standard of performance was rated as 'good' ($\bar{X}$ 4.1, SD 0.7) whereas their individual counterparts were rated as performing slightly above 'average' ($\bar{X}$ 3.3, SD 1.2). This result seem to indicate that due to the rugby players perceiving less strain coupled with playing weaker matches, they appeared to be more confident and this may have affected the coaches' performance ratings of the rugby players positively.

In an attempt to quantify the expected performance (see Performance Rating Scale, p215) the following scoring method was used: 'well below expectations' = 1, 'below expectations' = 2, 'as expected' = 3,'above expectations' = 4 and 'well above expectations' = 5. An analysis of the scores for expected performance revealed that most players and coaches rated the performances minimally below the 'expected' level (see Table VII). However, it is worth noting that in all these matches the players' ratings were lower than that of the coach, particularly for the *T*, *F*, *MT* and *FT* groups. In fact, the coaches rated the

performance of the team participants, particularly the rugby players as 'as expected'. This result therefore appears to indicate that the participants in this study, especially the team and female participants as a whole displayed a general disappointment in the standard of their performance.

PRACTICE AND MATCH RESULTS

In this section data will be presented on the physiological, perceptual and performance responses of youth sport participants as evaluated during a practice session as well as during three competitive matches.

PHYSIOLOGICAL RESPONSES

Heart Rate

A two-way analysis of variance of subjects' *initial* heart rate responses revealed that team sport participants' heart rates were significantly elevated prior to competition in comparison to their heart rate responses prior to practice sessions. Female participants showed significant elevations in *initial* heart rate before all three matches; although the male team athletes showed a significant elevation only in the third game; the responses prior to the other two games demonstrated a similar pattern. The results are presented in Table VIII.

It is interesting to note that no significant differences in *initial* heart rate responses prior to competition were recorded for both the male and female individual participants. It is thus apparent that in the present study that team sport participants, particularly the females, experienced significant increases in heart rate responses prior to competition. It is the author's contention that this result is in all probability due to the greater importance assigned to team games within the present school system in South Africa.

The *anticipatory* heart rates of the subjects, which were obtained immediately prior to competition, followed the same trend as their *initial* heart rate recordings. However, this time, both the male and female participants recorded significant elevations in heart rate prior to all three competitive matches in comparison to their *anticipatory* responses before a practice session (see Table VIII). Once again male and female individual participants recorded no significant differences in their *anticipatory* heart rates across practice and match conditions. From the above results one may observe that there were no differences in the responses for the two sex-groups but heart rate elevations of the subjects varied significantly depending on the type of sport they played.

TABLE VIII: Heart rate (HR) responses as measured under various conditions: means and standard deviations for all groups.

HR b.min-1	GROUP	CONDITION			
		PRACTICE	MATCH 1	MATCH 2	MATCH 3
INITIAL	MT	81.9 (11.8)	94.5 (15.2)	95.8 (12.0)	98.6 (11.8)
	MI	74.1 (9.3)	81.1 (8.1)	79.5 (7.7)	79.0 (7.9)
	FT	72.2 (13.5)	90.6 (17.3)	96.5 (14.5)	100.4 (9.4)
	FI	77.8 (7.6)	86.8 (14.9)	82.6 (11.7)	81.3 (9.9)
ANTIC	MT	110.9 (28.1)	141.1 (12.4)	146.1 (13.9)	141.9 (9.6)
	MI	120.3 (15.7)	124.7 (10.4)	124.6 (13.9)	123.4 (8.2)
	FT	113.7 (13.1)	142.3 (21.7)	144.6 (18.9)	150.9 (7.4)
	FI	116.9 (28.0)	135.1 (10.8)	132.2 (17.4)	132.9 (9.5)
HIGHEST	MT	169.8 (11.8)	172.2 (8.6)	164.0 (13.2)	166.1 (8.4)
	MI	168.0 (15.8)	138.3 (9.9)	137.0 (9.1)	134.2 (7.2)
	FT	173.6 (32.0)	173.3 (12.5)	165.6 (12.8)	169.3 (6.6)
	FI	178.4 (9.4)	155.3 (11.8)	154.1 (10.9)	151.4 (9.6)
AVERAGE	MT	121.9 (8.0)	120.5 (16.3)	105.3 (13.1)	111.9 (9.8)
	MI	129.3 (11.7)	116.6 (8.0)	116.6 (8.0)	116.2 (8.0)
	FT	138.9 (16.8)	125.4 (9.2)	132.6 (18.9)	119.2 (9.7)
	FI	124.8 (9.2)	125.8 (16.2)	125.1 (6.2)	123.2 (7.2)

BAR indicates a significant difference at $p > 0.05$

Although the players' heart rate responses were influenced by the physical warm-up, to a greater or lesser degree, it is the author's contention that emotional factors such as nervousness and anxiety had a greater effect on the *anticipatory* heart rate recordings of team participants in the present study.

When one compares the highest and the *average* heart rates recordings of the group with their *initial* and *anticipatory* heart rates two opposite trends are revealed. The subjects' *initial* and *anticipatory* heart rates were elevated prior to competitive matches whereas their *highest* and *average* heart rate recordings, which are presented in Table VIII, seem to decrease before matches. It is the author's contention that the decrease evident in the *highest* and *average* heart rate responses of players from a practice to a match condition is related to the physical demands experienced during the two conditions. A major factor related to these differences is the fact that the duration during which players *highest* and *average* heart rates were observed differed considerably. Players wore the heart-watches for the entire practice session, however it was only worn for the warm-up prior to a competitive match. The individual participants in the present study participated in a less demanding physical warm-up prior to matches in comparison to team sport participants, and therefore both the male and female individual players experienced significant decreases in their *highest* heart rate responses. By the same token male and female team players did not experience a

decrease in their *highest* heart rate recordings as their warm-up included bursts of speed which in all probability caused elevations similar to that experienced during practice. As individual participants did not include sprinting in their warm-up prior to matches, one may therefore contend that the physical demands of the warm-up of team and individual participants were largely responsible for the differences in *highest* heart rate for the two groups.

It has been mentioned that the *average* heart rate of the players followed a similar trend to their *highest* heart rate recordings. However, only the *MI* group experienced significant decreases in their *average* heart rate responses across all three matches in comparison to the practice session. The *FT* and *MT* groups experienced a significant decrease in their *average* heart rate recordings for match 3 only. Nonetheless the same trend was observed, with *average* heart rate decreasing for matches 2 and 3 for both male and female team participants in comparison to the practice session. It is the author's contention that the duration of the physical warm-up, in addition to the lesser demands of the warm-up in comparison to the full practice session were partly responsible for decreases in *average* heart rate responses of the players, particularly the male individual participants.

PERCEPTUAL RESPONSES

Evaluation of Task Demands (ETD)

All the players in the present study rated the matches as more demanding than the practice session, to a greater or lesser extent, which is illustrated in Table IX. However, there was great variation in the evaluation of task demands between matches which was in all likelihood due to players being involved in matches of varying standards. It is interesting to note that the female team participants were the only group to experience a significant increase in the evaluation of the task demands of hockey across all three matches in comparison to the practice session. Furthermore the *FT* group rated the third match as most demanding which resulted in this match being rated as significantly higher than the first match. It is the author's contention that this result was probably due to the fact that some of girls who were tested during the third match were involved in what may be considered as their most important match of the season. The male individual participants viewed the task demands of the first two matches as significantly higher than the practice session, with the third match following the same trend. The male team participants ratings of the task demands followed the same trend as their individual counterparts, however they only rated the third match as significantly higher than the practice session. This was in all likelihood due to some of the rugby players being tested during games of lesser importance

which decreased the overall response of the group. It is of interest to note that the female squash players were the only group who did not experience significant differences in the evaluation of task demands for practice and match conditions. However they too demonstrated the previous mentioned trend, with matches being rated slightly higher than the demands of the practice session.

TABLE IX: Evaluation of Task Demands (ETD) and Evaluation of Perceived Strain (EPS) scores under various conditions: means and standard deviations for all groups.

SCORE	GROUP	CONDITION			
		PRACTICE	MATCH 1	MATCH 2	MATCH 3
ETD	MT	6.0 (1.6)	7.4 (1.0)	7.6 (0.6)	8.1 (1.6)
	MI	4.9 (1.8)	6.6 (1.7)	7.0 (1.2)	6.2 (1.3)
	FT	5.8 (1.0)	7.3 (1.0)	7.8 (0.7)	8.5 (0.5)
	FI	6.1 (1.4)	6.8 (1.7)	6.6 (1.5)	7.3 (1.4)
EPS	MT	1.1 (0.4)	0.9 (0.1)	1.1 (0.1)	1.0 (0.2)
	MI	1.1 (0.4)	1.0 (0.2)	1.0 (0.1)	0.9 (0.2)
	FT	0.9 (0.1)	1.1 (0.1)	1.0 (0.1)	1.0 (0.1)
	FI	1.0 (0.2)	0.9 (0.2)	0.9 (0.1)	0.9 (0.1)

BAR indicates a significant difference at $p < 0.05$

Evaluation of Perceived Strain (EPS)

The EPS scores indicated that all the groups tended to cope better with the demands of the practice session in comparison with the matches, except for the female team participants. These participants seemed to demonstrate a feeling of strain even with the practice session (see Table IX). A further analysis of this result revealed that female team participants rated the task demands of a practice session as very low in comparison to how they perceived their ability to cope with those demands. In contrast, they rated the task demands of matches relatively higher but displayed a comparative ability to cope. Therefore their EPS scores revealed an ability to cope with the task demands of competitive matches, despite having rated the match demands as higher in comparison to the practice session.

Although there were no significant differences in the players' perceptions of their ability to cope with the task demands of practice and match situations, the female individuals displayed the greatest level of strain as a result of the competitive matches. The male team and individual players appeared to show less of an ability to cope with the demands of the matches in comparison to the practice session, except for match 2 where the team sport participants displayed an ability to cope with the task demands relative to their practice session.

MATCH PERFORMANCE

The players' standard of performance across practice and match conditions will be discussed only as it represents a more tangible method of assessing an individual's standard of performance, especially when one considers that the matches during a practice session were not full length matches. The results of the subjects ratings of their performance revealed no significant difference between the practice and the match conditions. The data are presented in Table X. All the groups, except the female team participants rated their performance during a practice session, as 'average' or slightly 'above average'. The *FT* group rated their performance during practice as 'below average'. The male individual participants were the only group who felt that they performed better in the practice session in comparison to all three matches. It is apparent that both the male and female team participants never rated their performance in a competitive match as 'below average' and this may be related to the fact that these players feel more confident about their performance as they are being evaluated within a team context in comparison to individual players who are evaluated in isolation.

An interesting observation is noticed when one examines the coaches' ratings of their respective players' performance. Not only were the coaches' ratings elevated for all the groups, but the female team participants' performance during their practice session was rated as 'good' whereas they had the lowest rating of

themselves as 'below average'. Moreover the male team participants were the only group who coaches rated their performance across all three matches as the same or above what they had rated their players during a practice session. This seems to indicate that the rugby coaches are especially pleased with their players' performance during matches. However, the coaches of the male individual participants rated the standard of their players performance relatively lower in comparison to the other groups.

An analysis of expected performance scores by players revealed that there was no significant difference in their expected performance across practice and match conditions. This trend is presented in Table X. All the groups rated their performance during practice as minimally below 'as expected', whereas the coaches rated all the players' performance, except the male individual participants as 'as expected'. It is interesting to note that all the players rated their performance during matches as below, or the same as their standard of performance for the practice session. The only group who did not follow this trend was the rugby players who rated themselves as 'as expected' for the third match. A similar trend may be seen in the coaches' ratings of their respective players' performance. Only the male team and individual participants' performance received ratings of expected performance higher for two matches than they received during a practice session.

TABLE X: Post-match rating of the standard of performance by player and coach under various conditions: means and standard deviations for all groups.

PERFORMANCE	GROUP	CONDITION			
		PRACTICE	MATCH 1	MATCH 2	MATCH 3
ACTUAL (PLAYER)	MT	3.6 (0.7)	3.4 (0.7)	3.3 (0.6)	3.6 (0.5)
	MI	3.4 (0.7)	2.8 (1.1)	3.1 (1.1)	2.9 (0.7)
	FT	2.8 (0.4)	3.2 (0.9)	3.0 (0.8)	3.1 (0.8)
	FI	3.0 (0.8)	2.9 (1.1)	3.0 (1.1)	3.1 (0.9)
(COACH)	MT	3.8 (0.6)	4.6 (0.5)	3.8 (0.8)	4.3 (0.9)
	MI	3.7 (0.6)	3.1 (1.3)	2.9 (1.1)	3.6 (0.8)
	FT	4.0 (0.6)	3.7 (0.6)	3.7 (1.0)	3.7 (0.9)
	FI	3.7 (0.8)	3.6 (1.1)	3.6 (0.9)	3.6 (0.9)
EXPECTED (PLAYER)	MT	2.8 (0.6)	2.5 (0.5)	2.5 (0.8)	3.0 (0.6)
	MI	2.9 (0.8)	2.6 (0.9)	2.9 (1.0)	2.7 (0.8)
	FT	2.6 (0.7)	2.5 (0.9)	2.5 (0.7)	2.6 (0.5)
	FI	2.8 (0.8)	2.6 (0.8)	2.6 (0.9)	2.9 (0.9)
(COACH)	MT	3.0 (0.6)	3.2 (0.6)	2.6 (0.5)	3.5 (0.7)
	MI	2.7 (0.5)	2.6 (0.8)	2.9 (1.2)	2.8 (0.6)
	FT	3.0 (0.5)	2.7 (0.6)	2.7 (0.9)	2.9 (0.7)
	FI	3.1 (0.6)	2.8 (0.6)	2.8 (0.6)	2.9 (0.7)

BAR indicates a significant difference at $p < 0.05$

Furthermore, the male team participants were the only group which the coaches rated as performing 'as expected' or slightly 'above expectations' for competitive matches. However, an atypical result for this group was observed in the second match in which coaches rated their players' standard of performance as significantly lower than the third match. It is thus apparent that the coaches generally rated their players' standard of performance during a practice session better than what they rated players' performance during matches. In contrast, players seemed to display a general disappointment in their standard of performance irrespective of whether it involved a practice session or a competitive match.

DISCUSSION

This study concerned itself with the examination of the responses to stressful demands of competitive sport on youth sport participants in relation to the nature of the sport and gender of the individual. A general overview of the results presented in this study would seem to indicate that, on the whole, each group was characterised by fairly distinctive and coherent scores and responses. When considering the vast network causality behind an individual's response to varying external demands, these trends encourage further investigation into possible sport-type and gender related differences within a competitive ambience, particularly across practice and competitive conditions. The

central focus of this discussion will consider the possible effects of societal and cultural expectations on the child's perceptual and physiological responses to competitive stress.

It is clear that in the context of traditional school sport in South Africa the difference between team and individual participants' responses to competitive stress was relatively higher in comparison to responses between the sex-groups. The most significant differences between team and individual participants were reflected in their *initial* and *anticipatory* heart rates prior to matches, as well as in the Evaluation of Task Demands for their respective matches. Team athletes in the present study experienced considerable elevation in their heart rate responses prior to competition which may be indicative of higher levels of state anxiety prior to competition in comparison to individual athletes (Martens **et al.**, 1990). A further analysis of participants responses to competitive stress across non-competitive practice sessions and competitive matches revealed the same trends. Team sport participants in general had relatively higher *initial* and *anticipatory* heart rates for matches as opposed to practice sessions in comparison to their individual sports counterparts. These findings contradict the reports that individual sport participants generally experience higher degrees of state anxiety prior to participation in a competitive ambience than players in team sports (Simon and Martens, 1979; Mahoney **et al.**, 1987).

Furthermore the team players in this study appear to attach far more significance to the demands of team sports in comparison to individual players who evaluated the task demands of competitive matches as significantly lower. Although a subsequent examination of the results reveal that male individual players also rated the matches as more demanding than the practice, it is the author's contention that team athletes experienced the demands of participation within a competitive ambience as greater due to their evaluations of the task demands being generally higher across practice as well as match conditions in comparison to individual players. It is tentatively suggested that cultural expectations appear to have a powerful influence on children's perceptual and physiological responses to team sports. It should be noted that the disparity between team and individual participants' responses may be largely a result of the present emphasis on team sports in the traditional 'white' South African school system. The powerful influence of societal and cultural expectations of the role of sport in society in indicated by Boutilier and San Giovanni (1992) who point out that the geography, history, ideology, culture and psychology of a people control the degree to which sport itself will be a significant part of society and which sports, in particular, will ultimately take root. They further suggest that team sports, like rugby and hockey, are more "culture-bound", more embedded to the society's unique constitution. In all probability it is for these reasons that the rugby and hockey players may have experienced more

strain as a result of greater evaluation potential elicited by the supporters, particularly 'significant others' such as Headteachers and coaches. On the whole rugby and hockey are more highly valued among 'white' South Africans than squash, tennis and athletics. Furthermore, the reluctance of certain rugby players and their respective coaches to assessing responses during critical matches is merely an indication of the amount of pressure put on schoolboys to excel in performance. This may well be reflected in the significantly higher level of competitive trait anxiety (*CTA*) reported by the rugby players in comparison to their individual sports counterparts. Although these findings are contrary to the social evaluation theory which postulates that *CTA* would be significantly elevated for individual than for team players due to the greater evaluation capacity which exists when performing alone (Martens **et al.**, 1990), it is in all probability due to the fact that far more importance is attached to winning a rugby or a hockey game for the sake of the school's reputation.

Bearing in mind these factors, one cannot ignore that gender related differences may well appear within a competitive ambience as competitive sport has traditionally been viewed as an arena for masculine behaviours. With reference to the present selection of elite female athletes one would have expected that gender related differences would be disappearing, especially at this level, given the increasing opportunities for girls in sport

(Lirgg, 1991). The most noticeable difference in the psychological profile of the two sex-groups was revealed in the SCAT scores. Female participants in the present study, irrespective of sport-type, presented significantly higher *CTA* levels in contrast to the males who had scores varying in relation to the type of sport played by them. Moreover the female participants, irrespective of the nature of the sport, were not overly confident about coping adequately with the demands of the matches as reflected in their greater perception of strain. A further analysis of the results across practice and match conditions revealed that female team players were under considerable strain at practice sessions, and yet appeared to be able to cope with the match demands despite their perception of the matches as being more demanding than the practice session. This was probably due to the fact that many of the subjects were top players in the league in which they were playing, and consequently displayed an ability to cope with the demands of competitive matches. However, their individual counterparts demonstrated a greater level of strain across all three matches. The males, both in team and individual sports demonstrated an ability to cope with the match demands. This apparent difference in confidence between males and females is perhaps related to the relatively recent acceptance of women to compete in sports (LeUnes and Nation, 1990). However, it must be pointed out that a strong possible reason for there being no significant difference in the players' perceptions of their ability to cope

with task demands of practice or under match conditions may in all probability due to players competing in matches of varying standards.

It is apparent that the culture of South African society seems to have an interrelated influence on the perception of youth participants' physical selves. In the context of the South African school system one may observe that gender related differences in the participants' physical self-perceptions are partially echoed in the responses of team and individual players. Mention has been made that team sports appear to bear greater significance in the traditional South African school sporting ambience in comparison to individual sports, hence it is not unexpected that team participants in the present study, because of the sometimes intense pressure placed on them, perceive themselves as having a slightly lower perception of their *sporting* and *athletic ability*, and suppressed feelings of *Physical Self-Worth* (*PSW*) and *Body* image in comparison to their individual counterparts. The male players in this study consequently may not have perceived themselves to fit the 'macho' image traditionally portrayed by rugby players as they did not generally seem to be large and muscular. A further factor which could be related to a lower self-image portrayed by these players may well be due to them not being 'top' teams. Moreover, it has been pointed out that the male participants level of *CTA* differed in relation to sport-type. Martens and co-authors (1990) revealed

that *CTA* has been found to be directly associated to underlying perceptions of self-worth in the achievement realm of competitive sport. Given the significant status of rugby in South Africa and the pressure placed on these boys to uphold this tradition, it is not surprising that the rugby players had a significantly higher *CTA* and lower perception of their physical self compared to individual participants.

Due to a constant portrayal by the media of the ideal female who is inevitably tall and slim (Tinning, 1991), it is of interest to note that the females in this study presented the lowest *Body* image. The lowered sense of *Physical Self-Worth* of the females in the present study, although not as dramatic as their suppressed *Body* image, illustrates that society's gender expectations regarding female participation in the domain of competitive sport may not be as apparent among elite female athletes, due to the increasing opportunities for female participation (Lirgg, 1991). Despite the heightened perception of the female participants' *Condition* and *Strength*, they tend to follow society's expectations of a poorer self-perception in comparison to males.

Although the focus of this discussion has centred on society's influence on the perceptual and physiological responses of youth sport participants to competitive stress, differences were noted in some of the physiological measures recorded for males and females which were not necessarily related to this factor. Female

participants in this study generally had higher *highest* and *average* heart rates in comparison to their male counterparts. It may be argued that as a result of the physical demands of the warm-up, females in this study experienced more physiological strain. It is the author's contention that the contributing factor is more of a physical than a psychological nature, and hence diverging from the trend demonstrated in the *initial* and *anticipatory* heart rate responses of the participants which have been discussed previously.

In the same vein, it may be argued that team sport participants experienced elevations in *highest* heart rate which were more likely due to the physical demands of the warm-up outweighing the psychological factors associated with competitive stress. The warm-up of team and individual participants differed, with team players including more intense activities such as sprinting whereas the activities of individual players encompassed stretching and moderately paced running. The changes in the participants' *highest* and *average* heart rates prior to a practice session and a match may also be ascribed to the physical demands experienced during the two conditions. The duration of the warm-up prior to a game was much less, possibly causing a decrease in these heart rate responses. Furthermore individual participants recorded relatively lower *highest* and *average* heart rates prior to matches compared to team participants which was in all probability due to their participation in a less demanding warm-

up. One may therefore contend that once again the physical demands of the warm-up of team and individual participants were largely responsible for the differences in *highest* and *average* heart rate whereas socio-cultural factors were more responsible for changes in participants *initial* and *anticipatory* responses prior to competitive matches. Thus it may be seen that there is a vast network causality behind an individual's response to varying external demands in the present study, ranging from cultural to physical factors.

Despite the marked elevations in some of the parameters of perceptual and physiological responses of team participants in the present study, this did not seem to have a substantial effect on their performance within a competitive ambience. Team players may well have felt more confident about their performance as they are within a team situation whereas the individual players were possibly less confident as they are evaluated in isolation. Moreover a subsequent analysis of practice and match results revealed that the male individual players were the only group who felt that they performed better in a practice session in comparison to match play. However, one cannot ignore the fact that on the whole rugby players competed in relatively easier matches and perceived less strain, and this may have contributed to an artificially elevated confidence level for team players in general. Furthermore, both male and female team participants had better ratings of their performance during competitive matches

and this may be due to them feeling more confident about their performance as they were being evaluated within a team context compared to individual players who are evaluated in isolation. It is interesting to note that the coaches in general rated the players' performance as higher than the ratings of the player's themselves which may be possibly due to the perceived pressure from the self and others to do well, and consequently they are rarely satisfied with their performance. Furthermore coaches generally rated their players' standard of performance during a practice session better than what they rated players' performance during matches. In contrast, players seemed to display a general disappointment in their standard of performance irrespective of whether it involved a practice or a match.

It is clear from the present study that although some differences appear to exist between male and female responses within a competitive ambience, the degree of difference is far more substantial between team and individual participants' perceptual and physiological responses to competitive stress, particularly for competitive matches as opposed to practice sessions. It may be argued that in general the trends seem to indicate that team sport participants have higher pre-competitive state anxiety than individual sport participants although this did not seem to have a significant effect on their performance during matches. The high probability of diverse unaccountable factors impinging on the individual may have contributed to the low levels of

significance that were obtained for some of the variables. Nevertheless, the results appear to indicate that cultural background played a major role in obtaining results which are contrary to much of the literature in that rugby and hockey, as team sports, are more highly valued by 'white' South Africans and therefore these players may experience more pressure and tension as they perceive the results of these sports as being far more important to the school.

As an individual's sport performance is influenced by an intricate interaction between psychological make-up, perceptual responses to competition and physical prowess, it is clearly evident that one needs to establish a performance profile for each participant in order to apply the appropriate motivational approach prior to competition and to implement suitable intervention strategies in order to attain optimal performance.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

AIMS OF THE STUDY

In view of the relative lack of attention given to youth sport in general and even less to female participation, this study sought to examine children's responses to competitive stress. With South Africa's recent re-admission into the international competitive sports domain, the numbers of youth participants who spend part of their days training or competing in sport are constantly escalating. Cahill and Pearl (1993) recommend that a concern about the consequences of this intense athletic pressure needs to be voiced. It was the prime aim of the present project to address the question of how this involvement affects participants.

Moreover, as most of the competitive stress research has centred on males (Scanlan and Passer, 1979), the purpose of the present study was to extend the existing knowledge of competitive stress to include female athletes and in fact to identify possible gender related differences. A current concern of some researchers has been the apparent lack of self-confidence of females in physical performance when compared to males (Lirgg, 1991).

A further objective of the project was to evaluate the nature of the sport itself as a potential source of stress for much of the literature view individual sport participants as exhibiting greater pre-competitive anxiety than team sport participants (Simon and Martens, 1979; Mahoney **et al.**, 1987).

A multidisciplinary approach to the examination of competitive stress was undertaken as many complex questions concerning children in sport are influenced by an intricate interaction of psychological, physiological and kinesiological factors (Gould, 1982). As the majority of performance testing under conditions of stress has been conducted in the laboratory setting (Scott, 1990), an *in field* study was considered appropriate in eliciting a 'natural' strain response as revealed by the individual's affective and somatic responses within a competitive sporting ambience. Moreover Duda (1993a) recently acknowledged the void of field work in the area of youth sport and recommends that more field studies are required.

The questions addressed aimed at determining whether or not there were significant differences between the following groups; males and females, team and individual sport participants, and male team and individual participants and female team and individual participants in respect of their physiological, perceptual and performance responses.

METHOD

In an attempt to collect data in a naturalistic youth sport ambience the subjects in the present study were tested in the stressful competitive environment of a number of sporting activities which were identified by the schools as being their premier sports. A sample of forty First team participants at high school volunteered to participate in the project. Subjects were involved in either hockey, rugby, squash, tennis or athletics, or in a combination of more than one of these sports. The subjects were then categorised according to their sex and the type of sport they competed in. The breakdown of the groups was as follows:

M = Male subjects
F = Female subjects
T = Team sport participants
I = Individual sport participants
MT = Male team participants
MI = Male individual participants
FT = Female team participants
FI = Female individual participants.

General demographic information of age, sex, race, sport and standard of performance, together with SCAT, TEOSQ and PSPP and *reference* heart rate were collected at the first testing session. The next four sessions occurred *in field*. In accordance with Borg's (1978) concept of the "effort triad", physiological, perceptual and performance variables were included for assessment at these testing sessions. The first *in field* session was used to establish base-line responses (physiological, perceptual and

performance) during a non-competitive practice session. Inter-school matches of a highly competitive ambience were selected for the subsequent three *in field* sessions.

Physiological parameters during *in field* testing included *initial*, *average*, *highest* and *anticipatory* heart rate measures which were collected immediately prior to the practice session or pending match by means of telemetric heart rate monitoring.

The perceptual parameter involved the use of PSS to obtain a rating of task demands (practice session or the pending match) and the subject's perceived ability to cope with these demands in order to assess the individual's perception of the match and the amount of strain experienced by the subjects prior to competition.

The performance variable included the actual match result as well as a rating from both player and coach immediately after the matches in order to obtain some tangible measure of the standard of performance.

Statistical analyses of these data were performed as follows: Basic descriptive statistics were conducted to acquire demographic data of the group. Two-factor analysis of variance was used to assess whether there was indeed a difference between the sexes or between the type of sports under conditions of competitive stress, for each of the parameters under investigation. Tukey's post hoc analyses were run to identify specific areas of differences. Finally, a two-factor analysis of

variance was used to evaluate the responses across the practice and match conditions.

RESULTS

Three psychometric inventories (SCAT, TEOSQ and PSPP) were utilised to provide a psychological profile of the subjects. This study produced results which indicated that females had a significantly higher competitive trait anxiety (*CTA*) score in comparison to males. This finding is commensurate with previous research findings investigating gender related differences in *CTA* (Martens **et al.**, 1990). Although there were no significant differences in *CTA* for team and individual participants, the *MT* group had a significantly higher *CTA* in comparison to their individual counterparts. It should be noted that the latter finding is contrary to the social evaluation theory which hypothesizes that *CTA* would be higher for individual than for team participants due to the greater evaluation potential that exists when performing alone (Martens **et al.**, 1990).

The results of the TEOSQ illustrated that there were little difference in the responses of males and females; with both groups scoring significantly higher in *task* orientation. Interestingly, the results of the males are contrary to previous research (Gill, 1988; White and Duda, 1994) who found males to be more *ego*-oriented. Both team and individual participants were significantly higher in *task* orientation; thus the results of all

four sub-groups are reflective of a general dominance of *task* orientation.

Consistent with the authors of PSPP, Fox and Corbin (1989), the present study was also successful in identifying differences in the components that form the physical self in relation to gender. Females, irrespective of the nature of the sport, had an elevated perception of their *Condition* and *Strength* compared to males in this study; yet they were inclined to model society's expectations of a poorer self-perception of their *Body* and a lowered sense of *Physical Self-Worth* in relation to males. Team participants perceived themselves as having a slightly lower perception of their sporting and athletic ability, and suppressed feelings of *Physical Self-Worth* and *Body* image in comparison to their individual counterparts which may be due to the intense pressure that may be placed on them at times.

There was an overall effect in the physiological variables of the group as a whole under conditions of competitive stress. Significant increases were noted in *initial* and *anticipatory* heart rates among team participants, particularly prior to competition. This result seems to indicate that team sport players in the present study experienced greater pre-competitive state anxiety levels prior to competition. There were no significant differences in these responses between the two sex-groups. However, females had significantly higher *highest* and *average* heart rates than the males when the practice and matches

were observed. This finding may be due to the physical demands of the warm-up. Once again team sport participants recorded significantly higher *highest* heart rates compared to individual participants but there were no significant differences in their *average* heart rate recordings. A different trend was evident when one observed the *highest* and *average* heart rate recordings of the group across practice and match conditions. These heart rate measures seem to decrease prior to competition and this may be related to the duration and the physical demands of the two conditions. Both the male and female individual participants experienced significant decreases in their *highest* heart rate responses, while only the *MI* group experienced significant decreases in their *average* heart rate across all three matches compared to the practice session.

The results of the PSS ratings during practice and match conditions revealed great variability in responses. This was no doubt due to the fact that the players were playing in matches against opposition of varying strengths, and the players themselves were of different playing standards. The results of the Evaluation of Task Demands (ETD) revealed that there were no significant differences between the two sex-groups in ETD, however a significant difference was observed between team and individual participants. Team players rated the task demands significantly higher compared to individual players which may related to the fact that far more importance is attached to

winning a team game for the sake of the school's name. All the subjects in the present study rated the matches as more demanding than the practice session, to a greater or lesser extent. The female team players were the only group to experience a significant increase across all three matches in comparison to the practice session whereas the *FI* group was the only group who did not experience significant differences across the two conditions.

The Evaluation of Perceived Strain (EPS) gives a tangible measure of the level of strain being experienced. The EPS scores indicate that there were no significant differences in the perception of strain between the two sex-groups, nor between team and individual players. However, it is interesting to note that the females, irrespective of the nature of the sport, appeared to be somewhat strained by the demands of the matches. In comparison both the *MT* and *MI* groups demonstrated a balance between the demands of the match and their ability to cope with these demands. The EPS scores also indicated that all the groups tended to cope better with the demands of the practice session in comparison with the matches, except for the female team participants. Although there were no significant differences in the players' perceptions of their ability to cope with the task demands across the two conditions, the *FI* group displayed the greatest level of strain as a result of competitive matches.

Performance evaluations in terms of win-loss outcome revealed that male players scored significantly more wins than the females. Although there were no significant difference between team and individual participants' win-loss outcome, team results across all groups were more successful than the individual results.

The actual performance ratings revealed that no significant differences exists between the two sex-groups nor between team and individual players in terms of the players' ratings of their performance. The male team players appeared to display the most satisfaction in their performance which may be due to the fact that on the whole rugby players competed in relatively easier matches. It is interesting to note that the coaches' ratings of their players' performance were elevated in comparison to the players' ratings of themselves. There were no significant differences in the coaches' ratings of the two sex-groups actual standard of performance, however team sport participants were rated as performing significantly better in comparison to their individual counterparts. Furthermore the *MT* group's standard of performance was rated significantly better in comparison to the *MI* group's performance. The results of the subjects ratings of their performance revealed no significant between the practice and match conditions. The male individual players were the only group who felt they performed better in the practice session in comparison to all three matches. No significant differences existed in the coaches' ratings of their respective players'

performance across practice and match conditions for all the groups, however the coaches ratings were elevated in comparison to the players' ratings of themselves.

The results of players' expected performance indicated that the participants in this study, especially the team and female participants as a whole displayed a general disappointment in their standard of performance. There were no significant differences in players' expected performance across practice and match conditions. However, coaches generally rated their players' standard of performance during a practice session better than what they rated players' performance during matches. In contrast, players appeared to demonstrate a general disappointment in their standard of performance irrespective of whether it involved a practice session or a competitive match.

HYPOTHESES

In light of these results a tentative acceptance or rejection of the overall null hypothesis will ensue. As the three sub-hypotheses are related to physiological, perceptual and performance responses respectively, they will be discussed separately. It is further pointed out that a significant difference in only one sub-group will lead one to reject the null hypothesis.

Hypothesis 1A : A rejection of the null hypothesis.

The findings of this study lead one to tentatively to accept the Alternative Hypothesis that there was a difference between males and females and team and individual participants with regard to their physiological responses. Specifically, males and females differed significantly in their *highest* and *average* heart rate measures, while team and individual participants differed significantly in *initial*, *anticipatory* and *highest* heart rate responses. The *MT* and *MI* groups also differed significantly on the latter three measures whereas the *FT* and *FI* groups differed significantly in their *initial* and *highest* heart rates. Furthermore the *MI* and *FI* groups differed significantly in their *highest* heart rate measures whereas the *MT* and *FT* groups differed significantly in terms of *average* heart rate responses. Significant differences were further found in subjects' heart rate responses across practice and match conditions. Team sport participants, particularly the females, experienced significant elevations in *initial* heart rate prior to competition. Team sport players' *anticipatory* responses on the whole differed significantly in comparison to individual participants prior to competition. Both the male and female individual participants experienced significant differences in their *highest* heart rate measures prior to competition in comparison to team players. Finally, the male individual participants as well as the *MT* and *FT* groups experienced significant differences in their *average* heart rate responses across practice and match conditions.

Hypothesis 1B : A rejection of the null hypothesis.

The findings of this study lead one to tentatively accept the Alternative Hypothesis that there was a difference between males and females and team and individual participants with regard to their perceptual responses. Team and individual sport participants differed significantly in terms of their Evaluation of Task Demands (ETD). Both the *MT* and *MI* and the *FT* and *FI* groups differed significantly in terms of these responses. However, statistically significant differences were not observed between male and female subjects' responses to ETD. Neither were there any significant differences among all the sub-groups on the Evaluation of Perceived Strain (EPS). Significant differences were observed in the subjects' ETD across practice and match conditions. The male team and individual participants, and particularly the female team participants showed significant increases in their ETD responses prior to competition. However no significant differences were observed among all the sub-groups in EPS across practice and match conditions.

Hypothesis 1C : A rejection of the null hypothesis.

The findings of this study lead one to tentatively accept the Alternative Hypothesis that there was a difference between males and females and team and individual participants with regard to their performance evaluations. In terms of win-loss outcome significant differences were observed between males and females, with the males scoring significantly more wins. No statistical

significant differences were found between team and individual participants in terms of win-loss outcome. However, significant differences were observed in the coaches ratings of their players' actual standard of performance. Team players' performance, particularly the males, were rated significantly higher in comparison to the coaches ratings of the individual players' standard of performance. There were no statistical significant differences in players' expected performance ratings. Neither were there any statistical significant differences in players' actual and expected performance across practice and match conditions.

CONCLUSIONS

It was beyond the scope of this project to solve all the problems of stress-perception analysis in youth sport settings; therefore this project was delimited to an *in field* investigation of competitive stress in youth sport participants using the Perceived Strain Scale to analyze stress perception, heart rate measures to reflect strain responses and performance evaluations to consider the consequent effects these responses had on the subjects' standard of performance.

Based on the findings of the study the following conclusions were drawn:

The subjects were a fairly homogenous group of First team school participants who valued competitive sport very highly. The females and the male team participants had the highest competitive anxiety traits. All the participants displayed a general dominance of *task* orientation to sport. In terms of the subjects' perceptions of their physical selves; females on the whole had an elevated perception of their *Condition* and *Strength* compared to males, yet they had a poorer self-perception of their *Body* and a lowered sense of *Physical Self-Worth* in relation to males. Similarly, team sport participants perceived themselves as having a lower perception of their sporting and athletic ability, and suppressed feelings of *Physical Self-Worth* and *Body* image compared to their individual counterparts.

It appears that the culture of South African society seems to have an interrelated influence on the psychological profile of youth participants. With reference to the present selection of elite female athletes it was expected that gender related difference would not be as apparent as in the past. However female participants, irrespective of the sport-type had higher competitive trait anxiety levels in contrast to the males. The poorer perception of the females' physical selves was nevertheless not as substantial as the difference observed in their competitive trait anxiety levels; thus indicating that the

domain of competitive sport may not be perceived as particularly inappropriate for elite female athletes as in the past.

As team sports appear to bear greater significance in the traditional South African school sporting ambience compared to individual sports, it was not unexpected that team participants (particularly the males) in the present study had a poorer self-image because of the intense pressure placed on them at times. Furthermore only the male team participants had exceptionally high competitive trait anxiety levels. This result was not surprising given the significant status of rugby in South Africa and the pressure placed on these boys to uphold this tradition.

In the context of traditional school sport on South Africa it appears that the difference between team and individual participants' responses to competitive stress was relatively higher in comparison to responses between the two sex-groups. Team athletes in the present study experienced substantial elevation in their heart rate responses prior to competition which may be seen to be indicative of higher levels of state anxiety prior to competition compared to individual athletes. Furthermore the team players seem to attach far more importance to team sports as they evaluated the task demands of competitive matches as significantly higher in comparison to the individual players. It is noted that the disparity between team and individual participants' responses is largely the result of the

present emphasis on team sports in the traditional 'white' South African school system. Hence it is tentatively suggested that cultural expectations appear to have a powerful influence on children's perceptual and physiological responses to team sports. It is for these reasons that the results obtained are contrary to much of the literature which states that individual sport participants generally encounter higher levels of state anxiety prior to competition than players in team sports.

The female participants in the present study, irrespective of the nature of the sport were not overly confident about coping with the demands of the matches as reflected in their greater perception of strain. However, it must be noted that players were competing in matches of varying standards and this may in all probability affected the players' perceptions of their ability to cope with matches. This was especially apparent in the rugby players' responses. Rugby players generally competed in relatively easier matches and this may consequently contributed to an artificially elevated confidence level for these players.

Although the main influence on the perceptual and physiological responses of youth sport participants to competitive stress stems from societal expectations, differences were noted in some of the physiological measures of males and females and team and individual participants which were in all probability related to physical factors. Thus it is apparent that there is a vast

network causality behind an individual's response to varying external demands in the present study, ranging from cultural to physical factors.

Despite the significant elevations in some of the perceptual and physiological responses of team participants in the present study, this did not seem to have a substantial effect on their performance within a competitive ambience. Players on the whole seem to display a general disappointment in their standard of performance which may be possibly related to the perceived pressure from the self and others to do well, resulting in a dissatisfaction with their performance.

In respect of this research project the overall null hypothesis was rejected as significant differences were observed in all three sub-hypotheses which pertained to the physiological, perceptual and performance responses of males and females and team and individual participants to competitive stress. The results of the present study indicate that although differences appear to exist between male and female responses within a competitive ambience, the magnitude of difference was far more notable between team and individual participants' perceptual and physiological responses to competitive stress, particulary for competitive matches as opposed to practice sessions. The high probability of diverse unaccountable factors encroaching on the individual may have contributed to the low levels of significance

that were obtained for some of the variables. Nonetheless, the results seem to demonstrate that cultural background played a major role in obtaining results which are contrary to previous research findings in that rugby and hockey, as team sports, are more highly valued by 'white' South Africans and hence these players may encounter more pressure and tension as they perceive these sports as being far more important to the school.

From the above results it is evident that an individual's sport performance is influenced by an complex interaction between psychological make-up, perceptual responses to competition as well as physical prowess. There is a need to meet the challenge of understanding the uniqueness of individual physiological and affective responses to competition by means of establishing a performance profile for each participant. In so doing one may be able to understand, monitor and adjust behaviour more accurately and with greater confidence in order to attain optimal performance.

RECOMMENDATIONS

The present study by virtue of its integrated *in field* approach appears to have been particularly worthwhile in challenging a greater understanding of the complexity of the youth sport participants' behavioral responses to performing in a

competitively stressful ambience. However, due to the logistical constraints experienced in the present study, such as geographic location, demographic composition of the schools examined, and not least a limit on time, it is suggested that the following recommendations for future research be considered.

During the present study only subjects in the age range 15 -19 years were assessed. It may be necessary to assess a younger age group to cover the full spectrum of youth sport participants. This may provide a fuller understanding of the factors influencing competitive stress as they may differ with the developmental stage of the child.

The present sample was largely comprised of 'white' subjects. It is suggested that further studies in this research area should also identify other ethnic groups within the South African population as sub-cultural influences need to be considered.

Due to the diverse unaccountable factors impinging on the results of a project of this nature it is recommended that subjects be examined during the entire competitive season. It is also suggested that subjects be monitored during a full-length practice match in order to enhance the comparisons across practice and competitive match conditions.

With more and more South African youth participants being exposed to international competition on a large scale, it would be worthwhile to include participants of a greater variety of activities. In this way coaches can become more sensitive to the idiosyncrasies in strain responses in order to enhance the child's performance.

Although heart rate responses are recognised as being highly reflective of the overall activities of the organism, cognisance must be taken of the interrelationship between the central and autonomic nervous system in the experience of stress. Thus in addition to monitoring blood pressure and ventilation rate it is recommended that endocrinal activity be monitored due to it being highly sensitive to emotion-inducing stimuli. Thus a "battery approach" where various physiological measures are used, as suggested by Smith **et al.** (1988), is recommended in future research.

REFERENCES

Note: Asterisked citations are secondary sources. These were not directly consulted and are referenced as fully as primary sources, indicated in brackets, permit.

Andersen MB and Williams JM (1987). Gender role and sport competition anxiety: A re-examination. Research Quarterly for Exercise and Sport, 58 (1): 52-56.

Armstrong N and Bray S (1991). Physical activity patterns defined by continuous heart rate monitoring. Archives of Disease in Childhood, 68: 245-247.

Astrand PO and Rodahl K (1986). Textbook of Work Physiology. New York: Mc Graw-Hill Co. Publishers.

Atkinson RL (1964). An Introduction to Motivation. Princeton, New Jersey: D Van Nostrand.

Bakker FC, Whiting HTA and van der Brug H (1990). Sport Psychology: Concepts and Applications. J Wiley and sons: Chichester, England, pp. 8-46.

Balogun JA (1987). The interrelationships between measures of physical fitness and self-concept. Journal of Human Movement Studies, 13: 255-265.

Bandura A (1977). Self-Efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84 (2): 191-215.

Bandura A (1986). Social Foundations of Thought and Action: A Social Cognitive Theory. Englewood Cliffs, New Jersey: Prentice-Hall.

Biddle S (1993a). Motivation and Participation in Exercise and Sport. Proceedings: Eighth World Congress in Sport Psychology. University of Lisbon, June, Lisbon, Portugal, pp. 22-42.

Biddle S (1993b). Children, exercise and mental health. International Journal of Sport Psychology, 24 (2): 200-216.

Bird AM and Horn MA (1990). Cognitive anxiety and mental errors in sport. Journal of Sport and Exercise Psychology, 12: 217-222.

Booth PI (1985). A geometric interpretation of the effects of anxiety on test performance. The Mathematical Intelligencer, 7 (4): 56-63.

Borg G (1970). Perceived exertions as an indication of somatic stress. Scandinavian Journal of Rehabilitative Medicine, 2: 92-98.

Borg G (1978). Subjective aspects of physical and mental load. Ergonomics, 21 (3): 215-220.

Borkovec TD (1976). Physiological and cognitive processes in the regulation of anxiety. In GE Schwartz and D Shapiro (eds): Consciousness and Self-regulation: Advances in Research (volume 1). New York: Plenum Press, pp. 261-312.

Borkovec TD (1981). Stress management in athletics: an overview of cognitive and physiological techniques. Motor Skills: Theory into Practice, 5 (1): 45-52.

Boutilier MA and San Giovanni LF (1992). Individual and team sports in the Olympics: a question of balance. International Review for the Sociology of Sport, 27 (2): 177-191.

* Boyd M, Callaghan J and Yin Z (1991). Ego-involvement and low competence in sport as a source of competitive trait anxiety. Proceedings, North American Society for the Psychology of Sport and Physical Activity, June, Asilomar, California. (see Duda,1993a).

Bressan E (1992). Children in sport. In J R Potgieter (ed): Readings in Sport Psychology. Stellenbosch: University of Stellenbosch, pp. 60-67.

Broadhurst PL (1957). Emotionality and the Yerkes-Dodson law. Journal of Experimental Psychology, 54 (5): 345-352.

Brustad R and Weiss MR (1987). Competence perceptions and sources of worry in high, medium and low competitive trait-anxious young athletes. Journal of Sport Psychology 9 (2): 97-105.

Burns R (1982). Self-Concept Development and Education. Eastbourne, London: Holt, Rinehart and Winston.

Burton D (1988). Do anxious swimmers swim slower? Reexamining the elusive anxiety-performance relationship. Journal of Sport and Exercise Psychology, 10 (1): 45-61.

Cahill BR and Pearl AJ (1993). Intensive Participation in Children's Sports. American Orthopaedic Society for Sports Medicine. Champaign, Illinois: Human Kinetics Publishers, pp XI - XIII.

Cannon WB (1929). Bodily Changes in Pain, Hunger, Fear and Rage. New York: Appleton.

Cannon WB and de la Paz D (1911). Emotional stimulation of adrenal secretion. American Journal of Physiology, 28: 64-70.

Carroll JD and Wish M (1974). Multidimensional perceptual models and measurement methods. In EC Carterette and PF Morton (eds): Handbook in Perception (volume 2). New York: Academic Press, pp. 391-443.

Caruso CM and Gill DL (1992). Strengthening physical self-perceptions through exercise. The Journal of Sports Medicine and Physical Fitness, 32: 416-427.

Charteris J, Cooper LA and Bruce JR (1976). Human Kinetics: A conceptual model for studying human movement. Journal of Human Movement Studies, 2 (4): 233-238.

Cherry N (1978). Stress, anxiety and work: a longitudinal study. Journal of Occupational Psychology, 51: 259-270.

Coakley JJ (1982). Sport in Society: Issues and Controversies. St Louis, Missouri: C V Mosby.

Coakley JJ (1987). Children and the sport socialization process. In D Gould and MR Weiss (eds): Advances in Paediatric Sport Sciences (volume 2) Behavioral Issues. Champaign, Illinois: Human Kinetics Publishers, pp 43-60.

Coddington RD (1972). The significance of life events as etiological factors in the disease of children. II A study of normal population. Journal of Psychosomatic Medicine, 16: 205-213.

Cohn PJ (1990). An exploratory study on sources of stress and athletic burnout in youth golf. The Sport Psychologist, 4: 95-106.

Coleman JS (1961). Athletics in high school. Annals of the American Academy of Political and Social Science, 338: 33-43.

Cox T (1985). The nature and measurement of stress. Ergonomics, 28 (8): 1155-1163.

Cox T (1986). Stress. London: Macmillan Education Ltd.

Cox T (1988). Psychobiological factors in stress and health. In S Fisher and J Reason (eds): Handbook of Life Stress, Cognition and Health. New York: J Wiley and Sons, pp. 603-615.

Cox T and Mackay C (1985). The measurement of self-reported stress and arousal. British Journal of Psychology, 76: 183-186.

Cox T and Ferguson E (1991). Individual differences, stress and coping. In CL Cooper and R Payne (eds): Personality and Stress: Individual Differences in the Stress Process. Chichester: J Wiley and Sons, pp. 7-30.

Crandall VC (1969). Sex differences in expectancy of intellectual and academic reinforcement. In CP Smith (ed): Achievement-related Motives in Children. New York: Sage Publications, pp. 121-150.

Davies S (1993). Lifestyle orientation of high versus low achievers in traditional school sports: an holistic analysis. Unpublished Masters Thesis. Rhodes University, South Africa.

de Vries H (1980). Physiology of Exercise for Physical Education and Athletes. Dubuque, Iowa: Wm C Brown Company Publishers.

Dewe P, Cox T and Ferguson E (1993) Individual strategies for coping with stress at work: A review. Work and Stress, 7 (1): 5-15.

Duda JL (1987). Toward a developmental theory of children's motivation in sport. Journal of Sport Psychology, 9 (2): 130-145.

Duda JL (1989). The relationship between task and ego orientation and the perceived purpose of sport among high school athletes. Journal of Sport and Exercise Psychology, 11: 318-335.

Duda JL (1993a). Goals: A social-cognitive approach to the study of achievement motivation in sport. In RN Singer, M Murphy and LK Tenant (eds): Handbook of Research on Sport Psychology. New York: Macmillan Education Ltd., pp. 421-436.

Duda JL (1993b). A goal perspective theory of meaning and motivation in sport. Proceedings: Eighth World Congress in Sport Psychology. University of Lisbon, June, Lisbon, Portugal pp. 65-81.

Duda JL and Nicholls JG (1992). Dimensions of achievement motivation in schoolwork and sport. Journal of Educational Psychology, 84: 1-10.

Duda JL, Fox KR, Biddle SJH and Armstrong N (1992). Children's achievement goals and beliefs about success in sport. British Journal of Educational Psychology, 62: 313-323.

Durant RH, Baranowski T, Davis H, Rhodes T, Thompson WO, Greaves KA and Puhl J (1992). Reliability and variability of indicators of heart-rate monitoring in children. Medicine and Science in Sport and Exercise, 25 (3): 389-395.

Easterbrook JA (1959). The effects of emotion on cue utilisation and the organisation of behaviour. Psychological Review, 66 (3): 183-201.

Ebbeck V and Weiss MR (1988). The arousal-performance relationship: task characteristics and performance measures in track and field athletics. The Sports Psychologist, 2 (1): 13-27.

* Ewing ME (1981). Achievement orientations and sport behaviour of males and females. Unpublished doctoral dissertation. University of Illinois. (see Duda, 1993a).

Feltz DL (1988). Gender differences in the causal elements of self-efficacy on a high avoidance motor task. Journal of Sport and Exercise Psychology, 10 (2): 151-166.

Ferguson GA (1981). Statistical Analysis in Psychology and Education. New York: Mc Graw-Hill Co. Publishers.

Fisher AC (1976). Psychology of Sport. California: Mayfield Publishing Company.

Fisher S (1986). Stress and Strategy. London: Lawrence Erlbaum Associates Ltd.

Fitts WH (1965). Manual: Tennessee Self-Concept Scale. Nashville, Tennessee: Counsellor Recordings and Tests.

Fox KR (1990). The Physical Self-Perception Profile Manual. Illinois: Office for Health Promotion, Northern Illinois University.

Fox KR and Corbin CB (1989). The physical self-perception profile: Development and preliminary validation. Journal of Sport and Exercise Psychology, 11 (4): 408-430.

Frankenhauser M (1991). The psychophysiology of sex differences. In M Frankenhauser, U Lundberg and M Chesney (eds): Women, Work and Health: Stress and Opportunities. New York: Plenum Press, pp 39-41.

Franks BD (1984). Physical activity and stress: Part 1, Acute effects and Part 2, Chronic effects. International Journal of Physical Education, 21 (4): 9-16.

Froehlich WD (1978). Stress, anxiety and the control of attention: A psychophysiological approach. In CD Spielberger and IG Sarason (eds): Stress and Anxiety (volume 5). New York: J Wiley and Sons, pp. 99-130.

Gamberale F (1985). The perception of exertion. Ergonomics, 28 (1): 299-308.

Gill DL (1986). Competitiveness among females and males in physical activity classes. Sex Roles, 15 (5/6): 233-247.

Gill DL (1988). Gender differences in competitive orientation and sport participation. International Journal of Sport Psychology, 19 (2): 145-159.

Goldberger L and Breznitz S (1982). Handbook of Stress: Theoretical and Clinical Aspects. New York: The Free Press (Macmillan Education Ltd.).

Gould D (1982). Sport Psychology in the 1980s: Status, direction and challenge in youth sports research. Journal of Sport Psychology, 4 (3): 203-218.

Gould D (1993). Intensive participation and the prepubescent athlete: competitive stress and burn-out. In BR Cahill and AJ Pearl (eds): Intensive Participation In Children's Sports. American Society for Sports Medicine. Champaign, Illinois: Human Kinetics Publishers, pp 19-38.

Gould D, Horn T and Spreeman J (1983). Sources of stress in junior elite wrestlers. Journal of Sport Psychology, 5 (2): 159-171.

Gould D and Weiss M (1987). Advances in Paediatric Sports Science: II Behavioral Issues. Champaign, Illinois: Human Kinetics Publishers.

Gould D, Petlichkoff L, Simons J and Vevera M (1987). Relationship between competitive state anxiety inventory-2 subscale scores and pistol shooting performance. Journal of Sport Psychology, 9 (1): 33-42.

Griffin MR (1972). An analysis of state and trait anxiety experienced in sports competition at different age levels. Foil, (Spring): 58-64.

Hall MA (1990). How should we theorize gender. In MA Messner and DF Sobo (eds): Sport, Men and the Gender Order. Champaign, Illinois: Human Kinetics Publishers, pp 223-241.

Hanson DL (1967). Cardiac responses to participation in little league baseball competition as determined by telemetry. The Research Quarterly, 38 (3): 384-388.

Harrison RP and Feltz DL (1981). Stress inoculation for athletes: Description and case example. Motor Skills: Theory into Practice, 5 (1): 53-61.

Harter S (1981). A model of intrinsic mastery motivation in children: Individual differences and developmental change. In W Collins (ed): The Minnesota Symposia on Child Psychology (volume 14). Hillsdale, New Jersey: Lawrence Erlbaum Associates Ltd, pp. 215-249.

Harter S (1983). Developmental perspectives on the self-esteem. In M Hetherington (ed): Handbook of Child Psychology: Socialization, Personality and Social Development (volume 4). New York: J Wiley and Sons, pp. 123-148.

Harter S (1985). Competence as a dimension of self-evaluation: Toward a comprehensive model of self-worth. In R Leahy (ed): The Development of the Self. New York: Academic Press, pp. 55-121.

Hatfield BD and Landers DM (1983). Psychophysiology: A new direction for sport psychology. Journal of Sport Psychology, 5: 243-259.

Hobfoll SE (1988). The Ecology of Stress. USA: Hemisphere Publishing Corporation.

Horn TS and Hasbrook CA (1987). Psychological characteristics and the criteria children use for self-evaluation. Journal of Sport Psychology, 9 (3): 208-221.

* Horner MS (1968) Sex differences in achievement motivation and performance in competitive and non-competitive situations. Unpublished doctoral dissertation, University of Michigan.(see Rudisill, 1988).

Jones JG and Cale A (1989). Relationships between multi-dimensional and competitive state anxiety and cognitive and motor subcomponents of performance. Journal of Sports Sciences, 7 (3): 229-240.

Jones JG and Hardy L (1989). Stress and cognitive functioning in sport. Journal of Sports Sciences, 7 (1): 41-63.

Jones G, Swain A and Cale C (1991). Gender differences in precompetition temporal patterning and antecedents of anxiety and self-confidence. Journal of Sport and Exercise Psychology, 13 (1): 1-15.

Kerr JH (1985). The experience of arousal: a new basis of studying arousal effects in sport. Journal of Sports Sciences, 3 (3): 169-179.

Klavora P (1978). An attempt to derive Inverted-U curves based on the relationship between anxiety and performance. In DM Landers and RW Christina (eds): Psychology of Motor Behaviour and Sport. Champaign, Illinois: Human Kinetics Publishers, pp. 369-377.

Krane V (1992). Conceptual and methodological considerations in sport anxiety research: From the Inverted-U hypothesis to a catastrophe theory. Quest, 44: 72-87.

Lacey JI (1967). Somatic response patterning and stress: Some revision of activation theory. In MH Apply and R Trumbell (eds): Psychological Stress: Issues in Research. New York: Appleton-Century-Crofts, pp. 14-42.

Landers DM (1980). The arousal-performance relationship revisited. Research Quarterly for Exercise and Sport, 51 (1): 77-90.

Landers DM (1985). Psychophysiological assessment and biofeedback: Applications for athletes in closed-skill sports. In JH Sandweiss and SC Wolf (eds): Biofeedback and Sport Science. New York: Plenum Press, pp. 63-105.

Landers DM and Boutcher SH (1986) Arousal-performance relationships. In JH Williams (ed): Applied Sport Psychology: Personal Growth to Peak Performance. Palo Alto, California: Mayfield Publishing Company, pp. 163-184.

Lazarus RS (1966). Psychological Stress and the Coping Process. New York: Mc Graw-Hill.

Lazarus RS (1975). The self-regulation of emotions. In L Levi (ed): Emotions: Their Parameters and Measurement. New York: Raven Press, pp. 47-67.

Lazarus RS and Folkman S (1984). Stress, Appraisal and Coping. Berlin: Springer.

Leary PM (1990). The effect of sport on the emotional well-being of school children. PEDMED, South African Paediatric Medicine, 4 (2): 20-22.

Lenney E (1977). Women's self-confidence in achievement settings. Psychological Bulletin, 84 (1): 1-13.

LeUnes AD and Nation JR (1990). Sport Psychology. Chicago, Illinois: Nelson-Hall.

Levi L (1971). Society, Stress and Disease (volume 1): The Psychosocial Environment and Psychosomatic Diseases. London: Oxford University Press.

Lewthwaite R (1990). Threat perception in competitive trait anxiety: The endangerment of important goals. Journal of Sport and Exercise Psychology, 12 (3): 280-300.

Lirgg CD (1991). Gender differences in self-confidence in physical activity: A meta-analysis of recent studies. Journal of Sport and Exercise Psychology, 13 (3): 294-310.

Lirgg CD and Feltz DL (1989). Female self-confidence in sport: Myths, realities and enhancement strategies. Journal of Physical Education, Recreation and Dance, 60 (3): 49-54.

Maccoby EE and Jacklin CN (1974). The Psychology of Sex Differences. Stanford, California: Stanford University Press.

Maehr M and Nicholls J (1980). Culture and achievement motivation: A second look. In N Warren (ed): Studies in Cross-cultural Psychology. New York: Academic Press, pp. 341-363.

Mahoney MJ, Gabriel TJ and Perkins TS (1987). Psychological skills and exceptional athletic performance. The Sport Psychologist, 1: 181-199.

Marsh HW and Peart ND (1988). Competitive and cooperative physical fitness training programs for girls: Effects on physical fitness and multidimensional self-concepts. Journal of Sport and Exercise Psychology, 10 (4): 390-407.

Marsh HW and Shavelson R (1985). Self-concept: Its multifaceted hierarchical structure. Educational Psychologist, 20: 107-123.

Martens R (1976). Competition: In need of theory. In DM Landers (ed): Social Problems in Athletics. Urbana, Illinois: University of Illinois, p. 14.

Martens R (1977). Sport Competition Anxiety Test. Champaign, Illinois: Human Kinetics Publishers.

Martens R (1978). Joy and Sadness in Children's Sport. Champaign, Illinois: Human Kinetics Publishers.

Martens R (1993). Psychological perspectives. In BR Cahill and AJ Pearl (eds): Intensive Participation in Children's Sports. American Orthopaedic Society for Sports Medicine. Champaign, Illinois: Human Kinetics Publishers, pp. 9-17.

Martens R, Vealey RS and Burton D (1990). Competitive Anxiety in Sport. Champaign, Illinois: Human Kinetics Publishers.

Mason JW (1975). Emotion as reflected in patterns of endocrine integration. In L Levi (ed): Emotions - Their Parameters and Measurement. New York: Raven Press, pp. 143-181.

Mead GH (1934). Mind, Self and Society from the Standpoint of a Social Behaviorist. Chicago, Illinois: University of Chicago Press.

McArdle WD; Katch FI and Katch VL (1986). Exercise Physiology: Energy, Nutrition, Human Performance. Philadelphia: Lea and Febiger, pp. 316-319.

Mc Clelland DC (1961). The Achieving Society. Princeton, New Jersey: D Van Nostrand.

McGrath JE (1970). A conceptual formulation for research on stress. In JE McGrath (ed): Social and Psychological Factors in Stress. New York: Holt, Rinehart and Winston, pp. 1-13.

McGrath JE (1976). Stress and behaviour in organisations. In M D Dunette (ed): Handbook of Industrial and Organisational Psychology. Chicago: Rand Mc Nally College Publishing Company, pp. 1351-1396.

Newton M and Duda JL (1993). Elite adolescent athlete's achievement goals and beliefs concerning success in tennis. Journal of Sport and Exercise Psychology, 15 (4): 437-448.

Nicholls JG (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice and performance. Psychological Review, 91 (3): 328-346.

Nideffer RM (1976). Test of attentional and interpersonal style. Journal of Personality and Social Psychology, 34 (3): 394-404.

Nideffer RM (1983). The injured athlete: Psychological factors in treatment. Orthopedic Clinics of North America, 14 (2): 373-385.

Noakes TD (1985). Lore of Running. Cape Town: Oxford University Press, pp. 15-85.

Ogilvie B (1979). The child athlete: Psychological implications of participation in sport. Annals of the American Academy of Political and Social Science, 445: 47-58.

Orlick T and Botterill C (1975). Every Kid Can Win. Chicago, Illinois: Nelson-Hall.

Oxendine JB (1970). Emotional arousal and performance. Quest, 13: 23-32.

Pancheri P and Benaissa C (1978). Stress and psychosomatic illness. In CD Spielberger and IG Sarason (eds): Stress and Anxiety (volume 5). New York: J Wiley and Sons, pp. 61-82.

Passer MW (1982). Psychological stress in youth sport. In RA Magill , MJ Ash and FL Smoll (eds): Children in Sport. Champaign, Illinois: Human Kinetics Publishers, pp. 153-177.

Passer MW (1984). Competitive trait anxiety in children and adolescents. In JM Silva and RS Weinberg (eds): Psychological Foundations of Sport. Champaign, Illinois: Human Kinetics Publishers, pp. 130-143.

Passer MW (1988). Determinants and consequences of children's competitive stress. In FL Smoll, RA Magill and MJ Ash (eds): Children in Sport. Champaign, Illinois: Human Kinetics Publishers, pp. 203-227.

Paterson GD (1992). Self-esteem in youth sport. In JR Potgieter (ed): Readings in Sport Psychology. Stellenbosch: University of Stellenbosch, pp. 68-78.

Peters EM (1983). The psycho-social implications of competitive sport during the middle-childhood years. South African Sports Medicine, 18: 2-7.

Petrie A (1967). Individuality in Pain and Suffering. Chicago: University of Chicago Press.

Porat Y, Lufi D and Tenenbaum G (1989). Psychological components contribute to select young female gymnasts. International Journal of Sport Psychology, 20 (4): 279-286.

Rethorst S and Duda JL (1993). Goal orientations, cognitions and emotions in gymnastics. Paper presented at the Eighth World Congress of Sport Psychology. University of Lisbon, June, Lisbon, Portugal.

Roberts GC (1984). Toward a new theory of motivation in sport: The role of perceived ability. In JM Silva and RS Weinberg (eds): Psychological Foundations of Sport. Champaign, Illinois: Human Kinetics Publishers, pp. 214-228.

Roberts GC (1986). The perception of stress: A potential source and its development. In MR Weiss and D Gould (eds): Sport for Children and Youths. Champaign, Illinois: Human Kinetics Publishers, pp. 119-126.

Rogers CR (1965). Client-centred Therapy: Its Current Practice, Application and Theory. Boston, Massuchusettes: Houghton Mifflin.

Rosenberg M (1965). Society and the Adolescent Self-image. Princeton, New Jersey: Princeton University.

Rosenberg M (1979). Conceiving the Self. New York: Basic.

Rudisill ME (1988). Sex differences in various cognitive and behavioral parameters in a competitive situation. International Journal of Sport Psychology, 19: 296-310.

Ryckman RM, Robbins MA, Thorton B and Cantrell P (1982). Development and validation of a physical self-efficacy scale. Journal of Personality and Social Psychology, 42 (5): 891-900.

Scanlan TK (1982). Motivation and stress in competitive youth sport. Journal of Physical Education, Recreation and Dance, 53 (3): 27-28.

Scanlan TK (1984). Competitive stress and the child athlete. In J M Silva and RS Weinberg (eds): Psychological foundations in Sport. Champaign, Illinois: Human Kinetics Publishers, pp. 118-129.

Scanlan TK and Lewthwaite R (1984). Social psychological aspects of competition for male youth sport participants: 1. Predictors of competitive stress. Journal of Sport Psychology, 6 (2): 208-226.

Scanlan TK and Passer MW (1978). Factors related to competitive stress among male youth sport participants. Medicine and Science in Sports, 10 (2): 103-108.

Scanlan TK and Passer MW (1979). Sources of competitive stress in young female athletes. Journal of Sport Psychology, 1 (2): 151-159.

Scott PA (1990). The development of a psychophysical scale for evaluating self-perceived strain. Unpublished Doctoral Dissertation. University of Stellenbosch, South Africa.

Scott PA (1992). Stress and performance. In JR Potgieter (ed): Readings in Sport Psychology. Stellenbosch: University of Stellenbosch, pp. 12-21.

Scott PA and Candler M (1989). Terrestrial and subaquatic apneic bradycardial responses under resting and working conditions. The Journal of Sports Medicine and Physical Fitness, 29 (4): 335-345.

Scott PA and Swart K (1993). Perceptual, physiological and performance responses to competitive stress in team and individual sports among female youth sport participants. Poster presentation at the Eighth World Congress in Sport Psychology. University of Lisbon, June, Lisbon, Portugal.

Sells SB (1970). On the nature of stress. In JE Mc Grath (ed): Social and Psychological Factors in Stress. New York: Holt, Rinehart and Winston, pp. 134-139.

Selye H (1956). The Stress of Life. New York: Longman.

Sharpley CF, Scuderi CS and Heffernan CJ (1989). Reliability of heart rate reactivity to a psychological stressor. Perceptual Motor Skills, 68: 319-322.

Shavelson R, Hubner JJ and Stanton GC (1976). Self-concept: Validation of construct interpretations. Review of Educational Research, 46: 407-441.

Siddle DAT and Turpin G (1980). Measurement, quantification and analysis of cardiac activity. In I Martin and PH Venables (eds): Techniques in Psychophysiology. New York: J Wiley and Sons, pp. 139-246.

Simon JA and Martens R (1979). Children's anxiety in sport and nonsport evaluative activities. Journal of Sport Psychology, 1 (2): 160-169.

Smith NC, Burwitz L and Jakeman P (1988). Precompetitive anxiety and motor performance: A psychophysiological examination. Journal of Sports Science, 6 (2): 115-130.

Smith RE (1986). A component analysis of athletic stress. In MR Weiss and D Gould (eds): Sport for Children and Youth. Champaign, Illinois: Human Kinetics Publishers, pp. 107-111.

Smith RE and Smoll FL (1982). Psychological stress: A conceptual model and some intervention strategies in youth sports. In RA Magill, MJ Ash and FL Smoll (eds): Children in Sport. Champaign, Illinois: Human Kinetics Publishers, pp. 176-195.

Smith T (1983). Competition anxiety in youth sport: Differences according to age, sex, race and playing status. Perceptual and Motor Skills, 57: 1235-1238.

Smoll FL, Magill RA and Ash MJ (1988). Children in Sport. Champaign, Illinois: Human Kinetics Publishers.

Smoll FL and Smith RE (1989). Competitive stress and young athletes. In CC Teitz (ed): Scientific Foundations of Sport Medicine. Toronto: BC Decker, pp. 375-390.

Sonstroem RJ (1976). The validity of self-perceptions regarding physical and athletic ability. Medicine and Science in Sports, 8 (2): 126-132.

Sonstroem RJ (1984). An overview of anxiety in sport. In JM Silva and RS Weinberg (eds): Psychological Foundations in Sport. Champaign, Illinois: Human Kinetics Publishers, pp. 104-117.

Sonstroem RJ and Bernado P (1982). Intraindividual pregame state anxiety and basketball performance: A re-examination of the Inverted-U curve. Journal of Sport Psychology, 4 (3): 235-245.

Sonstroem RJ, Speliotis ED and Fava JL (1992). Perceived competence in adults: An examination of the Physical Self-Perception Profile. Journal of Sport and Exercise Psychology, 14: 207-221.

Spielberger CD (1966). Anxiety and Behaviour: Theory and Research on Anxiety. New York: Academic Press, pp.3-20.

Spielberger CD (1977). Understanding Stress and Anxiety. Holland: Juta and Co., Ltd in association with Multimedia Publications.

Stewart MJ and Corbin CB (1988). Feedback dependence among low confidence preadolescent boys and girls. Research Quarterly for Exercise and Sport, 59:160-164.

Strømme SB, Wikeby PC, Blix AS and Ursin H (1978). Additional heart rate. In H Ursin, E Baade and S Levine (eds): Psychobiology of Stress: A Study of Coping Men. New York: Academic Press, pp.83-89.

Sutherland VJ and Cooper CL (1990). Understanding Stress: A Psychological Perspective for Health Professionals. London: Chapman and Hall.

Thornton JS (1991). Springing young athletes from the pressure cooker. The Physician and Sports Medicine, 19 (7): 92-99.

Tinning R (1991). Health Orientated Physical Education (HOPE): The case of physical education and promotion of healthy lifestyles. Australian Council for Health, Physical Education and Recreation, Summer: 4-10.

Treasure DC, Roberts GC and Hall HK (1992). The relationship between children's achievement goal orientations and their beliefs about competitive sport (abstract). Journal of Sports Sciences, 10: 629-630.

Treiber FA, Musante L, Hartdagan S, Davis H, Levi M and Strong W B (1989). Validation of a heart rate monitor with children in laboratory and field settings. Medicine and Science in Sport and Exercise, 21 (3): 338-342.

Turner JR (1989). Individual differences in heart rate response during behavioral challenge. Psychophysiology, 26 (5): 497-505.

van Doornen LJP and de Geus EJC (1989). Aerobic fitness and the cardiovascular response to stress. Psychophysiology, 26 (1): 17-28.

van Doornen LJP and van Blokland RW (1992). The relationship between cardiovascular and catecholamine reactions to laboratory and real-life stress. Psychophysiology, 29 (2): 173-181.

Vealey RS (1986). Conceptualization of sport confidence and competitive orientation: Preliminary investigation and instrument development. Journal of Sport Psychology, 8: 221-246.

Vealey RS and Campbell JL (1988). Achievement goals of adolescent figure skaters: Impact on self-confidence, anxiety and performance. Journal of Adolescence Research, 3: 227-243.

Waite BT, Gansneder B and Rotella RJ (1990). A sport specific measure of self-acceptance. Journal of Sport and Exercise Psychology, 12 (3): 264-279.

Wankel LM and Kreisel PSJ (1985). Factors underlying enjoyment of youth sports: Sport and age group comparisons. Journal of Sport Psychology, 7 (1): 51-64.

Watson GG (1984). Intrinsic motivation and competitive anxiety in sport: Some guidelines for coaches and administrators. The Australian Journal of Science and Medicine in Sport, 16 (4): 14-20.

Weiner TS (1982). The measurement of human workload. Ergonomics, 25 (11): 953-965.

Weiner B (1992). Human Motivation: Metaphors, Theories and Research. Newbury Park, California: Sage Publications.

Weiss MR (1987). Self-esteem and achievement in children's sport and physical activity. In D Gould and MR Weiss (eds): Advances in Paediatric Sport Sciences (volume 2): Behavioral Issues. Champaign, Illinois: Human Kinetics Publishers, pp. 87-119.

* Weiss MR (1988). Developmental sport psychology: What's it all about? Paper presented at the American Association for Health Physical Education Recreation and Dance national conference, April, Kansas City. (see Weiss **et al.**, 1990).

Weiss MR (1991). Psychological skill development in children and adolescents. The Sport Psychologist, 5 (4): 335-354.

Weiss MR (1993). Psychological effects of intensive participation on children and youth: self-esteem and motivation. In BR Cahill and AJ Pearl (eds): Intensive Participation in Children's Sports. American Orthopaedic Society for Sports Medicine. Champaign, Illinois: Human Kinetics Publishers, pp. 39-69.

Weiss MR, Ebbeck V, Mc Auley E and Wiese DM (1990). Self-esteem and causal attributions for children's physical and social competence in sport. Journal of Sport and Exercise Psychology, 12 (1): 21-36.

Welford AT (1974). Stress and performance. In AT Welford (ed): Man under Stress. London: Taylor Francis, pp. 1-14.

Wells LE and Marwell G (1976). Self-esteem: Its conceptualisation and measurement. Newbury Park, California: Sage Publications.

White RW (1959). Motivation reconsidered: The concept of competence. Psychological Review, 66: 297-334.

White SA and Duda JL (1994). The relationship of gender, level of sport involvement and participation motivation on task and ego orientation. International Journal of Sport Psychology, 25: 4-18.

Williams JE and Best DL (1982). Measuring Self-stereotypes: A Thirty Nation Study. Beverly Hills, California: Sage Publications.

Williams JG and Eston RG (1986). Does personality influence the perception of effort? The results from a study of secondary schoolboys. Physical Education Review, 9 (2): 94-99.

Wine JD (1980). Cognitive-attentional theory of test anxiety. In IG Sarason (ed): Test Anxiety: Theory, Research and Applications. Hillside, New Jersey: Lawrence Erlbaum Associates Ltd., pp. 349-385.

Wylie R (1979). The Self-concept: Theory and Research on Selected Topics. Lincoln, Nebraska: University of Nebraska.

APPENDIX A

(General Information)

Initial letter to headmaster

Equipment check-list

Outline of testing protocol

Informed consent information sheet

Subject consent form

27 January 1994

Mr P Reed
The Headmaster
Graeme College

Dear Mr Reed

Re: Participation in Masters Research Project

I am at present working on a Masters project investigating the affect of competitive stress on schoolchildren, and would be most grateful if you would allow me to use Graeme College pupils as subjects for my project.

All the relevant information concerning the project is detailed in the appended sheet.

My supervisor, Prof. PA Scott, and I would appreciate meeting with you for further discussion. If you are interested in taking part in this research project, we will telephone your secretary to make arrangements for a meeting.

Thank you.

Yours sincerely,

K Swart

PHYSIOLOGICAL, PERCEPTUAL AND PERFORMANCE RESPONSES TO COMPETITIVE STRESS IN INDIVIDUAL AND TEAM SPORTS AMONG YOUTH SPORT PARTICIPANTS.

The above is the title of my Masters Research Project at Rhodes University. It is evident from the existing literature that only scant attention has been paid to the study of youth sport. Yet with South Africa on the verge of re-entering international competition on a large scale youth sport participants will be under increasing pressure to perform successfully. Thus an awareness and understanding of the nature of competitive stress and its effects on performance is essential.

As this project is undertaken with a view to making a meaningful contribution to youth sport in South Africa I would like to include 15-18 year old male and female first team sport representatives of your school in my sample for data collection. They should be involved in either a premier individual or team sport, preferably at a provincial or even national level. If you concede to this request you will also be required to sign the informed consent form on behalf of your pupils.

Due to the multi-faceted nature of competitive stress subjects will be obliged to participate in five testing sessions. During the first session general demographic and base-line data

will be collected. The base-line data include three questionnaires viz, the Illinois Competition Questionnaire, the Task and Ego Orientation in Sport Questionnaire and the Physical Self-Perception Profile. A reference heart rate will also be obtained. An explanation of the overall battery of tests will be given at this first session which will take approximately one hour.

The next four testing sessions will occur *in field*. The first being a practice session in order to establish base-line norms. Inter-School matches of a highly competitive nature will be selected for the next three sessions. At each *in field* session physiological (anticipatory heart rate) and psychological (a perceived strain rating) measures will be taken within minutes before commencement of the game. After the game, performance will be assessed by means of a performance rating scale where both the participants themselves and the respective coaches will be required to rate the standard of performance immediately after the completion of the match at hand. This will take approximately 5 minutes.

EQUIPMENT CHECK-LIST

1. General information data sheet.
2. Heart-watch.
3. Heart-watch electrode strap.
4. Instructions for use of scales.
5. Illinois Competition Questionnaire.
6. Task and Ego Orientation in Sport Questionnaire.
7. Physical Self-Perception Profile.
8. Perceived Strain Scale.
9. Performance Rating Scale.
10. *In field* data sheet.

TESTING PROTOCOL

1. Explain objective of task.
2. Sign consent form.
3. General information.
4. Put on HR monitor.
5. Illinois Competition Questionnaire.
6. Task and Ego Orientation in Sport Questionnaire.
7. Physical Self-Perception Profile.
8. Record *reference* heart rate.
9. Instructions for *in field* tests.
10. Before match: *initial* HR
    average HR
    highest HR
    anticipatory HR
    overall PSS.
11. Completion of match: Performance rating scale:
    (by player and coach)
    Match result.

INFORMED CONSENT INFORMATION SHEET

PROJECT: An integrated analysis of competitive stress in youth sport participants among premier individual and team sports.

GENERAL: The objective of this project is to investigate the relationship between the stressful demands of competitive sport on school children and to analyze whether the nature of the sport (individual or team sports) has any affect on the responses.

For this purpose it was deemed appropriate to analyze physiological, psychological and performance parameters under non-stressful as well as stressful conditions.

SUBJECTS: Current First team participants of both sexes. The players will be drawn from schoolchildren participating in a premier individual or team sport as identified by the school. Subjects should be at least be first team players and preferably provincial players.

PROCEDURE: There will be five testing sessions.

Testing session 1: General demographic data
Base-line data

Testing session 2: Non-competitive practice session

Testing session 3-5: Stressful competitive situation.

The following base-line data will be collected during the first testing session:

Illinois Competition Questionnaire
Task and Ego Orientation in Sport Questionnaire
Physical Self-Perception Profile
Reference Heart Rate

The following data will be collected during *in field* testing sessions:

Physiological Parameter: Heart Rate
Psychological Parameter: Perceived Strain Scale
Performance Parameter : Performance Rating Scale (by subject and coach)
Match Result

Heart rate will be collected by means of a telemetric Uniq heart-watch which is a portable heart rate monitor. This

method represents a non-evasive evaluation of a physiological response, viz heart rate.

The entire data collection during the first testing session should last approximately 60 minutes. *In field* testing, that is before and after the practice session and the 3 matches, will simply involve the monitoring of heart rate as well as a rating on the Perceived Strain Scale (PSS). Prior to performance the heart-watch electrode strap will be attached to subjects 30 minutes before the match. The rating of PSS will take place just prior to the competition, and an evaluation of the standard of performance after the completion of the competition should take approximately 2 minutes.

RISKS: The risk factors entailed are minimal, and are the same nature as encountered in everyday stressful circumstances. All information obtained will be dealt with the strictest confidence.

BENEFITS: Individual results will be sent to each subject and should lead to a better awareness and understanding of your performance during stressful competitive situations; while the overall results will hopefully culminate in an improved understanding of the psychophysiology of stress as it pertains to the nature of the sport and the responses of both sex

groups. An overall summary of the results of the project will be sent to the respective schools.

SUBJECT CONSENT FORM

I, _____, have been fully informed of the nature of the research entitled: PHYSIOLOGICAL, PERCEPTUAL AND PERFORMANCE RESPONSES TO COMPETITIVE STRESS IN INDIVIDUAL AND TEAM SPORTS AMONG YOUTH SPORT PARTICIPANTS.

I am fully aware of the methods entailed as well as the potential risks and benefits attendant to my partaking as explained verbally and in writing. In agreeing to be a participant in this research, I waive any legal recourse against the researchers or Rhodes University, from any and all claims resulting from personal injuries endured. This waiver shall be binding upon my heirs and personal representatives. I am aware that it is essential for me to report immediately to the researcher any signs or symptoms indicating any abnormality or distress.

I am aware that I may withdraw from my involvement in the research at any time. I am aware that my anonymity will be preserved at all times, and agree that the information collected may be used and published for statistical or scientific purposes.

I have read the information sheet appended to this form and understand it. Any questions that may have occurred to me have been answered to my satisfaction.

SUBJECT (OR LEGAL REPRESENTATIVE):

_____	_____	_____
(PRINT NAME)	(SIGNED)	(DATE)

PERSON ADMINISTERING INFORMED CONSENT:

_____	_____	_____
(PRINT NAME)	(SIGNED)	(DATE)

WITNESS:

_____	_____	_____
(PRINT NAME)	(SIGNED)	(DATE)

APPENDIX B

(Data collection)

General information data sheet.

Instructions to subject on Illinois Competition Questionnaire.

Instructions to subject on Task and Ego Orientation in Sport Questionnaire.

Instructions to subject on Physical Self-Perception Profile.

Instructions to subject on Perceived Strain Scale.

Instructions to subject on Performance Rating Scale.

In Field data sheet.

GENERAL INFORMATION DATA SHEET

DEMOGRAPHIC DATA

NAME: _____ CODE: _____

AGE: _____ SEX: _____

RACE (ETHNIC GROUP): _____

SCHOOL STANDARD: _____

SPORTING INVOLVEMENT
SPORT (S): (1) _____ (2) _____ (3) _____

APPROXIMATE TOTAL TIME DURATION (Hrs) PER WEEK: _____

STANDARD OF MAIN SPORT: FIRST TEAM (SCHOOL) _____
NATIONAL LEVEL _____
PROVINCIAL LEVEL _____

_____

BASE-LINE DATA

ILLINOIS COMPETITION QUESTIONNAIRE: ____
(SCAT SCORE)

TASK AND EGO ORIENTATION IN SPORT SCORE: Task ____
Ego ____

PHYSICAL SELF-PERCEPTION PROFILE SCORE : Sport ____
Cond ____
Body ____
Str ____
PSW ____

REFERENCE HEART RATE: ____

INSTRUCTIONS TO SUBJECT:

The objective of this test is to note how you generally feel in competitive sport situations. The effects of highly competitive sport can be powerful and very different among athletes. Please complete this inventory as honestly as you can. Sometimes athletes feel they should not admit any nervousness, anxiety, or worry about competition because this undesirable.

Actually, these feelings are quite common, and to help us understand this we want you to share them with us freely. If you are worried about the competition or have butterflies or other feelings that you know are signs of anxiety, please indicate these feelings accurately on the inventory. Similarly, if you feel calm and relaxed, indicate these feelings as accurately as you can. Your answers will not be shared with anyone. Note that we will be looking at group responses, so your individual response will simply be anonymous data fed into a computer.

Illinois Competition Questionnaire

Form A

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

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

INSTRUCTIONS TO SUBJECT:

The objective of this test is to note your predominant goal perspective operating in a competitive sport setting which relates to how you define success and judge how competent you are at your particular sporting activity. There are two goal perspectives termed task and ego orientations. Please complete this questionnaire as accurately as you can and do not omit any. Remember that there are no right or wrong answers; it will merely give an indication of YOUR personal goal perspective. It is your immediate feelings that are required so do not puzzle over individual items.

For example, if you **strongly agree** with the statement:
I feel most successful in sport when I can do better than my friends, encircle **SA.**

TASK AND EGO ORIENTATION IN SPORT QUESTIONNAIRE
(developed by Joan Duda and John Nicholls)

Directions: Please read each of the statements listed below and indicate how much you personally agree with each statement by circling the appropriate response.

When do you feel most successful in sport. In other words, when do you feel a sport activity has gone really good for you?

I feel most successful in sport when...

		Strongley Disagree	Disagree	Neutral	Agree	Strongley Agree
1	I'm the only one who can do the play or skill	SD	D	N	A	SA
1	I learn a new skill and it makes me want to practice more.	SD	D	N	S	SA
2	I can do better than my friends.	SD	D	N	A	SA
3	The others can't do as well as me.	SD	D	N	A	SA
2	I learn something that is fun to do.	SD	D	N	A	SA
4	Others mess-up and I don't.	SD	D	N	A	SA
3	I learn a new skill by trying hard.	SD	D	N	A	SA
4	I work really hard.	SD	D	N	A	SA
5	I score the most points/goals/hits, etc.	SD	D	N	A	SA
5	Something I learn makes me want to go and practice more.	SD	D	N	A	SA
6	I'm the best.	SD	D	N	A	SA
6	A skill I learn really feels right.	SD	D	N	A	SA
7	I do my very best.	SD	D	N	A	SA

INSTRUCTIONS TO SUBJECT:

The objective of this test is to assess the perceptions of your physical self. Please complete this questionnaire as accurately as you can. There are no right or wrong answers. Your answers will not be shared with anyone. Select the statement that best describes you, and put an X in the appropriate box. REMEMBER to check only ONE of the four boxes and do not omit any.

THE PHYSICAL SELF PERCEPTION PROFILE (PSPP)

WHAT AM I LIKE?

These are statements which allow people to describe themselves.
There are no right or wrong answers since people differ a lot.

First, decide which one of the two statements best describes you.

Then, go to that side of the statement and check if it is just "sort of true" or "really true" FOR YOU.

Really True for Me	Sort of True for Me	EXAMPLE			Sort of True for Me	Really True for Me
☐	☐	Some people are very competitive	BUT	Others are not quite so competitive	☒	☐

REMEMBER to check only ONE of the four boxes

1.	☐ ☐	Some people feel that they are not very good when it comes to playing sports	BUT	Others feel that they are really good at just about every sport	☐	☐
2.	☐ ☐	Some people are not very confident about their level of physical conditioning and fitness	BUT	Others always feel confident that they maintain excellent conditioning and fitness	☐	☐
3.	☐ ☐	Some people feel that compared to most, they have an attractive body	BUT	Others feel that compared to most, their body is not quite so attractive	☐	☐
4.	☐ ☐	Some people feel that they are physically stronger than most people of their sex	BUT	Others feel that they lack physical strength compared to most others of their sex	☐	☐
5.	☐ ☐	Some people feel extremely proud of who they are and what they can do physically	BUT	Others are sometimes not quite so proud of who they are physically	☐	☐
6.	☐ ☐	Some people feel that they are among the best when it comes to athletic ability	BUT	Others feel that they are not among the most able when it comes to athletics	☐	☐

	Really True for Me	Sort of True for Me			Sort of True for Me	Really True for Me
7.	☐	☐	Some people make certain they take part in some form of regular vigorous physical exercise	BUT	Others don't often manage to keep up regular vigorous physical exercise	☐ ☐
8.	☐	☐	Some people feel that they have difficulty maintaining an attractive body	BUT	Others feel that they are easily able to keep their bodies looking attractive	☐ ☐
9.	☐	☐	Some people feel that their muscles are much stronger than most others of their sex	BUT	Others feel that on the whole their muscles are not quite so strong as most others of their sex	☐ ☐
10.	☐	☐	Some people are sometimes not so happy with the way they are or what they can do physically	BUT	Others always feel happy about the kind of person they are physically	☐ ☐
11.	☐	☐	Some people are not quite so confident when it comes to taking part in sports activities	BUT	Others are among the most confident when it comes to taking part in sports activities	☐ ☐
12.	☐	☐	Some people do not usually have a high level of stamina and fitness	BUT	Others always maintain a high level of stamina and fitness	☐ ☐
13.	☐	☐	Some people feel embarrassed by their bodies when it comes to wearing few clothes	BUT	Others do not feel embarrassed by their bodies when it comes wearing few clothes	☐ ☐
14.	☐	☐	When it comes to situations requiring strength some people are one of the first to step forward	BUT	When it comes to situations requiring strength some people are one of the last to step forward	☐ ☐
15.	☐	☐	When it comes to the physical side of themselves some people do not feel very confident	BUT	Others seem to have a real sense of confidence in the physical side of themselves	☐ ☐
16.	☐	☐	Some people feel that they are always one of the best when it comes to joining in sports activities	BUT	Others feel that they are not one of the best when it comes to joining in sports activities	☐ ☐

	Really True for Me	Sort of True for Me			Sort of True for Me	Really True for Me
17.	☐	☐	Some people tend to feel a little uneasy in fitness and exercise settings	BUT	Others feel confident and at ease at all times in fitness and exercise settings	☐ ☐
18.	☐	☐	Some people feel that they are often admired because their physique or figure is considered attractive	BUT	Others rarely feel that they receive admiration for the way their body looks	☐ ☐
19.	☐	☐	Some people tend to lack confidence when it comes to their physical strength	BUT	Others are extremely confident when it comes to their physical strength	☐ ☐
20.	☐	☐	Some people always have a really positive feeling about the physical side of themselves	BUT	Others sometimes do not feel positive about the physical side of themselves	☐ ☐
21.	☐	☐	Some people are sometimes a little slower than most when it comes to learning new skills in a sports situation	BUT	Others have always seemed to be among the quickest when it comes to learning new sports skills	☐ ☐
22.	☐	☐	Some people feel extremely confident about their ability to maintain regular exercise and physical condition	BUT	Others don't feel quite so confident about their ability to maintain regular exercise and physical condition	☐ ☐
23.	☐	☐	Some people feel that compared to most, their bodies do not look in the best of shape	BUT	Others feel that compared to most their bodies always look in excellent physical shape	☐ ☐
24.	☐	☐	Some people feel that they are very strong and have well developed muscles compared to most people	BUT	Others feel that they are not so strong and their muscles are not very well developed	☐ ☐
25.	☐	☐	Some people wish that they could have more respect for their physical selves	BUT	Others always have great respect for their physical selves	☐ ☐
26.	☐	☐	Given the chance, some people are always one of the first to join in sports activities	BUT	Other people sometimes hold back and are not usually among the first to join in sports	☐ ☐

	Really True for Me	Sort of True for Me			Sort of True for Me	Really True for Me
27.	☐	☐	Some people feel that compared to most they always maintain a high level of physical conditioning	BUT	Others feel that compared to most their level of physical conditioning is not usually so high	☐ ☐
28.	☐	☐	Some people are extremely confident about the appearance of their body	BUT	Others are a little self-conscious about the appearance of their bodies	☐ ☐
29.	☐	☐	Some people feel that they are not as good as most at dealing with situations requiring physical strength	BUT	Others feel that they are among the best at dealing with situations which require physical strength	☐ ☐
30.	☐	☐	Some people feel extremely satisfied with the kind of person they are physically	BUT	Others sometimes feel a little dissatisfied with their physical selves	☐ ☐

INSTRUCTIONS TO SUBJECT:

The aim of this project is to objectively evaluate the amount of strain you experience as a result of the amount of competitive stress imposed upon you when you are participating in inter-school matches.

The Perceived Strain Scale (PSS) is the measuring tool being used. It consists of two differential rating scales numerically valued from 1-10. 1 is the lowest rating, indicating a minimal value. 10 is the highest rating, indicating a maximal value.

The first rating is related to the task demands, and the second is based on how you perceive your ability to cope with the demands of the task on hand.

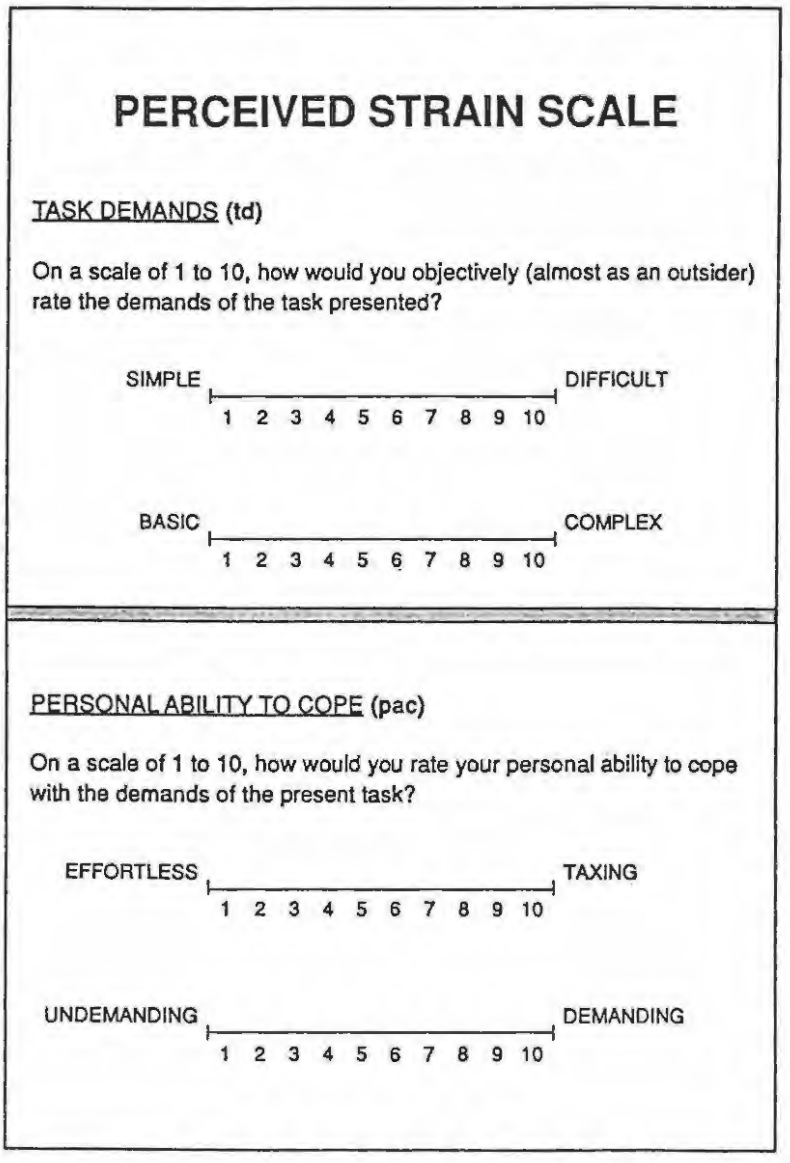
TASK DEMANDS (td)

Here you are required to objectively rate the demands of the task. For example, a double backward somersault off a 3m diving board. This would seem a highly demanding task and would be rated high by anyone, probably a 10; while jumping off the side of the pool is a very simple task and is likely to be rated 1 or 2 by most people.

PERSONAL ABILITY TO COPE (pac)

Here you are required to rate your perception of your ability to cope with the task demands. Taking the above example, if you are

an experienced diver you will perceive the dive as challenging but not impossible, consequently you may rate it as fairly high but not maximal, whereas a novice diver's perception of his (her) ability to cope with the task would be rated a great deal higher, possibly even maximal.



INSTRUCTIONS TO SUBJECT:

In order for me to have an objective measure of your performance during a match, you (the participant) as well as your respective coaches are required to rate your standard of performance by means of a performance rating scale. There are two ratings. The first is a rating of performance on a scale from 1-5 where :

1 = very poor

2 = poor

3 = average

4 = good

5 = very good.

Simply encircle your choice.

The second rating is a rating of performance expectations where:

-3 = well below expectation

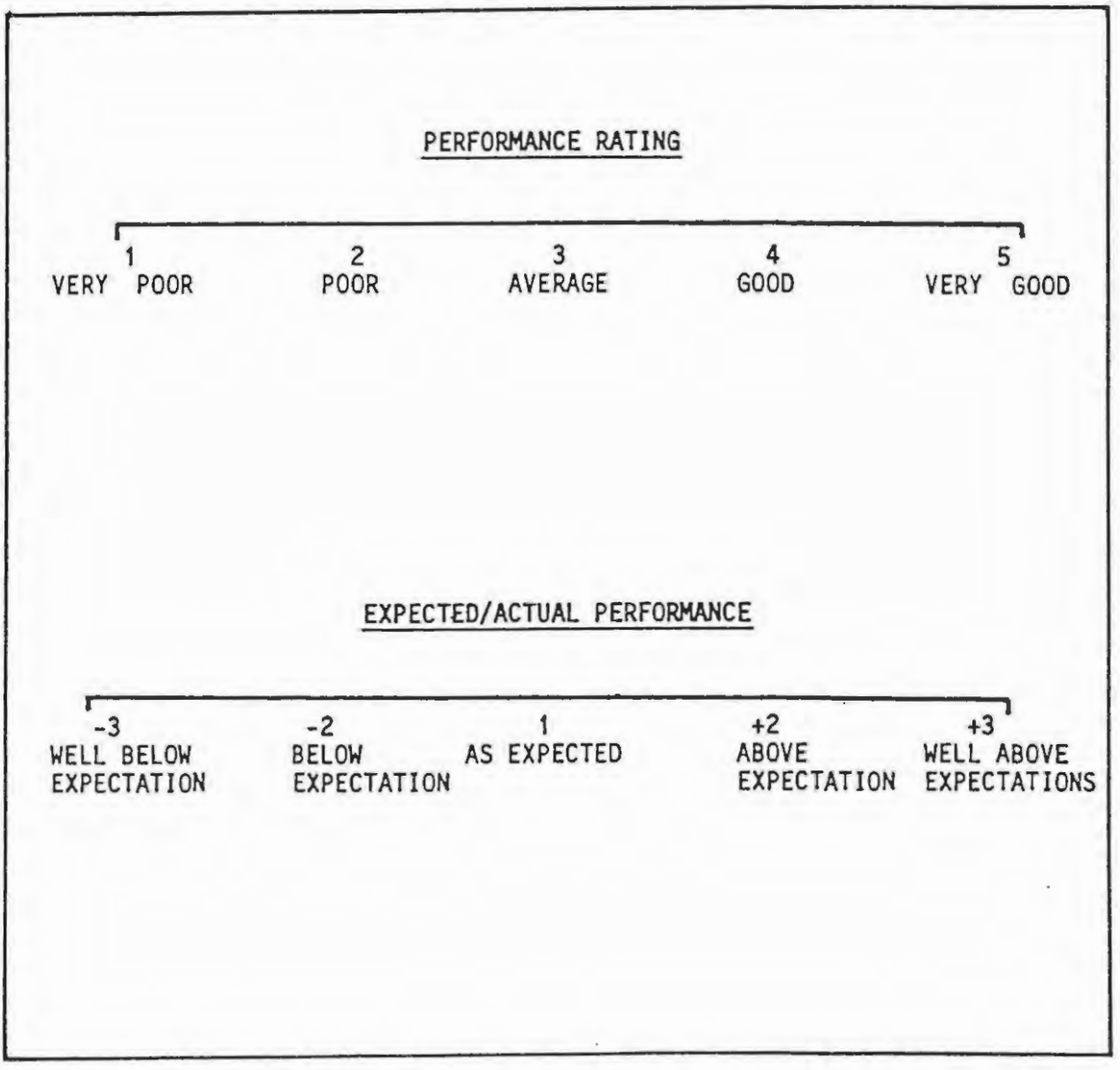
-2 = below expectation

1 = as expected

+2 = above expectation

+3 = well above expectations.

Encircle the response which best reflects how you feel about your performance. Try to estimate as honestly and as objectively as possible how you perceived your performance at the match on hand.


PERFORMANCE RATING
1
VERY POOR
2
POOR
3
AVERAGE
4
GOOD
5
VERY GOOD
EXPECTED/ACTUAL PERFORMANCE
-3
WELL BELOW EXPECTATION
-2
BELOW EXPECTATION
1
AS EXPECTED
+2
ABOVE EXPECTATION
+3
WELL ABOVE EXPECTATIONS

IN FIELD DATA SHEET - PRACTICE SESSION

COMPETITIVE MATCH

MATCH CONDITION: _____

CODE:_____

MATCH:_____ VS _____ RESULT:_____

DATE:_____ TIME :_____

td :_____ ; _____ pac : _____ ; _____

ETD :_____ EPS :_____

PSS :_____

INITIAL HEART RATE : _____

AVERAGE HEART RATE : _____

HIGHEST HEART RATE : _____

ANTICIPATORY HEART RATE : _____

PERFORMANCE RATING :	SUBJECT	COACH
ACTUAL PERFORMANCE :	_____	_____
EXPECTED PERFORMANCE :	_____	_____

APPENDIX C

(Results)

Examples of data collected.

Examples of data analysis.

GENERAL INFORMATION DATA SHEET

DEMOGRAPHIC DATA

NAME: _____ CODE: FT2

AGE: 17 SEX: F

RACE (ETHNIC GROUP): WHITE

SCHOOL STANDARD: 10

SPORTING INVOLVEMENT
SPORT (S): (1) HOCKEY (2) TENNIS (3) SQUASH

APPROXIMATE TOTAL TIME DURATION (Hrs) PER WEEK: 10

STANDARD OF MAIN SPORT:
FIRST TEAM (SCHOOL) X
NATIONAL LEVEL
PROVINCIAL LEVEL X

BASE-LINE DATA

ILLINOIS COMPETITION QUESTIONNAIRE: 26
(SCAT SCORE)

TASK AND EGO ORIENTATION IN SPORT SCORE:
Task 4
Ego 1.67

PHYSICAL SELF-PERCEPTION PROFILE SCORE :
Sport 18
Cond 17
Body 12
Str 19
PSW 13

REFERENCE HEART RATE: 79

IN FIELD DATA SHEET - PRACTICE SESSION

COMPETITIVE MATCH

MATCH CONDITION: MATCH 3

CODE: MT3

MATCH: DALE VS KINGSWOOD RESULT: 39-0

DATE: 11.6.94 TIME : 16h00

td : 9 ; 9 pac : 10 ; 9

ETD : 9.33 EPS : 0.95

PSS :

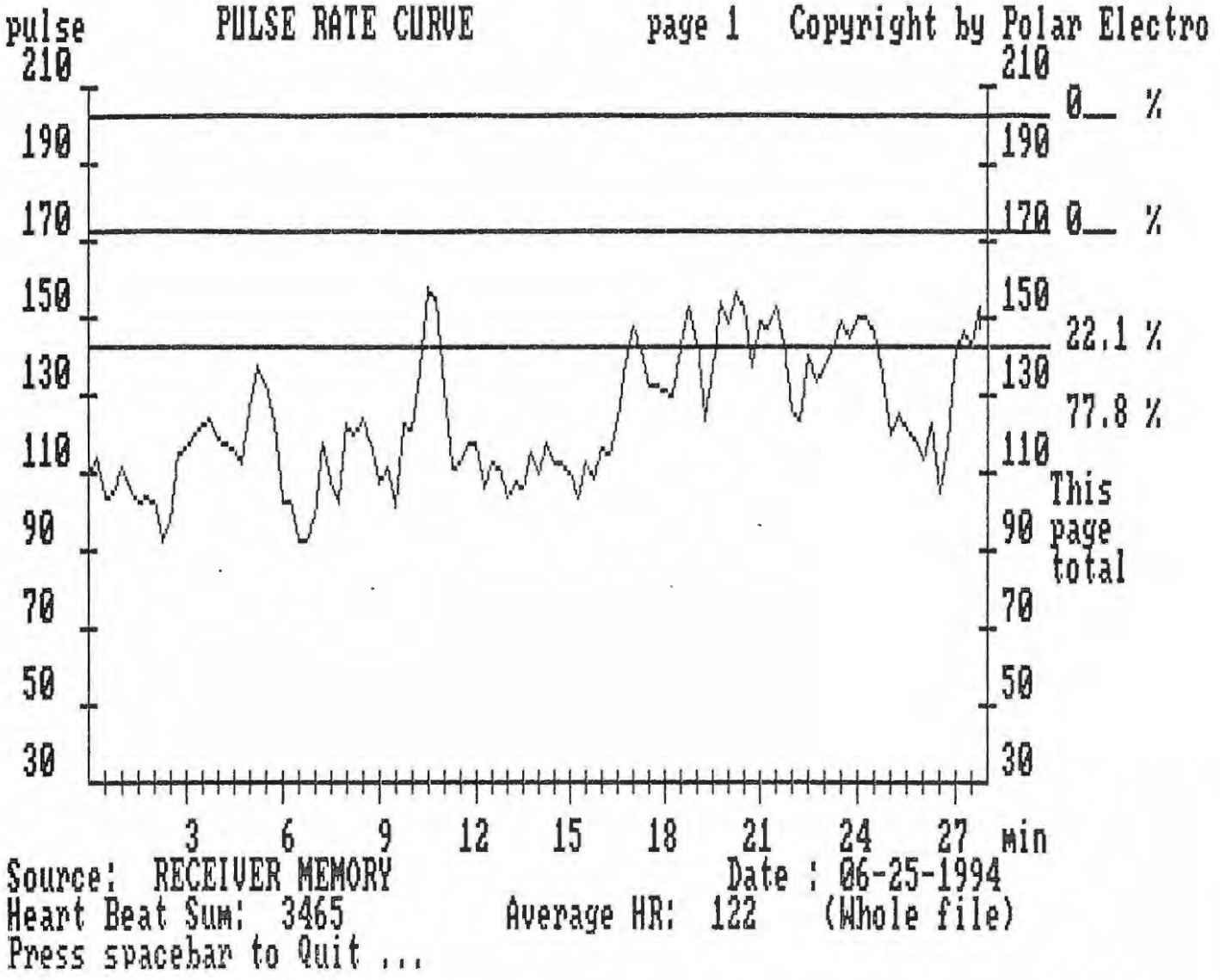
INITIAL HEART RATE : 107

AVERAGE HEART RATE : 100

HIGHEST HEART RATE : 171

ANTICIPATORY HEART RATE : 136

PERFORMANCE RATING :	SUBJECT	COACH
ACTUAL PERFORMANCE :	4	1
EXPECTED PERFORMANCE :	4	+2



page 1 PULSE RATE LISTING Copyright by Polar Electro

Time (min.)

Starting Time: 0 : 0 : 0

0	110	114	104	105	111	106	103	104	102	92	97	115
3	116	120	123	124	119	117	116	113	126	138	132	122
6	102	103	93	93	99	118	108	103	123	120	124	117
9	108	111	101	122	121	136	157	155	131	111	113	118
12	118	106	112	111	104	108	106	115	110	117	112	113
15	110	104	113	109	116	115	124	139	147	141	132	133
18	131	130	143	152	144	124	137	154	149	156	152	137
21	149	147	152	144	126	124	140	134	138	143	149	145
24	150	150	146	135	120	125	121	119	114	122	105	117
27	143	146	144	153								

Final Time: 27 : 52 : 6

27	148

07/14/94 04:53:46 PM

Variable:	SCAT	SCAT SELECT SEX=	SCAT SELECT SEX=
Sample size	44	22	22
Average	23.0227	24.6818	21.3636
Geometric mean	22.5732	24.2988	20.9701
Variance	19.046	16.7987	16.4329
Standard deviation	4.36417	4.09862	4.05375
Standard error	0.657923	0.873829	0.864263
Minimum	13	13	14
Maximum	29	29	27
Range	16	16	13
Coeff. of variation	18.9559	16.6058	18.975
Sum	1013	543	470

Variable:	(SCAT SELECT(SEX	(SCAT SELECT(SEX	(SCAT SELECT(SEX
Sample size	11	11	11
Average	23	26.3636	23.5455
Geometric mean	22.5019	26.2393	23.3577
Variance	22.2	6.85455	8.87273
Standard deviation	4.71169	2.61812	2.97871
Standard error	1.42063	0.789392	0.898116
Minimum	13	22	17
Maximum	29	29	27
Range	16	7	10
Coeff. of variation	20.4856	9.9308	12.6509
Sum	253	290	259

Variable:	(SCAT SELECT(SEX
Sample size	11
Average	19.1818
Geometric mean	18.8266
Variance	15.1636
Standard deviation	3.89405
Standard error	1.1741
Minimum	14
Maximum	26
Range	12
Coeff. of variation	20.3007
Sum	211

07/31/94 09:39:40 AM

Variable:	SCAT	TYPE=1	TYPE=2
Sample size	44	22	22
Average	23.0227	23.2727	22.7727
Geometric mean	22.5732	22.9258	22.226
Variance	19.046	14.8745	23.9935
Standard deviation	4.36417	3.85674	4.89832
Standard error	0.657923	0.82226	1.04432
Minimum	13	13	14
Maximum	29	29	29
Range	16	16	15
Coeff. of variation	18.9559	16.5719	21.5096
Sum	1013	512	501

Analysis of Variance for KSMATD.ETD - Type III Sums of Squares

rce of variation	Sum of Squares	d.f.	Mean square	F-ratio	Sig. level
IN EFFECTS					
4:KSMATD.SEX	1.615111	1	1.615111	.739	.4002
3:KSMATD.TYPE	40.627236	1	40.627236	18.600	.0000
TERACTIONS					
AB	4.4101114	1	4.4101114	2.019	.1571
SIDUAL	375.68263	172	2.1842013		
TAL (CORRECTED)	422.33509	175			

issing values have been excluded.
1 F-ratios are based on the residual mean square error.

Multiple range analysis for KSMATD.ETD by KSMATD.SEX

thod: 95 Percent Tukey HSD vel	Count	LS Mean	Homogeneous Groups
	88	6.8119318	X
	88	7.0035227	X

ntrast	difference	+/-	limits
- 2	0.19159		0.43978

* denotes a statistically significant difference.

Multiple range analysis for KSMATD.ETD by KSMATD.TYPE

thod: 95 Percent Tukey HSD vel	Count	LS Mean	Homogeneous Groups
	88	6.4272727	X
	88	7.3881818	X

ntrast	difference	+/-	limits
- 2	0.96091		0.43978 *

* denotes a statistically significant difference.

07/29/94 03:20:17 PM Page 1

Table of means for KSMATD.INIT SELECT((KSMATD.SEX=1) AND (KSMATD.TYPE=1)) by KSM

Level	Count	Average	Stnd. Error (internal)	Stnd. Error (pooled s)	95 % Confidence intervals for mean	
1	11	72.18182	4.0627312	4.5978346	62.887104	81.47653
2	11	90.54545	5.2281817	4.5978346	81.250740	99.84017
3	11	96.45455	4.3638258	4.5978346	87.159831	105.74926
4	11	100.36364	4.6559302	4.5978346	91.068922	109.65835
Total	44	89.88636	2.2989173	2.2989173	85.239007	94.53372

07/29/94 03:20:54 PM Page 1

Multiple range analysis for KSMATD.INIT SELECT((KSMATD.SEX=1) AND (KSMATD.TYPE=1

Method: 95 Percent Tukey HSD

Level	Count	Average	Homogeneous Groups
1	11	72.18182	X
2	11	90.54545	X
3	11	96.45455	X
4	11	100.36364	X

Contrast	difference	+/-	limits	
1 - 2	-18.3636		17.4308	*
1 - 3	-24.2727		17.4308	*
1 - 4	-28.1818		17.4308	*
2 - 3	-5.90909		17.4308	
2 - 4	-9.81818		17.4308	
3 - 4	-3.90909		17.4308	

* denotes a statistically significant difference.

07/29/94 03:21:53 PM Page 1

Table of means for KSMATD.INIT SELECT((KSMATD.SEX=1) AND (KSMATD.TYPE=2)) by KSM

Level	Count	Average	Stnd. Error (internal)	Stnd. Error (pooled s)	95 % Confidence intervals for mean	
1	11	77.818182	2.2994789	3.4218549	70.900760	84.735604
2	11	86.818182	4.4778611	3.4218549	79.900760	93.735604
3	11	82.636364	3.5477848	3.4218549	75.718941	89.553786
4	11	81.272727	2.9850869	3.4218549	74.355305	88.190150
Total	44	82.136364	1.7109274	1.7109274	78.677653	85.595075

APPENDIX D

(Subject Feedback)

Examples of feedback to subjects.

07/08/94

The Headmaster
Victoria Girls High

Dear Mr Long

I wish to thank you for allowing your pupils to participate as subjects in my research project on "Competitive Stress Among Youth Sport Participants".

I received tremendous interest and co-operation from the staff and pupils, and for this I am most grateful. Please convey my appreciation to both Miss Hart and Miss Mc Krindle for their invaluable support. An overall summary of the results of the project will be sent to the respective schools; should you be more interested in more detail of your pupils' results please contact me.

Once again I would like to thank you for your co-operation, and to wish the pupils all the best in their sporting, as well as academic careers.

Yours sincerely

K Swart

Dear _____

Thank you so much for participating as a subject in my research project on "Competitive Stress Among Youth Sport Participants".

I am enclosing some of the figures and comments on the overall results, together with your personal results and personalized comments. If you have any questions you would like to ask about the research as a whole or your particular results, please do not hesitate to contact me.

Once again I would like to thank you for your tremendous co-operation, and to wish you all the best in your sporting career.

Yours sincerely

K Swart

Subject Feedback

NAME:_____ **SPORT:**_____

1. Your score on the Illinois Competition Questionnaire is:
   In other words you have _____

2. Your score on the Task and Ego Orientation in Sport Questionnaire for each scale is:
   TASK ___ which indicates that you _____
   _____
   EGO ___ which indicates that you _____
   _____

3. Your score on the Physical Self-Perception Profile for each sub-scale is:
   SPORT ___ which indicates that you _____
   _____
   CONDITION ___ which indicates that you _____
   _____
   BODY ___ which indicates that you _____
   _____
   STRENGTH ___ which indicates that you _____
   _____
   PHYSICAL SELF-WORTH ___ which indicates that you _____
   _____

4.Physiological Responses: An assessment of the physiological measures tested indicates that there was a general increase in *initial* and *anticipatory* heart rate of subjects when tested under conditions of competitive stress: the most significant of which was reflected in the *initial* and *anticipatory* heart rate responses, ie increases in heart rate prior to the match without partaking in a physical warm-up as well as immediately before participation in the match or athletic event. However, the heart rate of team sport participants, generally, increased to greater extent than individual participants. There was little difference in the *initial* and *anticipatory* heart rate responses between the two sex-groups (see Table VIII). Thus team sport players in the present study seem to experience greater pre-competitive anxiety levels prior to competition.

In contrast, subjects' *highest* and *average* heart rate recordings seemed to decrease prior to competition. Furthermore, differences in these responses were recorded between the two sex-groups which may largely be attributed to the greater physiological strain experienced by the female subjects due to the physical demands of the warm-up (see Figure 5). A further analysis of the results across practice and match conditions revealed that individual participants generally had greater decreases in *highest* and *average* heart rate responses prior to competition (see Table VIII). This was in all probability due to the shorter duration of the individual participants' warm-up as

well as a less demanding warm-up in comparison to team sport participants.

5. Perceptual Responses: The ratings on the Perceived Strain Scale revealed a trend with regard to nature of the sport differences with team participants appearing to rate the task demands as more difficult compared to individual players. There were no significant differences between the two sex- groups (see Figure 6). This could be attributed to the fact that far more importance is attached to winning a rugby or hockey game for the sake of the school's name compared to the individual sports.

A further analysis of the Evaluation of Task Demands revealed that all players rated the matches as more demanding than the practice session, to a greater or lesser extent (see Table IX). The female team participants were the only group to experience a significant increase in the task demands of hockey across all 3 matches in comparison to the practice session. The male team and individual participants' results showed a similar trend, but the female squash players were the only group who did not experience significant differences in the evaluation of task demands for practice and match conditions. The great variation in the evaluation of task demands between matches was in all likelihood due to players being involved in matches of varying standards, eg some of the rugby players could only be tested in games of lesser importance and this may have decreased the overall response of the group.

The Evaluation of Perceived Strain scores indicate that there no significant differences in the perception of strain between the two sex-groups nor between team and individual players (see Figure 7). However, the trend seems to indicate that females,

irrespective of the nature of the sport, were not overly confident about coping adequately with the demands of the matches. This apparent difference in confidence between males and females may be due to competitive sport being long perceived as an arena for masculine behaviours.

A further examination of the EPS scores indicated that all groups tended to cope better with the demands of the practice session in comparison with the matches, except for the female team participants. However, these participants seemed to show a comparative ability to cope with match demands. In contrast, the female individual participants displayed the greatest level of strain as a result of the competitive matches. The male team and individual players generally appeared to show less of an ability to cope with the demands of the matches in comparison to the practice session (see Table IX).

6. Performance Measures:

Results

In terms of win-loss outcome male players won more matches than their female counterparts. Arguably, the male team participants generally played relatively easier matches and therefore experienced more wins, thus elevating the male group's score as a whole. However it may also be argued that the female participants perceived a greater inability to cope with the task demands than the males, and may well have experienced an increase in tension prior to the match which consequently may have had a deleterious effect on performance. There were no significant difference in the win-loss outcome for team and individual participants.

Match Performance

Generally, all participants rated their performance as average whereas the respective coaches rated their players' performance as above average. The male team participants had the highest ratings of their performance and therefore displayed the most confidence in evaluating their performance. However, one cannot overlook the fact that on the whole rugby players competed in

relatively easier matches and this may be contributing to an artificially elevated confidence for the male team players. For the males it appears as if better performances are associated with more wins. In contrast both the female team and individual players rated their performance as average despite the fact that the female team players experienced more wins than their individual counterparts. The coaches' performance ratings of team players were significantly higher than that of individual players which seems to indicate that irrespective of the win-loss outcome coaches rated the standard of their players' performance as above average (see Figure 8).

All participants did not rate their performance during matches as significantly different to their performance during matches. The male individual participants were the only group who felt they performed better in the practice session compared to all three matches. Both the male and female team participants never rated their performance as 'below average' and this may be related to the fact that these players may feel more confident about their performance as they are being evaluated within a team context in comparison to individual players who evaluated in isolation.

The coaches' ratings of the players' performance were elevated for all the groups, especially for female team participants who rated their performance during practice as 'good' whereas they had the lowest rating of themselves as 'below average'. The male team participants were the only group who coaches rated their

performance across all three matches as the same or above what they had rated their players during a practice session. This seems to indicate that the rugby coaches are especially pleased with their players' performance during matches. However, the coaches of the male individual participants rated the standard of their players performance relatively lower in comparison to the other groups.

The expected performance scores revealed that most players performed minimally below the 'expected' score by both themselves and the coach. However in all these ratings the players' ratings were lower than that of the coach, particularly for team participants (male and female) and female participants in general. This result seems to indicate that the participants in this study, especially the team and female participants displayed a general disappointment in the standard of performance (see Table VII).

A further analysis of expected performance scores by players revealed that there were no significant difference in their expected performance across practice and match conditions. All

the groups rated their performance during practice as minimally below 'as expected', whereas the coaches rated all the players' performance, except the male individual participants as 'as expected'. Coaches generally rated their players standard of performance during a practice session better than what they rated players' performance during matches. In contrast, players seemed to display a general disappointment in their standard of performance irrespective of whether it involved a practice session or a competitive match (see Table X).

7. Personal comments on pre- and post match evaluations

8. General comments

The general trends of results appear to indicate that although some differences appear to exist between male and female responses within a competitive ambience, the degree of difference is far more dramatic between team and individual participants' physiological and perceptual responses to competitive stress, particularly for competitive matches as opposed to practice sessions. It may be argued that in general the trends seem to indicate that team participants have higher pre-competitive state anxiety than individual participants although this did not seem to have a substantial effect on their performance during matches. Nevertheless, the results appear to indicate that cultural background played a role in obtaining results which are contrary to much of the literature in that rugby and hockey, as team sports, are more highly valued by traditionally 'white' South African schools and therefore these players may experience more pressure and tension as they perceive the demands of these sports as being greater than individual sports.

TABLE VIII: Heart rate (HR) responses as measured under various conditions: means and standard deviations for all groups.

HR b.min-1	GROUP	CONDITION			
		PRACTICE	MATCH 1	MATCH 2	MATCH 3
INITIAL	MT	81.9 (11.8)	94.5 (15.2)	95.8 (12.0)	98.6 (11.8)
	MI	74.1 (9.3)	81.1 (8.1)	79.5 (7.7)	79.0 (7.9)
	FT	72.2 (13.5)	90.6 (17.3)	96.5 (14.5)	100.4 (9.4)
	FI	77.8 (7.6)	86.8 (14.9)	82.6 (11.7)	81.3 (9.9)
ANTIC	MT	110.9 (28.1)	141.1 (12.4)	146.1 (13.9)	141.9 (9.6)
	MI	120.3 (15.7)	124.7 (10.4)	124.6 (13.9)	123.4 (8.2)
	FT	113.7 (13.1)	142.3 (21.7)	144.6 (18.9)	150.9 (7.4)
	FI	116.9 (28.0)	135.1 (10.8)	132.2 (17.4)	132.9 (9.5)
HIGHEST	MT	169.8 (11.8)	172.2 (8.6)	164.0 (13.2)	166.1 (8.4)
	MI	168.0 (15.8)	138.3 (9.9)	137.0 (9.1)	134.2 (7.2)
	FT	173.6 (32.0)	173.3 (12.5)	165.6 (12.8)	169.3 (6.6)
	FI	178.4 (9.4)	155.3 (11.8)	154.1 (10.9)	151.4 (9.6)
AVERAGE	MT	121.9 (8.0)	120.5 (16.3)	105.3 (13.1)	111.9 (9.8)
	MI	129.3 (11.7)	116.6 (8.0)	116.6 (8.0)	116.2 (8.0)
	FT	138.9 (16.8)	125.4 (9.2)	132.6 (18.9)	119.2 (9.7)
	FI	124.8 (9.2)	125.8 (16.2)	125.1 (6.2)	123.2 (7.2)

BAR indicates a significant difference at $p > 0.05$

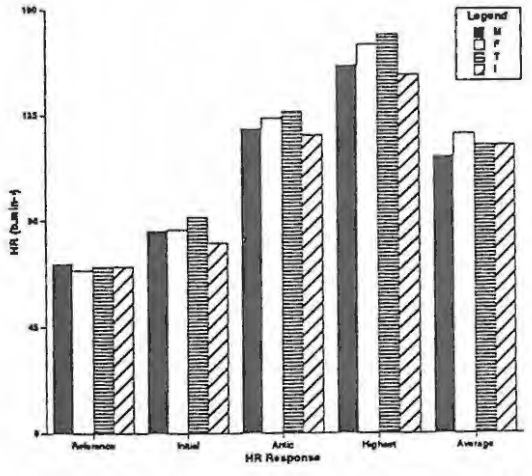


FIGURE 5: Heart rate responses at various intervals of data collection for Males and Females and Team and Individual participants.

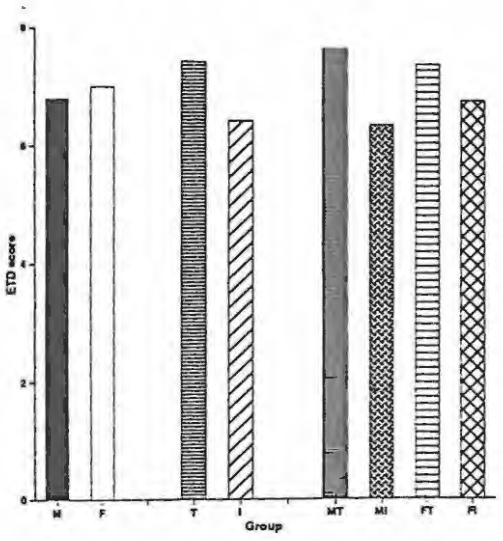


FIGURE 6: Evaluation of Task Demands (ETD) for all groups.

TABLE IX: Evaluation of Task Demands (ETD) and Evaluation of Perceived Strain (EPS) scores under various conditions: means and standard deviations for all groups.

SCORE	GROUP	CONDITION			
		PRACTICE	MATCH 1	MATCH 2	MATCH 3
ETD	MT	6.0 (1.6)	7.4 (1.0)	7.6 (0.6)	8.1 (1.6)
	MI	4.9 (1.8)	6.6 (1.7)	7.0 (1.2)	6.2 (1.3)
	FT	5.8 (1.0)	7.3 (1.0)	7.8 (0.7)	8.5 (0.5)
	FI	6.1 (1.4)	6.8 (1.7)	6.6 (1.5)	7.3 (1.4)
EPS	MT	1.1 (0.4)	0.9 (0.1)	1.1 (0.1)	1.0 (0.2)
	MI	1.1 (0.4)	1.0 (0.2)	1.0 (0.1)	0.9 (0.2)
	FT	0.9 (0.1)	1.1 (0.1)	1.0 (0.1)	1.0 (0.1)
	FI	1.0 (0.2)	0.9 (0.2)	0.9 (0.1)	0.9 (0.1)

BAR indicates a significant difference at $p < 0.05$

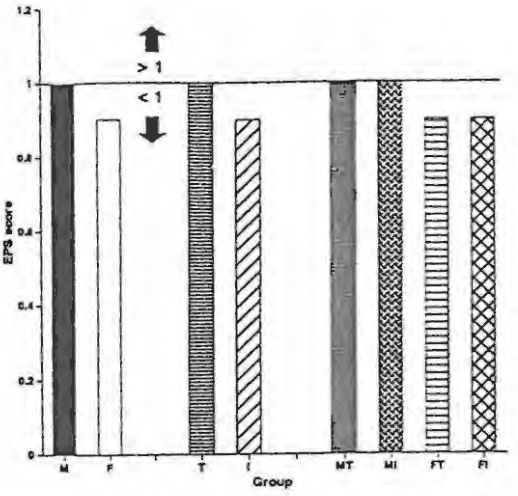


FIGURE 7: Evaluation of Perceived Strain (EPS) for all groups.

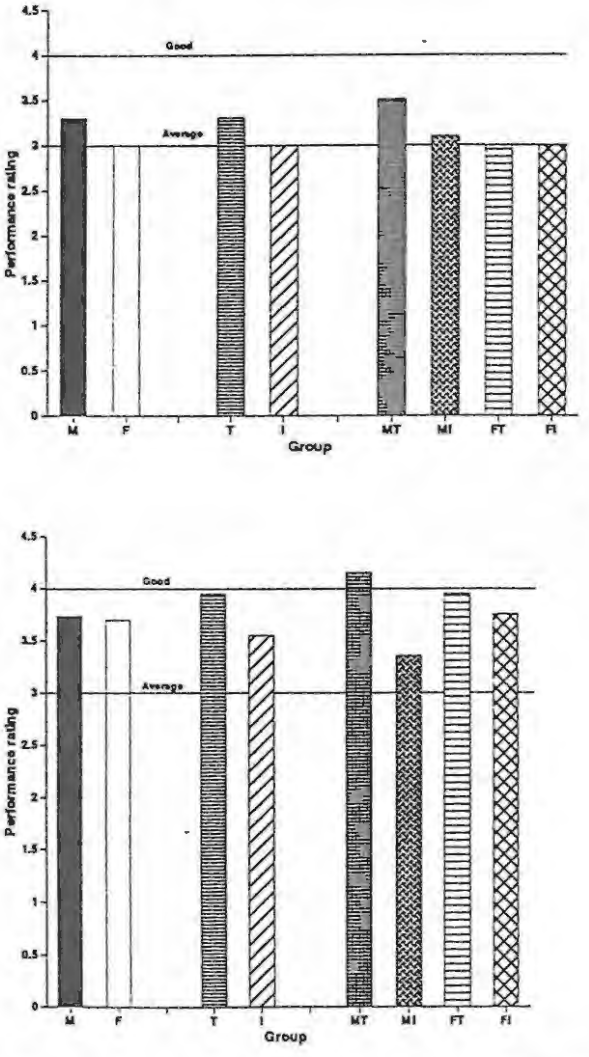


FIGURE 8: Post-match rating of Actual performance on a 5 point scale for all groups by (A) Players; (B) Coaches.

TABLE VII: Post-match rating of the standard of performance by player and coach: means and standard deviations for all groups.

GROUP	PERFORMANCE			
	ACTUAL		EXPECTED	
	PLAYER	COACH	PLAYER	COACH
M	3.3 (0.8)	3.7 (0.9)	2.7 (0.8)	2.9 (0.7)
F	3.0 (0.9)	3.7 (1.0)	2.6 (0.8)	2.9 (0.7)
T	3.2 (0.7)	3.9 (0.8)	2.6 (0.7)	3.0 (0.6)
I	3.0 (0.9)	3.5 (1.0)	2.8 (0.9)	2.8 (0.6)
MT	3.5 (0.7)	4.1 (0.7)	2.7 (0.7)	3.0 (0.6)
MI	3.1 (0.9)	3.3 (1.2)	2.8 (0.9)	2.8 (0.8)
FT	3.0 (0.7)	3.9 (0.8)	2.5 (0.7)	2.9 (0.7)
FI	3.0 (1.0)	3.7 (0.9)	2.7 (0.8)	2.8 (0.6)

BAR indicates a significant difference at $p < 0.05$

TABLE X: Post-match rating of the standard of performance by player and coach under various conditions: means and standard deviations for all groups.

PERFORMANCE	GROUP	CONDITION			
		PRACTICE	MATCH 1	MATCH 2	MATCH 3
ACTUAL (PLAYER)	MT	3.6 (0.7)	3.4 (0.7)	3.3 (0.6)	3.6 (0.5)
	MI	3.4 (0.7)	2.8 (1.1)	3.1 (1.1)	2.9 (0.7)
	FT	2.8 (0.4)	3.2 (0.9)	3.0 (0.8)	3.1 (0.8)
	FI	3.0 (0.8)	2.9 (1.1)	3.0 (1.1)	3.1 (0.9)
(COACH)	MT	3.8 (0.6)	4.6 (0.5)	3.8 (0.8)	4.3 (0.9)
	MI	3.7 (0.6)	3.1 (1.3)	2.9 (1.1)	3.6 (0.8)
	FT	4.0 (0.6)	3.7 (0.6)	3.7 (1.0)	3.7 (0.9)
	FI	3.7 (0.8)	3.6 (1.1)	3.6 (0.9)	3.6 (0.9)
EXPECTED (PLAYER)	MT	2.8 (0.6)	2.5 (0.5)	2.5 (0.8)	3.0 (0.6)
	MI	2.9 (0.8)	2.6 (0.9)	2.9 (1.0)	2.7 (0.8)
	FT	2.6 (0.7)	2.5 (0.9)	2.5 (0.7)	2.6 (0.5)
	FI	2.8 (0.8)	2.6 (0.8)	2.6 (0.9)	2.9 (0.9)
(COACH)	MT	3.0 (0.6)	3.2 (0.6)	2.6 (0.5)	3.5 (0.7)
	MI	2.7 (0.5)	2.6 (0.8)	2.9 (1.2)	2.8 (0.6)
	FT	3.0 (0.5)	2.7 (0.6)	2.7 (0.9)	2.9 (0.7)
	FI	3.1 (0.6)	2.8 (0.6)	2.8 (0.6)	2.9 (0.7)

BAR indicates a significant difference at $p < 0.05$