Competitive state anxiety: towards a clearer understanding

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Competitive State Anxiety: Towards A Clearer Understanding

by

Austin Bernard Johns Swain

A Doctoral Thesis
Submitted in Partial Fulfilment of the Requirements for the Award of

Doctor of Philosophy of the Loughborough University of Technology

January, 1992

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ABSTRACT

This thesis attempted to further understanding of various aspects of the competitive state anxiety response. The specific questions that were addressed in the five studies reported involve investigations into antecedents of competitive anxiety, temporal patterning, additional dimensions to the anxiety response and relationships with performance. Competitive anxiety was assessed in all of the studies by the Competitive State Anxiety Inventory-2 (CSAI-2) which measures cognitive anxiety, somatic anxiety and self-confidence. The first two studies employed a purely quantitative approach whilst the final three studies incorporated both quantitative and qualitative methodologies. The first study investigated situational factors which predict the CSAI-2 components in the specific population of middle-distance runners. Cognitive anxiety was predicted by three factors, 'Perceived Readiness', 'Attitude Towards Previous Performance' and 'Position Goal', whilst self-confidence was predicted by 'Perceived Readiness' and 'External Environment'. None of the factors predicted somatic anxiety. These results suggested that cognitive anxiety and self-confidence share some common antecedents but that there are also factors unique to each. The second study examined the temporal patterning of the CSAI-2 components in the period leading up to competition as a function of gender. Gender has previously been shown to mediate patterning of responses so that antecedents were also examined in an attempt to explain such findings. Results showed that males and females reported differential temporal patterning for cognitive anxiety and self-confidence and that different antecedents predicted these variables. Significant predictors of cognitive anxiety and self-confidence were associated with personal goals and standards in females and interpersonal comparison and winning in males. The third and fourth studies investigated the importance of additional dimensions to the competitive state anxiety response in furthering understanding of the construct. These studies examined the frequency and direction dimensions of anxiety and findings suggested that the intensity-alone approach currently employed is restrictive and that important information can be gained from considering these other dimensions. The fifth study focused on the dimensions of intensity and direction of anxiety and their specific relationship with sports performance. Findings revealed that a direction dimension was a better predictor of basketball performance than any of the intensity variables, further suggesting that future anxiety research should measure this dimension.
This thesis is dedicated to my family:
   To Mum, Dad and Julian
ACKNOWLEDGEMENTS

I would like to express my enormous gratitude to my supervisor, Dr. Graham Jones, for his expert advice and guidance. I am indebted to the tireless and professional nature of his assistance throughout the duration of this thesis. I would also like to apologize to his wife, Sian, for the frequent intrusions into their family life that occurred as a result of our many deliberations!

Thank you also to the Thorpe family, Rod, Elaine and Hannah, for the accommodating and patient way in which they put up with me and my computer! I am extremely grateful for all their help: And to my own family, to whom this thesis is dedicated. Thank you for your loyal and unwavering support throughout my time in Higher Education.

Finally, I wish to express my heartfelt thanks to Sarah. Her constant encouragement, selflessness and, above all, understanding have been remarkable. Her contribution to the completion of this thesis is immeasurable.
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CHAPTER 1

INTRODUCTION

THE SPORT EXPERIMENT

The importance of psychological preparation and achieving an appropriate mental state is becoming increasingly acknowledged as the crucial and determining factor in competitive sport (Orlick and Partington, 1988; Rushall, 1989). This is particularly evident at the elite level where differences in skill level and preparation have reached such levels of expertise that they serve to nullify each other. This is what Patmore (1986) referred to as the 'sport experiment' when she claimed:

"The technical skills of the contestants... cancel each other out...The deciding factor is not his (the contestant's) skill, but his ability to perform it under stress" (p.13).

Patmore identified the 'stresses' and 'pressures' in sport in the form of an experiment. The ideal experimental model, she argued, brings into contest subjects of more or less equal ability. The simplest way to apply pressure to a subject on a sports field is to provide him with opposition who will try to prevent him from doing what he came to do. This is the impetus behind competition of all kinds. She proposed:

"It is a dynamic method of applying pressure to all concerned, for each is striving to succeed in his performance while every effort is being made by others to disrupt it" (p.13).

Athletes at the elite levels of sport, because they have superior physical skills, are placed into extremely demanding competitive environments that require extraordinary psychological skills to perform optimally. Individual athletes have different ways of responding to this stress. Some performers appear to cope with the situation; indeed a hallmark of outstanding athletes is their ability to simultaneously maintain high intensity and remain 'loose' while others experience a negative, debilitating degree of anxiety and tension and are labelled 'choke artists'. Athletes can even vary within themselves in the nature of their responses to stress. An example of how the sport experiment can affect sports performers is evidenced in the following extracts from 'Running Free' by Sebastian Coe (1981). The first passage refers to events prior to the 1980 Olympic 800 metre final. It was a race he was expected to win but he ran considerably below his best and was beaten comfortably by Steve Ovett:
"...I've never known pressure like it. I thought people had exaggerated, but they hadn't. There was no comparison. I'd felt pressure going into the Europa Cup final the year before. but it just wasn't the same thing. It began after the semi-final. It was unusual for me. I'd never been like that so long before a race. I had the worst night's sleep I've ever had, just lying there listening to my own heartbeat, thinking to myself, you've coped with the pressure all year, for heaven's sake take a grip! But it was the same the next day. At lunch I knocked over my orange juice, and then dropped the cream carton into my cup of coffee. I suddenly felt ungainly, conscious of my own awkwardness" (p.88)

as compared to his comments prior to his gold medal winning performance in the 1500 metres final seven days later:

"I slept very well. Instead of the nerves I had before the 800 metres. I was now excited by the final of the 1500 metres. I wanted to get out there and enjoy it. The listlessness had gone and my whole preparation was much more switched on" (p.124).

Pressure largely stems from uncertainty about the outcome and if opponents are well matched then suspense surrounding the outcome is likely to materialise. Sport is littered with anecdotal comments like the ones from Sebastian Coe that frequently allude to the important effect that pressure or anxiety can have on sports performance. It is perhaps not surprising, therefore, that the most frequent questions that sports performers and coaches ask are "What causes athletes to become uptight? Why do some athletes rise to the occasion in intense competition while others choke under pressure? How does competitive anxiety affect the performance of the athlete?". There is now a considerable body of research literature on anxiety in sport that addresses questions such as these and this thesis will look to extend our ability to answer some of them.

**POPULARITY OF ANXIETY RESEARCH**

The expanding body of research literature on anxiety in sport owes a great deal to developments in mainstream psychology as the concept of anxiety caused initial intrigue amongst researchers in other psychology disciplines. Textbooks on psychology made no reference to the term 'anxiety' until the 1930s, however, as it required the translation of Freud's (1926) 'Hemmung, Symptom und Angst;' ('Inhibitions. Symptoms and Anxiety') for the word to become popular among psychiatrists and psychologists. Due to the lack of suitable psychometric measures to assess the phenomenon, it was not until the 1950s that anxiety research began to develop. The construction of the Manifest Anxiety Scale (MAS) (Taylor, 1953) spawned the first detailed research in general anxiety while further progress evolved in the educational and clinical
psychology disciplines. Mandler and Sarason's (1952) Test Anxiety Scale (TAS) generated considerable research activity in the test anxiety area that accelerated at an ever increasing rate throughout the 1960s and 1970s (Wine, 1980). Clinical psychologists also became more interested in anxiety and its perceived corollary, relaxation, with the introduction of Systematic Desensitization Theory by Wolpe in 1958. The emergence of autogenic training (Luthe, 1963) and the use of hypnosis (e.g. Paul, 1969), as further means of reducing anxiety, reflected a hastening of research activity in the area. This continued to develop during the 1970's, most notably as a result of the work of Davidson and his colleagues (Davidson, 1978; Davidson and Schwartz, 1976; Schwartz, Davidson and Goleman, 1978). Without question, anxiety remains a subject of substantial research interest. An indication that the 1990s will continue to witness considerable activity in this area is perhaps best illustrated by the emergence of a new journal, 'Anxiety Research', first published in 1988. The editorial comment in the inaugural edition read "anxiety literature is extremely extensive and encompasses work in several overlapping scientific, clinical and educational areas of study" and concluded by informing the reader that the new journal had been established, therefore, with the express purpose of providing a clearer focus for such a thriving field.

The study of anxiety in sport lies within the realms of the relatively new academic discipline of sport psychology. The recent growth in the popularity of sport psychology is a function of the acknowledgement that psychological factors play a crucial role in determining sports performance (Jones and Hardy, 1990a). Sport is an attractive environment for the study of anxiety, since it has the potential to place considerable physical and psychological demands upon people. It has been characterised as an ideal situation to study the antecedents, dynamics and consequences of anxiety (Hackfort and Spielberger, 1989). Furthermore, the athletic environment is one which is public in nature, and lends itself to naturalistic observations of both situational and behavioural variables. It also provides performance measures of high ecological validity that serve to enhance it as a setting in which to study anxiety (Smith, Smoll and Schutz, 1991). Considerable individual variation exists in the tendency to experience anxiety in the competitive context and empirical evidence strongly suggests that important outcomes such as performance and enjoyment are influenced by anxiety (Smith and Smoll, in press).

Due to the proclivity of anxiety in sport, sport psychologists have sought to identify the sources of anxiety and to learn how different individuals perceive these sources. They have examined both absolute and relative levels of anxiety and investigated the relationship between these levels and performance. Apitzsch commented in 1983 that this interest in the role of anxiety in sports competition had stimulated a substantial amount of research among sport psychologists over the past twenty years and that this research has included investigations of anxiety effects on individuals engaged in a wide variety of physical activities.

Although researchers have made significant progress in recent years towards a greater understanding of competitive anxiety, a number of important issues remain unclear; these issues
will form the focal point of this study. For the moment, it is important to recognise that the detailed research which has been recently carried out in competitive anxiety has largely stemmed from developments in mainstream psychology. It is beneficial at this stage, therefore, to trace this development in the mother discipline.

DEVELOPMENT OF ANXIETY RESEARCH IN MAINSTREAM PSYCHOLOGY

A longstanding problem in the study of anxiety has been the inconsistent use of terms such as arousal, activation, stress and anxiety. Interpretative problems have beset the literature because the terms are often used interchangeably but are conceptually distinct. Such has been the multiplicity of referents to anxiety, researchers have failed to meet the criteria for a scientific vocabulary recommended by Mandler and Kessen (1959) "that its words, from whatever source, must show a high consistency of usage from user to user and from occasion to occasion" (p.45).

This section will attempt to clarify the debate over definitions and establish semantic consistency for the remainder of this thesis.

Definition of Stress

Despite a large and growing literature, the concept of stress remains a somewhat amorphous construct. One of the major problems in examining the stress-performance relationship has been a lack of consensus over a precise definition of stress, semantic confusion (Gould and Krane, in press) and the fact that the term stress has often been utilised as synonymous with anxiety. It has been variously conceptualised as a stimulus (the independent variable), as a response (the dependent variable) and as a transaction between the person and the environment (Burchfield, Stein and Hamilton, 1986; Lazarus and Folkman, 1984).

Stimulus definitions are usually found in human performance theory (Broadbent, 1971). Here, stress is a label given to certain environmental and organismic conditions and hence, in the stimulus definition, noise, sleep loss and heat are all examples of 'stress'. Selye (1956), on the other hand, defined stress as the non-specific response of the body to any demand placed upon it, that is; stress is evoked by any stimulus.

However, more recent psychology literature has increasingly adopted an interactional definition, which considers stress as an intervening variable. As Selye (1974) conceptualised in his differentiation between eustress, or 'good' stress, and distress or 'bad' stress, not all stressors have negative consequences. Cherry (1978) similarly proposed that stress is a combination of external factors/stressors which are potentially disturbing to the individual. The important factor is the interaction between the stressor and the individual. Consequently, the individual will experience distress or strain (Cherry, 1978) only if he or she perceives him/herself as being unable to meet the demands imposed by a particular stressor (Lazarus, 1966; McGrath, 1970). Therefore,
use of the interactional paradigm suggests two broad categories of responses to a particular stressor: these being strain/negative response as a result of an unfavourable imbalance and coping/positive response as a result of favourable adaptation. The key to the whole stress process, therefore, is the cognitive appraisal of the relationship between demand and perceived capability to meet that demand. The way stress will be operationalised, therefore, is as a stimulus event that only takes on meaning as a result of the individual's interpretation of the situation.

**Definition of Anxiety**

Anxiety can be considered as one class of responses to stressors that is influenced by the personal salience of the situation for the person. Most theorists construe anxiety as including fear, shame and guilt (Janis, 1969), and other elements which have been suggested include distress, anger (Izard, 1972) and frustration (Gray, 1979). Neiss (1988) argued that any of these elements could degrade performance by introducing excessive tension. Anxiety is generally conceptualised, therefore, by what Cattell (1972) described as "a degenerate form of motivation". McGrath's (1970) stress process suggested that anxiety reactions would result from an objective environmental demand which was interpreted as threatening (a perceived imbalance between the demand and one's response capabilities) by an individual.

Therefore, an interactionist approach, which this work adopts, distinguishes between stress and strain. In other words, strain is not the inevitable consequence of a 'stress' experience. Strain is the response to an individual's negative cognitive appraisal of his or her adaptation to the demands of a particular environment (i.e. the stressor) (Lazarus, 1966), which may result in avoidance motivation. Another individual's perception of the same environment may be positive, resulting in approach motivation (Jones, 1990).

Anxiety is also a construct that some investigators believe lacks conceptual clarity. In the contextualist view (Efran, Germer and Lukens, 1986), symptoms such as anxiety can only be understood within the context of the individual's various roles and expectations. Anxiety, they argued, is worth considering only in relation to the individual's meaning system. Sarbin (1968) referred to anxiety as such a hydra-headed term that its "employment has negative utility for a science of human conduct" (p.417). His argument stems from what he termed the opaque nature of the word anxiety which results in emotions such as apprehension, concern, worry, and fear all meaning different things to different people and yet being interpreted as one common concept under the umbrella term of anxiety. This is not arguing against the notion that anxiety is a negative response to a stimulus but that the multiplicity of responses following a negative appraisal are so great, that one term is too broad to encapsulate them all, and in so doing will not accurately convey appropriate meaning.

In the context of this thesis, however, the term 'anxiety' will be used, although sympathy with the contextualist view is forwarded in Chapters 4, 5 and 6. Anxiety will refer, therefore, to
any negative response to a stimulus with stress being operationalised as that stimulus. Stress will be seen as a neutral phenomenon that only assumes a direction following the individual's interpretation of his ability to cope with that stress. This study will focus primarily on sports performers' interpretations of their reactions to stressful situations and the nature of the anxiety response.

Measurement of Anxiety

Having established a definition of anxiety, the issue of its actual measurement can now be considered. Measurement of various anxiety-related constructs has generated considerable controversy within psychology. In general, anxiety can be assessed on the cognitive level (self-assessment and assessment by others), records of physiological parameters and behavioural or expressive indices. The debate whether self-report anxiety inventories or psychophysiological indices are the most appropriate has been ongoing in psychology and sport psychology alike. Martens (1977), for example, stated that he was convinced that self-report measures would indicate more about an athlete's state of arousal than any composite of physiological indices, whereas Landers, Wang and Courtet (1985) suggested that physiological measures of anxiety were a more sensitive indication of the effect of anxiety on performance than was self-report anxiety.

Anxiety scales have become increasingly popular, not only because of their ease of administration, especially in field settings, but also because they allow individuals to register their own interpretations of their cognitive and physiological states. What is required is judicious use of self-report methodologies to guard against contamination by social desirability. As conceived by Crowne and Marlowe (1960), social desirability is a self-presentational motive: in performance situations it can function in either direction. Firstly, subjects can deny the existence of anxiety because it conflicts with an image they wish to project. Males may be especially prone to deny pre-competition anxiety, as indicated by Gackenbach's (1982) study of collegiate swimmers, although Williams and Krane (1989) revealed similar results with female subjects. Certainly, problems of anxiety repression and willingness to disclose information cannot be overlooked (Hackfort and Schwenkmezger, 1989). Secondly, subjects can claim that anxiety degraded a performance as a defence mechanism against failure. The validity of these instruments depends significantly on such factors as openness, honesty and the self-awareness of the respondent.

Physiological parameters frequently studied with regard to anxiety include pulse rate, blood pressure, rate of respiration, biochemical indicators such as adrenaline and electrophysiological measures such as electroencephalograph (EEG) correlates and skin resistance. The advantages that physiological measurements bring to anxiety research can be defined as removal of the weaknesses of self-report measures. They are not prone to social desirability or dependent upon verbal expressive ability; they can be assessed continuously, parallel to behaviour. However, substantial weaknesses remain. Perhaps the most oft-cited reservation is that different physiological indicators,
such as heart rate and action potential in an electromyogram, both of which are indices of general arousal, frequently show only slight correlations with each other. Neiss (1988) has advocated that arousal researchers employing physiological assessments should consider Lacey and Lacey's (1958) notions of both inter-and intra-response stereotypy which emphasizes the identification of specific arousal measures (e.g., heart rate versus galvanic skin response) that typify specific individual's stress responses.

Furthermore, although physiological side effects of emotional processes can be measured objectively, situations occur whereby the researcher cannot infer positive or negative affect. This means that an increase in heart rate can occur both in the context of the emotion of anxiety and in reactions of excitement. Which of these emotional reactions occurs is determined by a cognitive evaluation of the stimulus situation. Nitsch (1981) also points out that we do not know whether one has assessed the reaction to the stressor being studied or the person-specific stress sensitivity toward physiological procedures. As Hackfort and Schwenkmezger (1989) asserted, physiological processes in the anxiety response are only of secondary importance. It is the perception of physiological processes as information for the subjective evaluation of one's state that is important. Lazarus (1981) emphasized the role of subjective assessment, which influences both emotional reactions and further actions. He assumed that this process of action guidance, which is put into gear by mental processes, has substantial effects on somatic processes. For this reason, the careful use of self-report methodologies is probably the best method. Consequently, this thesis will concentrate on questionnaires as its central means of assessing the anxiety response.

CONCEPTUAL ADVANCES AND PSYCHOMETRIC IMPROVEMENTS IN ANXIETY RESEARCH IN MAINSTREAM PSYCHOLOGY.

Conceptual advances in anxiety research have been particularly evident in three areas and these have been reflected by corresponding improvements in the measurement of the construct. The first example of progress was the distinction between general and situation-specific anxiety which established that anxiety tended to be a learned response to a particular situation. This development stimulated awareness that a greater understanding of anxiety would arise from discrimination between a general tendency to be anxious and transitory anxiety states and hence a distinction between state and trait anxiety also emerged. The third improvement in our understanding involved the differentiation between cognitive and somatic components of anxiety as a result of increasing discontent with unidimensional conceptualizations of the response.

General versus Situation-Specific Distinction

Conceptual advances were initially plagued by divergent opinions on the subject and this lack of consensus was reflected in the nature of the early questionnaire measures. Researchers such
as Taylor (1953) believed that there was a relatively constant level of internal anxiety or emotionality, regardless of the situation in which this level of anxiety was manifested. In other words, whatever the context of the stressful situation, people would respond in an identical manner. Consequently, this theoretical assumption underpinned the construction of the MAS (Taylor, 1953), one of the prominent general anxiety scales, as well as the IPAT anxiety scale (Cattell, 1957). However, at the same time, Child (1954) and Mandler (1954) reported intra-individual differences in anxiety both in content and intensity from one situation to another. Mandler and Sarason (1952) were the first proponents of the need for more sensitive situation-specific anxiety measures with the development of TAS. They argued, justifiably, that the first concern in constructing a measuring instrument which will predict the effect that anxiety may have in a particular setting, is to define the experiences and behaviours which the item responses are to reveal. They claimed that anxiety was a learned response to situations and not a unitary, general phenomenon. These investigators, studying anxiety in academic achievement situations, devised TAS "...a questionnaire which was specially concerned with the subjects' attitudes and experiences in a testing situation" (Mandler and Sarason, 1952; p.166). The implication of this type of scale was that the increased situational specificity of its item content would allow for a more sensitive measurement of anxiety and its effect in the academic achievement situation. A number of studies reported the merits of situational specificity over generality of item content via statistical procedures such as regression analyses which indicated greater predictability for performance by accounting for considerably more of the variance in the performance measures (Alpert and Haber, 1960; Schulz and Calvin, 1955). It followed that specific scales for other situations would be needed. As a result of Mandler and Sarason's research showing improved behavioural prediction when a person's situation-specific anxiety disposition is known, other scientists have developed situation-specific anxiety scales to measure audience anxiety (Paivio and Lambert, 1959), fear of negative evaluation and social avoidance and distress (Watson and Friend, 1969), and fear of snakes, heights, and darkness (Mellstrom, Cicala and Zuckerman, 1976).

State versus Trait Distinction

This proliferation of anxiety research in the 1950's not only debated the relative merits of situation-specific versus general scales but also increased awareness that anxiety instruments needed to discriminate between a general tendency to be anxious and momentary anxiety states. Spielberger (1966), in particular, argued that for a theory of anxiety to be adequate, it must differentiate between anxiety as a mood state and as a personality trait. Consequently, he proposed the state-trait theory of anxiety based upon an interactional paradigmatic approach. State anxiety was defined as:
"subjective, consciously perceived feelings of apprehension and tension, accompanied by or associated with activation or arousal of the autonomic nervous system" (Spielberger, 1966: p.17).

This condition can vary from moment to moment and fluctuates proportionally to the perceived threat in the immediate situation. Trait anxiety, on the other hand, is:

"a motive or acquired behavioural disposition that predisposes an individual to perceive a wide range of objectively non-dangerous circumstances as threatening and to respond to these with state anxiety reactions disproportionate in intensity to the magnitude of the objective danger" (Spielberger, 1966: p.17).

The state-trait theory of anxiety predicted that high trait anxious individuals would react with greater state anxiety in more situations than low trait anxious individuals. This led to the development of the State-Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch and Lushene, 1970) with the intention of providing reliable, relatively brief self-report measures of state and trait anxiety. As a result, future scales have identified themselves as specifically examining either trait or state anxiety.

Cognitive versus Somatic Distinction

A third important conceptual development involved the distinction between cognitive and somatic components of anxiety. Substantial progress had resulted from the situation-specific and trait-state conceptualisations of the anxiety response, but increasingly, researchers began to conclude that anxiety as a unidimensional construct was too amorphous to be useful as a predictor of behaviour, and that it was fallacious to consider the construct as a general unitary response (Davidson and Schwartz, 1976; Liebert and Morris, 1967). It became increasingly apparent that the anxiety construct required greater conceptual specificity as evidence of independence between different components of anxiety began to emerge (e.g. Davidson, 1978; Schwartz et al., 1978). These researchers demonstrated that emotional states consist of specific bio-behavioural processes that retain independence from one other, and that they tend to cluster into these cognitive (worry) and somatic (emotionality) groupings.

In 1967, Liebert and Morris introduced a two-component conceptualisation of anxiety into the test anxiety literature. According to this view, the experience of anxiety is separable into at least two major components, worry and emotionality. Morris, Davis and Hutchings (1981) defined worry as:
"the cognitive elements of the anxiety experience, such as negative expectations and
cognitive concerns about oneself, the situation at hand, and potential consequences" (p.54).

whereas emotionality was defined as:

"one's perception of the physiological elements of the anxiety experience, that is,
indications of autonomic arousal such as nervousness and tension" (p.54).

This distinction has stimulated considerable research. Davidson and Schwartz (1976) and
Borkovec (1976) identified two similar components of anxiety that they labelled cognitive anxiety
and somatic anxiety. Morris et al. (1981a), in a review of multidimensional state anxiety, indicated
that the cognitive-somatic distinction is essentially the same as the worry-emotionality distinction
made by Liebert and Morris (1967). In addition, Barrett (1972) factor analyzed traditional
anxiety questionnaires and found two major subcomponents, one consisting of an awareness of
somatic changes and the other concerned with an awareness of unpleasant feelings and thoughts.
Similar dimensions, labelled psychic (cognitive) and somatic anxiety were derived from self­
ratings of psychiatric patients (Buss, 1962).

The value in measuring cognitive and somatic components of anxiety separately not only
stems from conceptual arguments but also from empirical evidence that these two components
possess elements of independence (Davidson and Schwartz, 1976; Liebert and Morris, 1967).
Thus, one person may respond to a stressor with primarily cognitive anxiety and another with
primarily somatic anxiety, or the same person may experience primarily cognitive anxiety in one
situation and somatic anxiety in a different situation. Equally, people can also respond with high
levels of both components.

This differentiation between cognitive and somatic components of anxiety has stimulated
the development of both global and situation-specific multidimensional measures. Moreover, both
trait measures (e.g. Schwartz et al.'s 1978 Cognitive-Somatic Anxiety Questionnaire (CSAQ)) and
state measures (e.g. Liebert and Morris', (1967) and Morris et al.'s (1981a) Worry-Emotionality
Inventory (WEI)) have been developed. Liebert and Morris (1967) first countered the trend
towards lack of operationalisation and treatment of state anxiety as a uniform state. The ten item
WEI was developed from items on the Sarason-Mandler TAS and were chosen on the basis of the
general factor loadings of previous research (Gorsuch, 1966; Sassenrath, 1964). Wine (1980) is in

1.1 Whilst recognizing that worry and emotionality are synonymous with the concepts of cognitive and somatic
anxiety, respectively, the terms are used interchangeably in this chapter. This is in order to be in keeping with the
actual terminology adopted by the relevant researchers whose work is reviewed.
little doubt as to its importance: "The WEI is perhaps the most outstanding of the situational measures .... which has contributed so heavily to the theoretical advances in the field" (p.353). This increased specificity is not exclusive to anxiety. In a related context, Hardy and Whitehead (1984) developed a 14-item arousal questionnaire which comprised separate cognitive activation and somatic activation components.

Four lines of evidence support this conceptual distinction between cognitive and somatic anxiety. First, evidence exists that although they interact with one another, cognitive and somatic anxiety may be elicited by different antecedents. In several studies, threat of electric shock had its primary impact on somatic rather than cognitive anxiety (Morris, Harris and Rovins, 1981; Morris and Liebert, 1973). On the other hand, pre-performance expectancies in evaluative situations tend to be more highly correlated with cognitive anxiety than with somatic anxiety (Liebert and Morris, 1967), and the cognitive component covaries with performance expectancy changes during subsequent performance (Morris and Engle, 1981; Smith and Morris, 1976).

A second line of evidence indicates that cognitive and somatic anxiety have differential effects on performance. Morris and Liebert (1969) reported convincing evidence that worry may play the greater role in intellectual performance and suggested that emotionality may be a better predictor of motor performance. In their reviews of the test anxiety literature, Deffenbacher (1980) and Tryon (1980) concluded that although worry and emotionality are correlated with one another, only worry appears to be consistently related to performance decrements on cognitive tasks under evaluative stress conditions. Although Parfitt, Jones and Hardy (1990) have suggested that these particular findings may only represent part of the picture, in that assumptions based on correlational analyses often require some qualification, the fact remains that cognitive and somatic anxiety appear differentially related to performance. Sarason (1984) also found the worry scale of his multidimensional test anxiety measure related negatively to performance on cognitive tasks under evaluative conditions, whereas somatic anxiety was unrelated to performance. Wine (1971) argued that the mechanism by which cognitive anxiety inhibits performance is by inhibiting attentional processes by dividing attention between self-preoccupied worry and task cues. Wine (1980) reasoned:

"Worry is the more stable, enduring component of test anxiety, whereas self-report of emotionality has a more transient quality and is confined to evaluating situations. Worry interacts with other cognitive variables and bears a consistent, negative relationship to cognitive performance and to performance expectancies; emotionality does not relate consistently to these variables. Thus it is the cognitive, self-preoccupied worry component of anxiety that interferes most directly with task performance" (p.356).
Consequently, it is generally considered that subjects with high cognitive anxiety suffer performance impairments because their attention is misdirected from task-relevant to task-irrelevant self or social evaluation cues. In contrast, the somatic component of state anxiety is considered to have less consistent effects on performance because it does not typically interfere with task-relevant thoughts.

Neiss (1988) argued, however, that worry (cognitive anxiety) may account for more variance in performance measures than emotionality (somatic anxiety) because it includes a 'component of rational prediction', not because it is the greater source of interference. Neiss concluded:

"The cognitive and emotional components of this phenomenon (i.e. anxiety) are highly interactive and not profitably separated by research methodologies that take no account of their interaction" (p.358).

This is not an argument propagating a unitary conceptualisation of anxiety, but is acknowledgment that, although cognitive and somatic anxiety are viewed as independent, they are likely to covary in stressful situations because these situations contain elements related to the arousal of each (Morris et al., 1981a). Borkovec (1976) agreed, but for a different reason. He suggested that each component of anxiety may serve a conditional function for the other component. A substantially more detailed review of the anxiety-performance literature will be presented in Chapter 5.

A third line of evidence for the viability of the cognitive-somatic distinction relates to the issue of anxiety reduction. Cognitive and somatic anxiety have been regarded by some theorists as partially independent response systems that are activated by stressors (e.g. Borkovec, 1976; Davidson and Schwartz, 1976). If individual differences exist in the tendency to experience one or the other (or both) components, then treatment might be most effective if it is directed at the most strongly activated response system(s). Although this 'matching hypothesis' regarding treatment efficacy has not always been supported, there does exist considerable empirical evidence for it (Morris et al., 1981a; Michelson, 1986; Schwartz et al., 1978). Burton (1990) has suggested, however, that the best intervention programmes should employ multimodal stress management techniques that attack multiple types of anxiety simultaneously.

The fourth and final source of evidence indicates that cognitive and somatic anxiety exhibit differential temporal patterning in the period leading up to an evaluative event. Spiegler, Morris and Liebert (1968) reported that emotionality was a function of "imminent stressful circumstances, while worry was not" (p.454). Consequently, emotionality is predicted to increase rapidly close to the onset of the event but then dissipate once the event has begun (e.g. Doctor and Altman, 1969; Smith and Morris, 1976). Worry, on the other hand, is predicted to remain unchanged in the
period leading up to evaluation (Morris and Fulmer, 1976). The cognitive-somatic distinction thus appears to be an important one from theoretical, empirical and treatment perspectives.

This section that has briefly reviewed the psychometric developments made in anxiety research has identified, therefore, three conceptual advancements: Namely, acknowledgement of the need to differentiate between trait and state anxiety; the importance of distinguishing between cognitive and somatic components of the response; and, awareness that situation-specific anxiety responsiveness exists. Sport psychology has embraced these developments and the next section details these advances in the context of sport competition.

**DEVELOPMENT OF ANXIETY RESEARCH IN SPORT PSYCHOLOGY**

Sport psychology has followed the general trends set within mainstream psychology. As will become clear, the vast majority of conceptual and psychometric development in the area has been generated by the work of Rainer Martens and his colleagues in the United States. This work has, at various stages, culminated in the availability of sport-specific measures of competitive anxiety which served to accelerate the proliferation of research during the 1980s. Indeed, LeUnes, Wolf, Ripper and Anding (1990) acknowledged that competitive stress has been a topic of considerable interest and a central focus for a number of researchers.

**Early Use of the State-Trait Anxiety Inventory**

In the formative years of competitive anxiety research in sport psychology, sport psychologists used the STAI (e.g. Martens and Gill, 1976; Scanlan, 1977) in the absence of sport-specific psychometric measures. The STAI has separate state (SAI) and trait (TAI) anxiety scales. In responding to the TAI, subjects are instructed to report how much they generally tend to experience symptoms of anxiety. Scores on the SAI define a continuum of increasing anxiety intensity, at that moment, and in the situation that the questionnaire is being completed. Low state anxiety scores indicate calmness and serenity; intermediate scores indicate moderate levels of tension and nervousness; high scores reflect intense apprehension and fearfulness, approaching panic. Spielberger (1989) argued that the findings in sport psychology research provide evidence that the SAI is a sensitive index of the changes in anxiety levels produced by practice versus competition (Klavora, 1974), physical activity (Rhodes, 1980), perceived or experienced success or failure (Martens and Gill, 1976) and level of competition (Tenenbaum and Milgram, 1978). Findings using the trait version, however, appear less conclusive (Spielberger, 1989). Although research evidence suggests that the SAI has some utility in sport settings, the problem remains that it is a general anxiety scale and unidimensional in nature. Evidence from other psychology disciplines referred to in the previous section suggested that sport psychology could benefit from
situation-specific and trait-state conceptualisations, as well as a distinction between cognitive and somatic components.

**Sport Competition Anxiety Test**

Based upon the proposition that a sport-specific trait anxiety scale would likely be a better predictor of state anxiety in competitive situations than would a general trait scale, Martens (1977) developed the Sport Competition Anxiety Test (SCAT) for the purpose of providing a reliable and valid measure of competitive trait anxiety. The construct of competitive anxiety was conceptualised within a theoretical framework based on the interactional paradigm, situational-specificity and the distinction between personality traits and states. Systematic research studies were conducted to develop SCAT as a "reliable and valid operationalisation of the competitive trait anxiety construct" (Martens, Vealey and Burton, 1990; p.67). These studies provided evidence for the reliability, and content, concurrent and construct validity of SCAT in both laboratory and field settings. Thus, a theoretically based, valid operationalisation of competitive trait anxiety was successfully developed. Ostrow and Ziegler (1978) welcomed SCAT as the "first known sport-specific behavioural scale that combines a substantive theoretical base with rigorous psychometric construction" (p.139).

Since the original conceptualisation of competitive anxiety and development of SCAT, many studies have used the scale. Martens et al. (1990) reported that an extensive search of the sport psychology literature provided 217 citations of the original SCAT monograph (Martens, 1977), and included in these citations are 88 published empirical studies using SCAT. As Sonstroem (1984) stated, "in its short history SCAT has uniquely advanced an understanding of anxiety in motor learning and sport" (p.113). Studies have examined the influence of competitive trait anxiety on variables such as gender (Gill, 1988), gender role (Swain and Jones, 1991a), age (Hogg, 1980), ability (Passer, 1983) and type of sport (Power, 1982).

**Competitive State Anxiety Inventory**

Through the validation research for SCAT, it became apparent that a sport-specific state anxiety scale was also needed. A modified version of the SAI was first developed and was called the Competitive State Anxiety Inventory (CSAI) (Martens, Burton, Rivkin and Simon, 1980). This scale consisted of 10 items from the SAI that were applicable to the competitive sport environment. The research using the CSAI verified that it was a more sensitive scale than was the SAI for measuring state anxiety in sport contexts (Martens et al., 1990). Whilst use of the scale has not been as widespread as use of the SCAT, due to being superceded shortly afterwards by the CSAI-2, a number of studies using the CSAI have provided evidence of the significant relationship
between competitive trait and state anxiety in competitive situations (e.g. Cooley, 1987; Scanlan and Lewthwaite, 1984).

**Competitive State Anxiety Inventory-2**

Recent theory and research suggest that, even with these conceptual developments, anxiety may be a more useful construct with even greater conceptual specificity (Davidson, 1978). This requirement of increased specificity was matched by a need for instruments to measure them. The authors of the CSAI (Martens et al., 1980) responded to the increasing awareness that the unidimensional conceptualisation of the competitive state anxiety response had become outmoded.

As discussed earlier, the conceptual distinction centred on a discrimination between cognitive and somatic components and this distinction led to the construction of at least three inventories to measure cognitive and somatic anxiety. As already mentioned, Liebert and Morris (1967) developed the WEI, which was later revised by Morris et al. (1981a); Spielberger, Gonzalez, Taylor, Algaze and Anton (1978) developed the Test Anxiety Inventory (TAI); and Schwartz et al. (1978) developed the Cognitive-Somatic Anxiety Questionnaire (CSAQ). The former is a state anxiety scale, and the latter two inventories measure trait anxiety. The conceptual distinction between cognitive and somatic state anxiety and the subsequent development of instrumentation to tap these multidimensional components of anxiety initiated the re-conceptualisation of competitive anxiety and a modification of the CSAI to account for both components of state anxiety. Since the CSAI-2 forms a focal point of this thesis, its development is described in some detail below.

The CSAI-2 was originally constructed to include subscales to measure not only cognitive and somatic state anxiety but also fear of physical harm and generalised anxiety. Seventy nine items were generated to measure one of these four types of state anxiety. Items were obtained from (a) the original CSAI, (b) by modifying items from other cognitive-somatic state anxiety inventories (Liebert and Morris, 1967; Schwartz et al., 1978) to make them sport-specific, and (c) by composing them especially for the new inventory. This inventory, known as Form A, was completed by 106 University American football players one hour prior to competition and to 56 undergraduate physical education students who completed the inventory on the basis of a hypothetical competitive situation. Their responses were analysed by computing item analyses, item-to-subscale correlations, factor analyses and discriminant analyses. A composite of all these analyses was used to select the more appropriate items for retention in the CSAI-2 item pool on the basis of standard test construction evaluation criteria (Magnusson, 1966).

The most significant finding from this stage of the psychometric process was the emergence of a state self-confidence subscale which was identified when an iterative factor analysis of the questionnaire split the hypothesized cognitive anxiety factor into two separate components;
one consisting of negatively worded items (cognitive anxiety) and others consisting of positively worded items (self-confidence).

The composite picture of each item derived through these four separate statistical analyses led to the elimination of less discriminating items, reducing Form A from 79 to 36 items. This new form, labelled Form B, included a 12-item cognitive state anxiety subscale, a 12-item somatic state anxiety subscale, a 10-item state self-confidence subscale, and a two-item fear-of-physical-harm subscale. The next step was to re-calculate the same statistical analyses for the responses of the same 162 athletes on the 36-item Form B. The most significant consequence of these re-analyses was the removal of the fear-of-physical-harm subscale from further versions of the scale.

Two further administrations of the scale to 80 male and female athletes and subsequent minor revisions produced a new 27-item CSAI-2, comprising three 9-item subscales measuring cognitive state anxiety, somatic state anxiety and state self-confidence, known as Form D. Test-re-test reliability is inappropriate for state scales, so that the only method of estimating reliability for the CSAI-2 was by examining the internal consistency of the scale (Kerlinger, 1973). Internal consistency measures the degree to which items in the same subscale are homogenous. Alpha coefficients ranged from 0.79 to 0.90, demonstrating a sufficiently high degree of internal consistency for each of the CSAI-2 subscales. The concurrent validity of Form D of the CSAI-2 was examined by investigating the relationship between each of the CSAI-2 subscales and eight selected previously validated scales. The correlation coefficients which emerged were highly congruent with hypothesized relationships among the CSAI-2 subscales and scales of related constructs.

However, Form D was found to be susceptible to social desirability response bias and was modified into Form E to lessen this bias. The scale modifications and the use of anti-social desirability instructions in administering the CSAI-2 ensured that Form E was accepted as the final form of the CSAI-2 to be used in the subsequent construct validation research. It comprised 27 items containing three 9-item subscales measuring cognitive state anxiety, somatic state anxiety and state self-confidence.

The final and most important phase in the development of the CSAI-2 was its construct validation. Construct validity is determined by an accumulation of evidence that the operational definitions of the new constructs (sport-specific cognitive state anxiety, somatic state anxiety, state self-confidence) are related to other constructs as predicted by theory. Evidence supporting the construct validity of the CSAI-2 was provided by the authors through a systematic progression of four research studies. Study 1 supported hypothesized relationships between the CSAI-2 components and various individual difference and situational factors. More specifically, the results indicated that each of the CSAI-2 components were significantly influenced by competitive trait anxiety, gender, skill level of athletes and the type of sport. Individual sport athletes, contact sport athletes, high trait anxious athletes and females displayed significantly higher cognitive and somatic anxiety and lower self-confidence than team sport athletes, non-contact sport athletes, low trait
anxious athletes and males, respectively. Athletes in subjectively-scored sports were significantly higher in cognitive anxiety and lower in self-confidence than athletes in objectively-scored sports, although no differences were found in levels of somatic anxiety. Study 2 provided support for the hypothesized independence of the CSAI-2 components by demonstrating differential changes in the components based on the proximity of competition. Separate groups of wrestlers and gymnasts both reported that somatic anxiety was lower than cognitive anxiety several days before competition, but that somatic anxiety increased rapidly once athletes arrived at the competition site just prior to competition. Study 3 examined the relationship between the CSAI-2 components and golf performance and found equivocal results. None of the pre-competition CSAI-2 scores correlated with golf performance, although mid-competition CSAI-2 scores (taken after nine holes) did predict final performance. To study the relationship between CSAI-2 and sport performance more precisely, Study 4 extended Study 3 by utilizing intra-individual performance measures. The results of Study 4 provided evidence that the relationship between anxiety and performance is influenced by the multidimensional nature of state anxiety as well as by task complexity and duration (Martens et al., 1990). Findings supported the predicted (a) inverted-U relationship between somatic anxiety and performance, (b) negative linear relationship between cognitive anxiety and performance, and (c) positive linear relationship between self-confidence and performance, in a mid-season swimming competition.

**Sport Anxiety Scale**

The importance of distinguishing between the cognitive and somatic components of anxiety is already evident in recent research involving the CSAI-2 state measure (Burton, 1988; Gould, Petlichkoff, Simons and Vevera, 1987). The usefulness of multidimensional trait anxiety measures has been demonstrated in other areas of anxiety research, such as test anxiety (Sarason, 1984). The development of such a measure to assess the tendency to experience cognitive and somatic anxiety reactions in sport would appear, therefore, to be valuable. Smith et al. (1990) have recently developed the Sport Anxiety Scale (SAS), a multidimensional measure of cognitive and somatic trait anxiety, for such a purpose. The SAS, derived through the use of both exploratory and confirmatory factor analyses, provides a measure of individual differences in the tendency to experience somatic reactions, worry, and concentration-disruption within sport settings. The scale comprises 21 items, nine as part of the somatic anxiety component, seven items which assess the 'worry' component and five items which measure 'concentration disruption'. The SAS would appear to have promise as a research tool and the various validation studies performed "suggest that the scale taps three meaningful dimensions of anxiety" (Smith et al., 1990; p.277). In addition to the somatic component, results indicated the viability of a distinction between the two cognitive components.
As publication of this scale did not appear until 1990, there is little evidence of research that has used it to date. However, it seems likely that forthcoming competitive anxiety research will increasingly implement the SAS as its measure of competitive trait anxiety with the CSAI-2 continuing to be the predominant psychometric means of assessing the state response.

The previous section has described developments in the conceptualisation and measurement of competitive anxiety and illustrates that sport psychology has embraced the cognitive-somatic, trait-state distinctions of the response originally derived in mainstream psychology.

The major measuring instrument in this thesis is the CSAI-2. Whilst much of the research using the CSAI-2 is discussed in more detail in the forthcoming chapters, a very brief overview of this work is appropriate at this stage.

RESEARCH USING THE CSAI-2 - GENERAL OVERVIEW

Research using the CSAI-2 can be largely separated into three categories: (1) examination of the antecedents of the CSAI-2 components; (2) examination of the temporal patterning of the CSAI-2 components in the period leading up to competition and the influence of individual differences; and (3) investigation of the relationships between the CSAI-2 components and performance.

Ascertaining which factors elicit the different CSAI-2 components has been an area that has attracted research interest. Antecedent factors considered have included competitive trait anxiety, perceived ability, experience, previous match outcome and mental preparation strategies. Gould, Petlichkoff and Weinberg (1984), in a study involving two back-to-back wrestling competitions, found that competitive trait anxiety was a significant predictor of cognitive state anxiety for both matches, but predicted somatic state anxiety only in Match I. Experience was the strongest predictor of cognitive state anxiety for both matches and perceived ability predicted state self-confidence in Match I but was not related to cognitive or somatic state anxiety.

Examination of the temporal patterning of the CSAI-2 components has generally supported the prediction that cognitive anxiety and self-confidence remain relatively unchanged during the pre-competition period and that somatic anxiety does not increase until just prior to competition. Support for this patterning is evident in investigations involving volleyball players (Gould et al., 1984), cricket players (Jones, Cale and Kerwin, 1988) and basketball players (Parfitt and Hardy, 1987). However, it has been suggested that females do not conform to this patterning (Jones and Cale, 1989a) and that other individual differences (e.g. competitive orientation) may influence the temporal patterning of the CSAI-2 components in the period leading up to competition (Swain and Jones, in press).

On the basis of Multidimensional Anxiety Theory, Martens, Burton, Vealey, Bump and Smith (1982) predicted that cognitive state anxiety and state self-confidence would be stronger
predictors of performance than would somatic state anxiety because somatic anxiety manifestations are hypothesized to dissipate at the onset of competition. On the other hand, cognitive anxiety and self-confidence are linked to social evaluation and expectancy, both of which continue throughout the contest. However, the majority of investigations examining the anxiety-performance relationship using the CSAI-2 have failed to find significant relationships (e.g. Gould et al., 1984; Krane and Williams, 1987). Burton's (1988) study, alluded to earlier as 'Study 4' in the establishment of the construct validity of the CSAI-2, is a notable exception. His findings revealed an Inverted-U relationship between somatic anxiety and performance, a negative linear relationship between cognitive anxiety and performance and a positive linear relationship between self-confidence and performance.

PURPOSE AND OUTLINE OF THE STUDY

The overall purpose of this thesis was to examine certain aspects of the competitive state anxiety response that are perceived as key areas of interest. The specific questions that will be addressed are identified in the brief description of each chapter outlined below. Each chapter will provide a detailed review of the relevant literature and then report on a study or a series of studies that examine these central issues.

Chapter 2 reports an investigation (Study 1) of which situational factors predict the CSAI-2 components through a study carried out on the specific population of middle-distance runners. The purpose of this study was to examine the antecedents of competitive state anxiety and self-confidence and to test the theoretical prediction that cognitive anxiety and self-confidence, but not somatic anxiety, would be elicited by factors relating to performance expectancies.

Chapter 3 reports an examination (Study 2) of the antecedents and temporal patterning of the CSAI-2 components in the period leading up to a competition as a function of gender. The specific example of gender was chosen as a result of Jones and Cale's (1989a) interesting finding that gender may mediate the temporal patterning of the competitive state anxiety response. The purpose of this study, therefore, was to examine the potential influence of the individual difference variable of gender and to provide an explanation as to why any differences in temporal patterning may exist.

Chapter 4 reports two investigations whose purpose was to determine whether there are additional dimensions to the competitive state anxiety response other than mere intensity. The first investigation (Study 3.1) reports an examination of the intensity of competitive state anxiety and the frequency of cognitive intrusions about the event in a sample of track and field athletes; the second investigation (Study 3.2) considers the intensity and frequency dimensions of anxiety as
well as examining the further dimension of direction (i.e. positive or negative interpretation of the 'anxiety' experienced). Relationships with a subjective measure of performance were also examined.

Chapter 5 reports an examination (Study 4) of the relationship between anxiety and performance. The investigation focused on the dimensions of intensity and direction and their relationship with an objective measure of performance in a sample of basketball players. This study also incorporated a completely different methodology, through the adoption of a more longitudinal, ideographic approach.

The sixth and final chapter summarizes and reflects on these findings as a whole from both theoretical and practical perspectives and make suggestions as to possible directions for future research.
CHAPTER 2

ANTECEDENTS OF MULTIDIMENSIONAL COMPETITIVE STATE ANXIETY AND SELF-CONFIDENCE

The search for effective methods of achieving optimal performance states means that the identification of precursors of anxiety is likely to prove valuable. The relevant literature tends to be currently dominated by explanations of stress management models that elucidate various authors' recommendations of how to treat the symptoms of anxiety (e.g. Burton, 1990; Davidson and Schwartz, 1976; Meichenbaum, 1975). Whilst this research has pointed towards salient and useful means of remedying the problems of inappropriate pre-competition states, it seems logical that researchers can benefit from a knowledge of what causes that anxiety in the first place. This preventative approach may provide information that will allow the sport psychologist to make an even greater contribution towards facilitating the optimal performance state of an athlete. An understanding of what may specifically cause anxiety gives us the opportunity to address potential problems before they manifest themselves. However, to date, relatively little systematic and structured research has been carried out which examines the antecedents of multidimensional competitive state anxiety (Jones and Hardy, 1990a). Jones and Cale (1989b) and Gould et al. (1984) have urged the pursuit of this line of research in order to assist in the identification of which intervention strategies, for example, best suit particular athletes.

As outlined in chapter one, this chapter reports an investigation designed to examine situational antecedents of the multidimensional anxiety components and self-confidence in a sample of elite student middle-distance runners, and is structured in the following way. The review of literature is divided into four separate subsections: the first considers the related literature from disciplines outside the field of sport psychology; the second section discusses the 'sources of stress in sport' research that has tended to adopt a unidimensional perspective to the concept of anxiety; the third describes a recent model that seeks to explain the causes of competitive state anxiety; and, finally, the fourth section reviews the research that has examined the antecedents of the CSAI-2 components. This review is then followed by a detailed explanation of the methodology employed in this investigation and a results section that describes and justifies the statistical procedures chosen to analyse the data. The chapter concludes with a discussion of the findings from both a theoretical and practical perspective.
ANTECEDENTS OF ANXIETY: GENERAL PSYCHOLOGY LITERATURE

'Worry' and 'emotionality' responses are theorized to be conceptually independent in the sense that the two anxiety components are aroused and maintained by different situational conditions (Morris et al., 1981a). The experience of worry is aroused and maintained by situational factors that influence one's cognitive evaluations. However, emotionality is postulated to be a classically-conditioned autonomic-affective reaction to cues associated with the start of an evaluative situation (Deffenbacher, 1980). Therefore, the cues that are theorized to elicit emotionality are typically of shorter duration and seem to consist primarily of initial, non-evaluative stimuli which soon lose pertinence as attention is turned to the task itself (Morris et al., 1981a).

Morris and Liebert (1973) examined this distinction in administering the Digits Backward Test (Wechsler, 1955) to a group of male university students. The experimental task was divided into two periods separated by the introduction of experimental manipulation. The first period was identical for all subjects and involved establishing their maximum ability to repeat digits backwards. Having ascertained the subjects' 'limit' in this task, the students were given one of three sets of instructions depending on the condition to which they were assigned. 'Failure-threat' subjects were told they should be able to respond more quickly and urged to try harder. 'Shock-treatment' subjects were told they were doing well and that they would receive 'strong electric shocks' between some of the remaining trials. 'No threat' subjects were simply told they were doing well. The failure condition caused an increase in worry but had no effect on emotionality. However, the threat of the electric shock without performance evaluation of the task gave rise to increases in emotionality only. These results provided, therefore, strong support for the worry-emotionality distinction and are shown in Figure 2.1. They indicate that these two components of anxiety are increased by different kinds of stress and that they can be aroused relatively independently of one another. Earlier evidence for this had been found by Morris and Liebert (1969) who had subjects respond to the five subtests of the Wechsler Adult Intelligence Scale (WAIS) under different conditions. A 'difficulty' manipulation was accomplished by choosing items from the complex part of the scale versus items from the simple part of the scale and then having the subjects perform the test under differential timing procedures. Those subjects in the timed condition were informed that time taken to reach a solution would be taken into account in determining their score. In the untimed condition, nothing was said about time. The results revealed that the difficulty manipulation in conjunction with performance in the timing condition caused an increase in worry scores but no increases in emotionality. Similarly, subjects receiving ego-involving instructions associated with an anagram task had significantly higher worry scores but no higher emotionality scores than subjects receiving reassuring instructions (Deffenbacher, 1978). The performance expectancies held by students as they enter test situations are highly related to their worry scores, but have been found consistently to be either unrelated or less
Figure 2.1: DATA FROM MORRIS AND LIEBERT (1973)

![Graph showing mean standardized scores for Worry and Emotionality under different threat conditions.]

- Worry
- Emotionality

THREAT CONDITIONS

NO
SHOCK
FAILURE
strongly related to their emotional scores (e.g. Liebert and Morris, 1967; Morris and Liebert, 1970). These findings all provide support for the notion that although some stimuli are expected to elicit both worry and emotionality, the two are also elicited by different cues (Deffenbacher, 1980) and hence, warrant separate measurement.

ANTECEDENTS OF ANXIETY: SPORT PSYCHOLOGY LITERATURE.

Sources of Stress in Sport - Research Utilizing a Unidimensional Perspective

In order to avoid semantic confusion in this subsection, the reference to the term 'stress' that is made in the research papers that are reviewed will largely imply a negative response, i.e. anxiety. The decision to retain the term stress is for convenience as it reflects the actual terminology used by a number of sport psychology researchers who have worked in this area. A substantial number of studies have considered the causes of negative responses in sporting situations, but authors have consistently labelled this research as examinations into the 'sources of stress'. For example, Gould, Horn and Spreeman (1983a) in their study of stress in junior elite wrestlers commented that "for the sake of simplicity, stress, arousal, and state anxiety will be used as synonymous" (p.160) and that the vast majority of other studies have done the same.

The move towards understanding sources of stress began as long as 20 years ago and gathered pace in the late 1970's. However, the research undertaken in this area has viewed anxiety from a unidimensional perspective which considers the concept as a uniformal, amorphous state with no distinction made between cognitive and somatic components. In the context of this study, however, and in view of the relative paucity of research examining antecedents of multidimensional anxiety components, it would be wrong to completely ignore the considerable research that has been generated in this area. However, it must be acknowledged that the majority of this line of research has been conducted with child and adolescent populations.

Scanlan (1984) has identified the need to acknowledge that the experience of anxiety appears to be mediated by factors that tend to group into one of two categories. The first category involves intra-personal or individual difference factors associated with the occurrence of anxiety. This category includes competitors' dispositions, cognitions, psychological states and self-perceptions, as well as their perceptions of significant others. The second category involves situational factors that can be perceived as threatening by the competitor and therefore result in anxiety. Such variables include the characteristics inherent in various sporting contexts, events that commonly occur during competition, and actual behaviour of significant others.

Kroll (1980) also identified a number of factors that he considered to underlie pre-competition anxiety. He considered that the causes of anxiety could be grouped into one or more of five categories. These included 'physical complaints' (e.g. digestive disturbances, shaking and yawning); 'fear of failure' (e.g. fear of losing, choking, living up to expectations, and making
mistakes): 'feelings of inadequacy' (e.g. being unprepared, poorly conditioned, lower skill, ability, and feelings that something is wrong); 'loss of control' (e.g. being jinxed, bad luck, poor officiating, inclement weather); and, finally, 'guilt' (e.g. concerns about hurting an opponent, playing dirty, and cheating).

Hanson (1967) and Lowe and McGrath (1971) were among the first investigators to specifically examine sources of stress in sport. In both studies, telemetry was used to assess physiological arousal (via heart rate and/or respiration) in baseball players ranging in age from 9 to 12 years. Comparisons were made for the purpose of determining variations in stress as a function of the situation in which the athlete was placed, (e.g. each time the player was 'in the dugout', 'at bat', and so on). The results from both studies revealed that heart rates were highest when the child was 'at bat' and suggested the importance of the immediate situation within the game was related to the level of stress experienced. In addition, the importance or criticality of a particular game within a season was found to be an important determinant of arousal (Lowe and McGrath, 1971). Thus, both game and situation criticality were found to be related to stress responses, as measured by heart rate, in athletes.2.1

Scanlan and Passer (1978, 1979) have conducted the most extensive study of sources of stress in young athletes. These investigators first examined intra-personal and situational factors related to pre-competitive state anxiety levels of male youth soccer players age 10 and 11 (Scanlan and Passer, 1978). Their results revealed that higher pre-game state anxiety levels were related to the participant's level of competitive trait anxiety, basal state anxiety, self-esteem, personal performance expectancies and team performance expectancies. In a follow-up investigation, the majority of these findings were replicated using a sample of female soccer participants of the same age (Scanlan and Passer, 1979). These findings suggest that both sexes are affected by common sources of stress (Gould et al., 1983).

Pierce and Stratton (1981) surveyed 543 youth sports participants aged 10 to 17 and asked them to select, from a list of 10 choices, their biggest worries when participating in sports. Results revealed that 'not playing well' and 'making mistakes' were the worries most frequently reported by the respondents, with approximately 62% of the young athletes selecting these items. Eleven percent of the respondents indicated that they were worried about what their parents would say; 24.9% about what their coaches would say; and 24.7% about what their team-mates would say.

Gould et al. (1983a) assessed perceived sources of stress in 453 junior elite wrestlers who rated the frequency with which they typically experienced 33 sources of stress before competition. Descriptive statistics revealed that performing up to one's ability, improving on one's last performance, participating in championship meets, not wrestling well, and losing, were identified.

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2.1 These authors have operationalised 'stress responses' as synonymous with heart rate. This misleading and incorrect assumption is one of the major issues addressed in chapter 4.
as major sources of stress. Factor analytic results showed that the 33 sources of stress loaded on three factors, comprising: fear of failure-feelings of inadequacy, external control-guilt, and social evaluation. Multiple regression analyses revealed that wrestler trait anxiety and years of wrestling experience were significant predictors of the fear of failure-feelings of inadequacy factor, while trait anxiety also was found to be a significant predictor of the social evaluation factor.

Scanlan and Lewthwaite (1984) investigated the influence of individual difference and situational factors on the competitive stress experienced by 9 to 14 year old wrestlers prior to two consecutive tournament matches. Wrestlers' dispositions, characteristic pre-competition cognitions, perceptions of significant adult influences, psychological states, self perceptions and competition outcomes were examined as predictors of pre-match stress. The most influential predictors of pre-match stress (as measured by the CSAI-C (i.e. CSAI version for children); Martens et al., 1980) were competitive trait anxiety and personal performance expectancies. In addition, pre-match worries about failure and perceived parental pressure to participate were predictive of round 1 pre-match stress.

Weiss, Wiese and Klint (1989) also examined the sources of stress in male gymnasts aged 7 to 18 years, by examining their worry cognitions in preparation for an important upcoming competition. The major sources of stress for the gymnasts revolved around worries about expectations and negative evaluation from significant others such as coaches, parents and teammates.

Cohn (1990) adopted a slightly different methodology in his attempt to determine the most frequent sources of stress reported by golfers. A guided interview approach consisting of specific questions relating to golfing experiences was used to collect data from ten high school competitive golfers. A typological analysis of the interviews identified a number of competitive sources of stress, the most frequently cited sources being playing a particularly difficult shot, playing up to personal standards, performing in front of a crowd and playing in poor weather. Whilst these findings fall into the broad categories identified earlier by Scanlan (1984), they also suggest the need to examine the sport-specific nature of the sources of anxiety.

Scanlan, Stein and Ravizza (1991) examined the sources of stress in elite figure skaters. The findings from this investigation are noteworthy as the majority of previous studies have examined youth and adolescent populations, whereas Scanlan and her colleagues asked adults (whose ages ranged from 22 to 49 years), to retrospectively think about the various aspects of their skating experiences that caused them stress. They interviewed 26 former national championship competitors who were asked to identify their sources of stress during the most competitive phase of their athletic careers. Five major sources of stress emerged from the data: negative aspects of competition (e.g. competitive failure and perceiving inordinate importance of competitive outcome); negative significant-other relationships (e.g. interpersonal conflict and performance criticism); demands or costs of skating (e.g. time and financial costs); personal struggles (e.g. dealing with
homosexuality); and traumatic experiences (e.g. family disruption). The results demonstrated that elite and youth sport athletes have similar competition-related stressors but that individual differences do exist among elite athletes' sources of stress. The findings also suggested that elite athletes experience stress from both competition and non-competition sources. This revelation of non-competitive sources of stress in elite sport was also found in interviews conducted by Jones and Hardy (1990b). They reported that some athletes identified their amateur status, whilst trying to compete at international level, as a source of pre-competitive stress. In other words, the time commitment involved to ensure that sufficient training was being completed, whilst maintaining a full-time occupation at the same time, was seen as extremely stressful.

Clearly, extensive and valuable research has been conducted in the 'sources of stress' domain and whilst it is evident that sport-specific sources exist, some consistent factors, such as worries about personal expectations and the expectations of significant others, seem to arise. Nonetheless, there appears a need to establish if there are common concepts that underpin all these sources of stress that have been identified. Would the field benefit, for example, from a model which attempts to encompass these variables in a conceptual form? This would establish a theoretical base from which one can make general hypotheses about potential antecedents, before identifying the particular sport-specific sources that may exist as well.

This whole body of knowledge would also benefit from adopting a multidimensional perspective to the nature of competitive 'stress'. As mentioned already, some impressive research has been generated in the area but it remains limited in that it adopts a unidimensional approach to the assessment of anxiety. If a closer examination of these studies is made, it becomes apparent that they would contribute to the literature to an even greater extent if they had considered both cognitive and somatic components of the competitive anxiety response. As previously discussed, Scanlan and Lewthwaite (1984), for example, found that a number of variables such as pre-match expectancies and 'worries about failure' were predictors of the pre-match state anxiety of young male wrestlers. However, as the CSAI was the measure of state anxiety used in this study it was impossible to determine whether these variables predicted cognitive anxiety or somatic anxiety or both. In terms of potential implications for practising sport psychologists, the findings provide useful but incomplete information. These authors would probably argue, quite correctly, that a validated version of the CSAI-2 for use with child populations has yet to be developed, but the fact remains that a multidimensional assessment of the anxiety response will provide information of greater utility to researchers and practitioners alike.

It appears, therefore, that research in this area can benefit from two developments. Firstly, the construction of a model that provides a theoretical rationale for specifying the causes of competitive anxiety, and secondly, the adoption of a multidimensional approach to the measurement of anxiety in further 'sources of stress' research. The remaining two sections of this review consider these issues. The next section outlines a 'theory of competitive anxiety' which postulates which elements in the objective competitive situation cause the state anxiety reaction.
The review is then completed with an examination of the studies that have considered the antecedents of the CSAI-2 components.

A Model Identifying the Causes of Competitive State Anxiety

Throughout this section, the term 'threat' will be used, as distinct from state anxiety, to mean the perception of danger arising from the objective competitive situation. State anxiety will refer to the response made to the perception of that danger or threat. This distinction is made to emphasize the importance of perception in determining responses made to the environment. The important constructs of the theory of competitive anxiety that have been proposed by Martens et al. (1990) are shown in Figure 2.2. It is proposed that competition is an evaluative process that creates uncertainty about the outcome before the actual competition. The greater the uncertainty and the importance of the outcome, the greater the threat. The relationship between uncertainty and importance is hypothesized to be multiplicative because if either uncertainty or importance is absent, then no threat is expected to exist. Thus, threat is a function of uncertainty multiplied by importance of the outcome. For threat to exist there must be substantial uncertainty about an outcome, and the outcome must be important to the person. Hence, as threat increases, it causes increasing state anxiety responses. The perception of threat in competitive situations varies from person to person as a function of previous experiences and individual qualities. The model recognizes, therefore, the importance of competitive trait anxiety as an antecedent of the state response. Research has shown that people with higher levels of trait anxiety perceive a greater degree of threat in competitive situations than people low in trait anxiety (Martens, 1977; Scanlan, 1978; Scanlan and Passer, 1979).

McGrath (1970) has specified the antecedents of threat, and thus state anxiety, in a general form in his conceptual development of the stress process. 'Stress', he stated, "has to do with a (perceived) substantial imbalance between demand and response capability, under conditions where failure to meet demand has important (perceived) consequences" (p.20). That is, there is uncertainty that the demand can be met, and failure to do so is important. From this general formulation, Martens et al. (1990) have developed a theory of the specific causes of threat in competitive situations. They proposed uncertainty and importance of the outcome as the two constructs that encapsulate how different objective competitive situations affect a person's perception of threat and, hence, state anxiety. Uncertainty as a construct has been popular in information theory, but not particularly in theorizing about anxiety. Martens et al. (1990) argued that this is surprising as uncertainty about future outcomes intuitively appears to be a common denominator among the many sources of state anxiety that performers experience. Indeed, as this thesis attempted to establish at the outset, one criterion for a competitive event to be a 'good' contest is that the outcome be reasonably uncertain. Martens et al.'s model also incorporates the component of importance. Crandall (1974) labelled the construct of importance as attainment value.
Objective competitive situation

Uncertainty of outcome is perceived

Importance of outcome is perceived

Perception of threat

Competitive A-trait

A-state reaction

Stimulus

Organismic perceptions

Response

Figure 2.2: A THEORY OF COMPETITIVE ANXIETY (FROM MARTENS ET AL., 1990)
and stated that the construct focuses simultaneously on the individual and on the task and situation at hand. Thus, it is a situation-specific measure of individual differences in perceived value in obtaining a particular outcome. The model as shown in Figure 2.2 proposes that these two components interact to generate a perception of threat, and hence state anxiety.

By identifying the constructs that encompass the causes of state anxiety, this model serves an important purpose from a general perspective. However, there remains the need to also identify the specific antecedents of the multidimensional anxiety components. Implicit in Martens et al.'s model is that competitive state anxiety comprises the separate but related components of cognitive and somatic anxiety. The final section of this review, therefore, details the studies that have examined antecedents of the CSAI-2 components.

**Antecedents of the CSAI-2 Components**

Martens et al. (1990) hypothesized that the antecedents of cognitive anxiety, and also those of self-confidence, are those factors in the environment which are related to the athlete's expectations of success. These include perceptions of one's own ability based largely on previous competitive experiences and also perception of opponent's ability (Martens et al., 1990). Consequently, when expectations decrease or become uncertain, the athlete is likely to experience an increase in cognitive anxiety and a lowering of self-confidence. Alternatively, cues that elicit somatic anxiety consist mainly of conditioned responses to stimuli which in the sporting context would include changing room preparation, pre-contest warm-up routines, game importance and crowds (Gould et al., 1984; Martens et al., 1990).

However, there has been relatively little detailed examination of the particular antecedents of multidimensional state anxiety in sport; thus the basis for these assertions has come largely from research in areas other than sport psychology (cf Morris et al., 1981). Four studies which have examined the precursors of competitive state anxiety, however, are those by Gould et al. (1984), McAuley (1985), Weinberg, Jackson and Seabourne (1985), and Lan and Gill (1984). Gould et al. (1984) reported that the CSAI-2 subscales were found to have different antecedents, although precise predictions by Martens et al. (1990) were not supported. Gould and colleagues' study involved 37 inter-collegiate wrestlers who were administered the CSAI-2 immediately prior to two different competitions. The antecedents considered were competitive trait anxiety (as measured by SCAT; Martens, 1977), perceived ability, experience, and previous match outcome. The results showed that no single antecedent was related to all three CSAI-2 components. However, the strongest predictor of cognitive anxiety was found to be years of experience, which was established by ascertaining the competitors' intercollegiate varsity experience and the age at which they began wrestling. This relationship was negative in that performers with more experience reported less cognitive anxiety. Competitive trait anxiety was a significant predictor of cognitive anxiety for both matches, but predicted somatic anxiety only in Match 1. Perceived ability, on the
other hand, was strongly related to self-confidence in Match 1 but showed little relationship to cognitive and somatic anxiety. Previous match outcome was not a significant predictor of any of the CSAI-2 components. These results indicate, therefore, that various antecedents influence CSAI-2 components in different ways.

Lan and Gill (1984) found self-efficacy to be a significant antecedent of anxiety for subjects competing on an experimental task. Self-efficacy was manipulated by controlling the difficulty of the task. Individuals had lower cognitive and somatic anxiety and higher self-confidence when performing the high efficacious task than when they were performing the low efficacious task. Therefore, all three components were significantly affected by self-efficacy.

McAuley (1985) indicated that performance was a significant predictor of post-competitive cognitive anxiety and self-confidence but not somatic anxiety. This finding supports the notion that cognitive anxiety and self-confidence are influenced by the evaluation of previous performance whereas somatic anxiety appears to be more of a preparatory conditioned response to competition that dissipates once the competition is over. However, this investigation did not consider antecedents of pre-competitive state anxiety responses.

Weinberg et al. (1985) had 24 subjects perform under four different mental preparation conditions on four performance tasks. The CSAI-2 was administered before all the tasks. Although performance differences were indicated in that subjects performed better in mental preparation conditions than in control conditions, no significant differences emerged in the CSAI-2 components. These results indicate that different antecedent conditions represented by the mental preparation strategies were not powerful enough to elicit changes in the CSAI-2 components (Martens et al., 1990).

It is evident, therefore, that research examining the antecedents of the CSAI-2 components is both sparse and inconclusive. The fact that such investigations are few and far between is baffling when one considers the potential importance and wide ranging implications of such work. There is a need for a body of consistent findings to serve as a basis for practical applications. Consequently, the investigation reported in this chapter attempts to ameliorate this relative void in the competitive anxiety literature.

STUDY 1
Purpose of the Study

Clearly, there is still much to be learned about the antecedents of competitive state anxiety but the issue is complicated by the fact that the considerable number of personal and situational variables that operate in the competitive sporting situation will influence the precise nature of these precursors of anxiety. As Scanlan (1984) commented, antecedents are likely to differ as a function of either intrapersonal or individual difference factors such as competitors' dispositions, cognitions and self-perceptions, or situational factors that can be perceived as threatening. Such situational
variables include the various elements, such as environmental factors, that are inherent in competitive sport and events that commonly occur during competition.

In view of the extreme difficulty of catering for all of these variables, this study examined a particular method of investigating antecedents. A questionnaire was developed in order to specifically examine the situational variables which Athletes considered influenced their pre-race thoughts and feelings. As a consequence of this methodology, the subject population for this investigation was inevitably narrow and comprised exclusively male middle-distance runners (defined as 800 metres to 3000 metres). These athletes were selected for three reasons; firstly, the time of year (May/June) coincided with a stage in the development of this thesis that necessitated data collection; secondly, they provided a large sample due to the popularity of middle-distance running in student athletics, especially at Loughborough University; and, finally, it allowed the opportunity to 'test' relatively elite student performers.

The purpose of this study, therefore, was to examine situational antecedents of multidimensional competitive state anxiety and self-confidence in a sample of elite student middle-distance runners. Following a series of structured interviews with middle-distance runners, a 19-item pre-race questionnaire was designed in order to examine the precursors of competitive state anxiety and self-confidence. More specifically, the relationship between the responses on this questionnaire and the responses on the CSAI-2 were explored to determine which items best predicted the CSAI-2 components. In view of the exploratory nature of this study, no theoretical rationale existed from which to form specific hypotheses. However, in accordance with Martens et al.'s (1990) predictions, it was expected that cognitive anxiety and self-confidence, but not somatic anxiety, would be elicited by factors relating to performance expectancies.

METHOD

Subjects

The subjects comprised 125 male middle-distance runners ranging in age from 18 to 30 years with a mean age of 22.18 years (S.D. = 3.36). The majority of subjects were elite student runners (N=109), whilst the remaining 16 were athletes competing for the Amateur Athletic Association (AAA). In order to obtain an adequate sample size, it was necessary to draw the sample from runners from two different race meetings during the 1988 and 1989 track seasons. The first meeting was the traditional match between Loughborough Students Past and Present Athletics Club and the AAA in 1988, and the second event was the 1989 British Universities Championships held at Derby. The subjects comprised those athletes who competed in one of the four following distances; 800 metres, 1500 metres, 2000 metres steeplechase, and 3000 metres. 'Elite' was operationalised by including athletes with the following personal bests: 800 metres in under 1 minute 58 seconds; 1500 metres in under 3.59; 2000 metres steeplechase in under 5.42;
and 3000 metres in under 8.32.

Instrumentation

Pre-Race Questionnaire (PRQ)

The Pre-Race Questionnaire (PRQ) was developed following a series of structured interviews with middle-distance runners. During the interviews the runners were asked to describe which situational variables contributed most to how they generally felt during the period immediately preceding a race. Following these interviews, potential items were formulated and presented to a group of middle-distance runners who assessed their suitability as questions for such athletes. The 19 items that finally emerged were presented as a pilot study to six middle-distance athletes prior to competition. The pilot study involved administering the PRQ to the six athletes approximately one hour before their race. On completion, the athletes provided feedback as to possible changes, any difficulties they had encountered were noted, and adjustments were made before the PRQ was presented to the experimental sample. The full PRQ comprises three sections which incorporate questions concerning 'the last few weeks', 'the last race' and 'the next race'. Responses to each item are on a Likert-type scale ranging from 1 to 9 and the full questionnaire is presented in Appendix 2.

Competitive State Anxiety Inventory-2 (CSAI-2)

Pre-competition levels of anxiety were measured via the CSAI-2. Recent evidence (Gould et al., 1984; Martens et al., 1990) has shown desirable psychometric properties of this scale, suggesting that it is a valid multidimensional measure of competitive state anxiety (Burton, 1988; Gould et al., 1987). Martens et al. (1990), for example, reported internal reliability coefficients ranging from 0.79 to 0.90. This scale comprises 27 items, with nine items in each of the three subscales of cognitive anxiety, somatic anxiety and self-confidence. Examples of cognitive anxiety items include 'I am concerned about this competition' and 'I am concerned about performing poorly', whilst somatic anxiety items include 'I feel nervous' and 'My body feels tense'. Self-confidence items include 'I feel at ease' and 'I'm confident about performing well'. Responses to each item are on a Likert scale ranging from 1 ('not at all') to 4 ('very much so'). Thus, possible scores of the three subscales range from 9 to 36. (See Appendix 1)
Procedure

The PRQ and the CSAI-2 were administered to the subjects one hour before their races. Every effort was made to allow the athlete his normal warm-up procedure and one hour was generally regarded as the most acceptable time before the race. Before completing the PRQ and CSAI-2, each subject was presented with standardized instructions recommended by Martens et al. (1990) (see Appendix 1). The instructions informed each subject of the need for honesty in his responses and for an indication of his feelings 'right now'. The subjects were assured of the confidentiality of these responses.

RESULTS

The means and standard deviations of the responses on the CSAI-2 and on each of the PRQ items are presented in Table 2.1.

Table 2.1: Mean Scores on the CSAI-2 and the PRQ

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Anxiety</td>
<td>19.86</td>
<td>4.65</td>
</tr>
<tr>
<td>Somatic Anxiety</td>
<td>19.36</td>
<td>4.44</td>
</tr>
<tr>
<td>Self-Confidence</td>
<td>21.50</td>
<td>4.32</td>
</tr>
<tr>
<td>Past 4 weeks training (Item1)</td>
<td>5.73</td>
<td>1.66</td>
</tr>
<tr>
<td>Past 4 weeks races (2)</td>
<td>5.76</td>
<td>1.47</td>
</tr>
<tr>
<td>Coach Influence Last 4 Weeks (3)</td>
<td>5.92</td>
<td>1.47</td>
</tr>
<tr>
<td>How feel about position? (4)</td>
<td>5.32</td>
<td>1.91</td>
</tr>
<tr>
<td>Previous pos/prerace expect (5)</td>
<td>5.65</td>
<td>2.20</td>
</tr>
<tr>
<td>How feel about time? (6)</td>
<td>5.55</td>
<td>2.12</td>
</tr>
<tr>
<td>Previous time/prerace expect (7)</td>
<td>5.21</td>
<td>2.08</td>
</tr>
<tr>
<td>Coach Influence last race (8)</td>
<td>5.59</td>
<td>1.64</td>
</tr>
<tr>
<td>Important to do well (9)</td>
<td>6.36</td>
<td>1.27</td>
</tr>
<tr>
<td>Can you achieve pos goal? (10)</td>
<td>6.43</td>
<td>1.43</td>
</tr>
<tr>
<td>How diff to ach pos goal? (11)</td>
<td>6.01</td>
<td>1.89</td>
</tr>
<tr>
<td>Can you achieve time goal? (12)</td>
<td>6.34</td>
<td>1.14</td>
</tr>
<tr>
<td>How diff to ach time goal? (13)</td>
<td>6.22</td>
<td>1.29</td>
</tr>
<tr>
<td>How well running? (14)</td>
<td>5.89</td>
<td>1.62</td>
</tr>
<tr>
<td>Fatigue (15)</td>
<td>4.91</td>
<td>1.85</td>
</tr>
<tr>
<td>Physical Readiness (16)</td>
<td>5.47</td>
<td>1.90</td>
</tr>
<tr>
<td>Mental Readiness (17)</td>
<td>5.78</td>
<td>1.76</td>
</tr>
<tr>
<td>Suitability of weather (18)</td>
<td>5.58</td>
<td>2.24</td>
</tr>
<tr>
<td>Suitability of track (19)</td>
<td>7.49</td>
<td>1.37</td>
</tr>
</tbody>
</table>
It would appear unduly detailed to reflect on the responses to each item, but there are some striking mean values which warrant brief comment. It is interesting to note that the mean value for self-confidence (21.50) is relatively low. Relating this score to the CSAI-2 norms for male college athletes provided by Martens et al. (1990), only 22% of the respondents in the norm group had lower scores on this subscale. This finding may be a function of the type of competitions from which the data were collected. The athletes may have been experiencing an unusual degree of uncertainty in the Student Championships due to a lack of knowledge about the opposition. Since so few inter-student athletic meets take place, the runners may have had little information on which to base performance expectancies. Similarly, the strength of the opposition in the AAA's match may have dented self-confidence levels on that occasion.2.2

A perusal of the mean scores for the PRQ items reveals, in particular, the general liking for the tracks on which the races were held. The mean value of 7.49 indicated that runners felt the tracks were extremely suitable. The responses to each of the four goal-related items (Items 10-14) are also interesting in that scores ranged from 6.01 to 6.43. Maximum scores of 9 represented 'extreme difficulty' in the nature of the target set by the goal, but also represented 'definitely yes' in terms of the conviction that the goal could be met. This appears to indicate that the group as a whole perceived their goals as very challenging but realistic, which conforms to recommendations from Locke and Latham (1985) regarding the importance of setting appropriate but difficult targets. However, as later analyses reveal, these goals may actually have been too hard and, therefore, dysfunctional.

**Correlations Between CSAI-2 Components**

Correlations were calculated between the CSAI-2 subscale scores in order to further examine the proposal that it does measure three independent components of anxiety. The findings generally support Martens et al.'s (1990) predictions regarding low to moderate subscale correlations, thus providing further support for the proposal that the CSAI-2 is a valid multidimensional measure of competitive state anxiety. The correlations are presented in Table 2.2. In addition, this table contains the mean intercorrelations of CSAI-2 subscales obtained by Martens et al. (1990), Gould et al. (1984), and Jones and Cale (1989b) for the purposes of comparison. Although the relationship between cognitive anxiety and self-confidence appears to be relatively large, it still only represents a 36% sharing of the variance. The other two interrelationships are largely consistent with previous findings.

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2.2 A t-test was performed to determine whether self-confidence levels differed between the two meets. A non-significant difference emerged (p = 0.72): Event 1: M = 21.35; S.D. = 4.76; Event 2: M = 21.63; S.D. = 3.98.)
Table 2.2: Intercorrelations Between CSAI-2 Subcomponent Scores

<table>
<thead>
<tr>
<th></th>
<th>cog anx and som anx</th>
<th>cog anx and self-conf</th>
<th>som anx and self-conf</th>
</tr>
</thead>
<tbody>
<tr>
<td>This study</td>
<td>0.51</td>
<td>-0.60</td>
<td>-0.39</td>
</tr>
<tr>
<td>Jones and Cale (1989b)</td>
<td>0.50</td>
<td>-0.21</td>
<td>-0.49</td>
</tr>
<tr>
<td>Martens et al. (1990)</td>
<td>0.50</td>
<td>-0.51</td>
<td>-0.52</td>
</tr>
<tr>
<td>Gould et al. (1984) -study 1</td>
<td>0.52</td>
<td>-0.48</td>
<td>-0.40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gould et al. (1984) -study 2</td>
<td>0.48</td>
<td>-0.54</td>
<td>-0.42</td>
</tr>
</tbody>
</table>

Factor Analysis of the PRQ

Factor analysis serves the cause of scientific parsimony (Kerlinger, 1973), in the sense that it reduces the multiplicity of various tests and measures to greater simplicity. Factor analysis is a method for determining the number and nature of the underlying variables among larger numbers of measures. A factor is a construct, a hypothetical entity, that is assumed to underlie scales, items and measures of almost any kind, and it tells us, in effect, what measures or items belong together (Kerlinger, 1973). It was decided, therefore, to factor analyze the 19 items of the PRQ in order to establish the precise nature of any underlying variables and, in so doing, facilitate an examination of the relationship between PRQ scores and responses on the CSAI-2. The data from the PRQ were factor analyzed by means of principal components analysis with both varimax and oblique rotations. Since these analyses revealed very similar factor structures, and also since correlations amongst the factors that emerged were small, only the results of the varimax rotation are reported here. The analysis revealed six factors with eigen values greater than one which cumulatively

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2.3 It should be emphasized that the sample size (n=125) for such an analysis is relatively small but Tabachnick and Fidell (1984) consider a sample size of 100-200 as adequate when the subjects are homogenous and the number of variables is not too large.
accounted for 68.8% of the total variance. Factor loadings are presented in Table 2.3. The first factor accounted for 26.2% of the total variance and was named 'Perceived Readiness', comprising the items concerning the runner's physical and mental readiness, level of fatigue, how well training had progressed during the past four weeks, and how well the runner perceived himself to be running at the time. The item referring to the extent to which the athlete thought he could achieve his time goal was complex in that it loaded highest on the 'Perceived Readiness' factor but also cross-loaded on two other factors. Consequently, this item was excluded from this factor for the purpose of subsequent analyses. The second factor accounted for 13.4% of the variance and was named 'Attitude Towards Previous Performance'. This factor comprised the items concerning the athlete's reactions to his previous race in terms of position and time expectations. The third factor was named 'Position Goal' and accounted for 8.2% of the variance. Items in this factor asked the athlete about the difficulty of the goal and his perception of his capacity to attain that goal. The fourth factor, 'Coach Influence', accounted for 7.9% of the variance and included the items regarding the impact of the coach on both the previous race and performance over the past four weeks. The fifth factor accounted for 7.4% of the variance and comprised the items concerning the suitability of the weather and track conditions and also the importance of doing well in the upcoming race. However, since the last item also loaded highly on the 'Perceived Readiness' factor, this was excluded and the factor was named 'External Environment'. The final factor comprised the single item regarding the difficulty of achieving the time goal and accounted for 5.7% of the variance. Due to the problems associated with the validity of a one-item factor, this factor was excluded leaving five factors in the factor structure. Cronbach's (1951) alpha coefficients for the five factors ranged from 0.63 to 0.78. It should be noted that these are not particularly high, but this is not surprising considering that there were a relatively few number of items in the factors (Kim and Mueller, 1978).

Regression Analyses

Regression analysis is the method that calculates the arithmetic relation between two or more predictor variables and a predicted variable. It permits the researcher to study the effects and the magnitudes of the effects of more than one independent variable on one dependent variable using the principles of correlation. In the context of this investigation, separate stepwise multiple regression analyses were performed in order to establish which of the five PRQ factors best predicted each of the multidimensional anxiety subcomponents measured via the CSAI-2.4

2.4 It should be emphasized again that the sample size for such an analysis is relatively small. However, the 125 subjects in this study satisfy Tabachnick and Fidell's (1984) recommendations that when using stepwise regression analyses the number of subjects should be at least four or five times as large as the number of variables.
### Table 2.3. Factors with Loadings After Varimax Rotation

<table>
<thead>
<tr>
<th>Item (No.)</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
<th>F5</th>
<th>F6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perceived Readiness (F1)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Readiness (16)</td>
<td><strong>0.84</strong></td>
<td>0.13</td>
<td>0.01</td>
<td>0.03</td>
<td>0.08</td>
<td>0.01</td>
</tr>
<tr>
<td>How well running? (14)</td>
<td><strong>0.79</strong></td>
<td>0.03</td>
<td>0.12</td>
<td>0.18</td>
<td>0.15</td>
<td>0.29</td>
</tr>
<tr>
<td>Past 4 Weeks Training (1)</td>
<td><strong>0.75</strong></td>
<td>0.08</td>
<td>0.31</td>
<td>0.13</td>
<td>0.05</td>
<td>0.32</td>
</tr>
<tr>
<td>Fatigue (15)</td>
<td><strong>-0.75</strong></td>
<td>0.07</td>
<td>0.12</td>
<td>0.20</td>
<td>0.16</td>
<td>0.23</td>
</tr>
<tr>
<td>Mental Readiness (17)</td>
<td>0.71</td>
<td>0.31</td>
<td>0.02</td>
<td>0.23</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>Past 4 weeks races (2)</td>
<td>0.56</td>
<td>0.38</td>
<td>0.12</td>
<td>0.39</td>
<td>0.02</td>
<td>0.12</td>
</tr>
<tr>
<td>Can you achieve time goal? (12)</td>
<td>0.47</td>
<td>0.27</td>
<td>0.17</td>
<td>0.04</td>
<td>0.37</td>
<td>0.37</td>
</tr>
<tr>
<td><strong>Attitude Towards Previous Performance (F2)</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Previous pos/prerace expect (5)</td>
<td>0.13</td>
<td>0.79</td>
<td>0.10</td>
<td>0.16</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>How feel about time? (6)</td>
<td>0.17</td>
<td><strong>0.79</strong></td>
<td>0.11</td>
<td>0.07</td>
<td>0.26</td>
<td>0.10</td>
</tr>
<tr>
<td>Previous time/prerace expect (7)</td>
<td>0.04</td>
<td>0.73</td>
<td>0.01</td>
<td>0.11</td>
<td>0.14</td>
<td>0.02</td>
</tr>
<tr>
<td>How feel about position? (4)</td>
<td>0.24</td>
<td><strong>0.55</strong></td>
<td>0.20</td>
<td>0.31</td>
<td>0.21</td>
<td>0.23</td>
</tr>
<tr>
<td><strong>Position Goal (F3)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How diff to ach pos goal? (11)</td>
<td>0.01</td>
<td>0.02</td>
<td>0.81</td>
<td>0.01</td>
<td>0.03</td>
<td>0.32</td>
</tr>
<tr>
<td>Can you achieve pos goal? (10)</td>
<td>0.33</td>
<td>0.18</td>
<td><strong>0.77</strong></td>
<td>0.02</td>
<td>0.01</td>
<td>0.18</td>
</tr>
<tr>
<td><strong>Coach Influence (F4)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coach infl past 4 weeks (3)</td>
<td>0.13</td>
<td>0.11</td>
<td>0.09</td>
<td>0.89</td>
<td>0.04</td>
<td>0.09</td>
</tr>
<tr>
<td>Coach influence last race (8)</td>
<td>0.15</td>
<td>0.40</td>
<td>0.01</td>
<td><strong>0.58</strong></td>
<td>0.10</td>
<td>0.19</td>
</tr>
<tr>
<td><strong>External Environment (F5)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suitability of track (19)</td>
<td>0.03</td>
<td>0.14</td>
<td>0.08</td>
<td>0.22</td>
<td><strong>0.75</strong></td>
<td>0.13</td>
</tr>
<tr>
<td>Suitability of weather (18)</td>
<td>0.13</td>
<td>0.36</td>
<td>0.36</td>
<td>0.23</td>
<td><strong>0.60</strong></td>
<td>0.35</td>
</tr>
<tr>
<td>Important to do well? (9)</td>
<td>0.49</td>
<td>0.22</td>
<td>0.06</td>
<td>0.06</td>
<td>0.53</td>
<td>0.17</td>
</tr>
<tr>
<td><strong>Time Difficulty Goal (F6)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How diff to ach time goal? (13)</td>
<td>0.11</td>
<td>0.11</td>
<td>0.13</td>
<td>0.01</td>
<td>0.08</td>
<td><strong>0.84</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Eigenvalue</th>
<th>% of Variance</th>
<th>Cumulative % Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>4.98</td>
<td>26.20</td>
<td>26.20</td>
</tr>
<tr>
<td>F2</td>
<td>2.54</td>
<td>13.40</td>
<td>39.60</td>
</tr>
<tr>
<td>F3</td>
<td>1.56</td>
<td>8.20</td>
<td>47.80</td>
</tr>
<tr>
<td>F4</td>
<td>1.51</td>
<td>7.90</td>
<td>55.70</td>
</tr>
<tr>
<td>F5</td>
<td>1.41</td>
<td>7.40</td>
<td>63.10</td>
</tr>
<tr>
<td>F6</td>
<td>1.08</td>
<td>5.70</td>
<td>68.80</td>
</tr>
</tbody>
</table>

Unitary weightings were used to calculate factor scores used in these analyses. The results showed that 3 of the 5 factors were found to be significant predictors of cognitive anxiety. As Table 2.4 indicates, 23% of the total variation in cognitive anxiety was explained by the 'Perceived Readiness' factor. The second significant predictor was 'Attitude Towards Previous Performance' which, when considered together with 'Perceived Readiness', accounted for 26.5% of the total variance in cognitive anxiety. Both of these factors were negatively related to cognitive anxiety in that the greater the 'Perceived Readiness' and the more favourable the 'Attitude Towards Previous Performance' the lower was the cognitive anxiety response and vice versa. A third factor, 'Position...
Goal'. also emerged as a significant predictor of cognitive anxiety, contributing an additional 3.3% of the variance when considered in conjunction with the two other predictors. Level of somatic anxiety in the runners was found not to be predicted by any of the factors of the PRQ. Self-confidence, however, was significantly predicted by two factors: 'Perceived Readiness', which accounted for 34.9% of the total variance, and 'External Environment' which provided an additional 4.8% of the explained variance when considered in conjunction with 'Perceived Readiness'. Both of these factors were positively related to self-confidence in that the greater the 'Perceived Readiness' and the more positive the perception of the 'External Environment', the higher the self-confidence response.

Table 2.4. Stepwise Multiple Regression Summary: Significant Predictors of Cognitive Anxiety and Self Confidence

<table>
<thead>
<tr>
<th>CSAI-2 Subcomponent</th>
<th>PRQ factor</th>
<th>R</th>
<th>R²</th>
<th>F-to-enter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive anxiety</td>
<td>Perceived Readiness</td>
<td>-0.480</td>
<td>0.230</td>
<td>36.76**</td>
</tr>
<tr>
<td></td>
<td>Attitude Toward Previous Performance</td>
<td>-0.515</td>
<td>0.265</td>
<td>21.98**</td>
</tr>
<tr>
<td></td>
<td>Position Goal</td>
<td>-0.546</td>
<td>0.298</td>
<td>17.14**</td>
</tr>
<tr>
<td>Self-Confidence:</td>
<td>Perceived Readiness</td>
<td>0.591</td>
<td>0.349</td>
<td>65.87**</td>
</tr>
<tr>
<td></td>
<td>External Environment</td>
<td>0.630</td>
<td>0.397</td>
<td>40.10**</td>
</tr>
</tbody>
</table>

**p< .01.
DISCUSSION

The purpose of the study that has been described in this chapter was to examine the situational antecedents of competitive state anxiety and self-confidence in elite student middle-distance runners. The decision to conduct such an investigation was generated from an awareness of the paucity of research in this area. The need to address the issue is considerably heightened by the extensive implications that can be derived from this line of research and the PRQ was developed in order to facilitate such an examination. It was structured with the intention of measuring situational variables that contribute to middle-distance runners' feelings and perceptions during the period immediately preceding a race. Five factors emerged as a result of the factor analysis of the PRQ. These related to the athlete's perception of his readiness, his attitude towards previous performance, his perception of the difficulty of the position goal he had set and whether he thought he could achieve it, the influence of the coach on recent training and performance, and the suitability of the weather and track conditions (i.e. external environment). All of these factors might be characterized as representing different variables that contribute to performance expectations. Closer inspection of the factors that emerged allows consideration of why such items were identified as important by the athletes. In a sport where physical conditioning and being in 'good shape' are prerequisites for successful performance, it is perhaps inevitable that the primary factor that was revealed, 'Perceived Readiness', largely reflects the importance that the athlete attaches to his physical state. The emergence of the second factor is also unsurprising as recent performance is often the best indication that the athlete is running well. The items that formulate this factor are a reflection of the fact that the majority of elite runners are extremely analytical about their performances both in training and competition. Runners consistently monitor their progress in an attempt to establish which patterns of training work best for them. This constant monitoring tends to be required more in track athletics than in other sports because of the importance of the periodisation process and the need to carefully structure training plans in order to maximize the effectiveness of preparation. Therefore, it may be that athletes tend to set themselves various short-term targets, sometimes subconsciously, as a means of assessing their progress. This may account for the emergence of the various goal-related items as well.

The five factors to emerge also appear to resemble elements of the sources of self-efficacy that were identified by Bandura (1977). Clearly, the 'Perceived Readiness' and 'Attitude Towards Previous Performance' factors can be related to Bandura's primary source, that of performance accomplishments. In particular, the components of 'Attitude Towards Previous Performance' seem to reflect the significance of mastery experiences that Bandura argued provides the most valuable information about our capabilities. The 'Perceived Readiness' factor is also made up of a number of items that represent the apparent importance of recent performances in both training and competition. The physical readiness and mental readiness items that also form part of this factor
can be linked as well to Bandura's fourth source of efficacy information, that is, the information that is conveyed by physiological arousal in terms of appropriate preparedness. The 'Coach Influence' factor may represent some congruity with Bandura's third source of self-efficacy, verbal persuasion. Bandura argued that the exhortations and encouragement from a respected coach whose opinions are valued may lead to an enhancement of self-efficacy. Similarly, the athletes in this study identified the important influence that the coach can have on performance.

Interestingly, some items did not appear that may have been expected to do so. No mention was made of other athletes and the contribution that they may have had on how the athletes felt prior to competing. Wandlizak, Potter and Lorentzen (1982) reported the importance that perceptions of the ability of the opposition have on pre-game anxiety. It is perhaps surprising, therefore, that no 'Rating of the Opposition' item appeared from the original interviews. This may be a reflection of the fact that middle-distance runners perceive performance to be relatively independent of other athletes in the sense that they tend to adopt performance-oriented goals (i.e. personal bests) more often than outcome-based (i.e. winning) goals. Burton (1984) suggested that athletes in the objectively-measured sports such as track and field and swimming do set themselves general outcome goals but these are superseded by their commitment to performance goals. These performance goals may be seen as the means by which to achieve any outcome goal they may hold. Successful performance, in their view, lies in their hands and this is reflected in the nature of the PRQ items that were identified as contributing to pre-match feelings.

It is important to clarify that the PRQ was designed for the specific purpose of examining the precursors of anxiety in the subject population that was selected for this study. By definition, therefore, it is limited in the sense that it has not been validated for use with other sporting populations. Indeed, the means for generating the items on the questionnaire (i.e. asking middle-distance runners to express what contributes to how they feel prior to competing) precludes its use with performers who are not middle-distance runners. The PRQ was not developed as a general psychometric measure of the situational antecedents of competitive state anxiety, although unquestionably the need for such an instrument exists. At this stage it is also important to mention that there is a potential weakness in the goal-related items. All the athletes in this study reported that they set themselves both a position goal and a time goal for the forthcoming race. Whilst this may appear a little surprising it may be that the items forced a response from the athletes. They may not have had a specific goal in mind but the questions may have caused vague, relatively uncommitted goals to then be set. The questions concerned made no account of the strength of, or attachment to, those goals. For example, some athletes may have had very precise and calculated goals in mind whilst others saw things more generally and less intensely. Research into goal commitment would suggest that individuals differ considerably in their determination to reach goals (Beggs, 1990). This is pure supposition but one runner may have set himself a target of finishing first in his 1500 metres race and running 3 minutes 40 seconds in the process, whereas another may loosely aim to get "somewhere in the first five" and run "around 3:50 something". Future research that wishes to
examine the issue of 'goals' and their potential as sources of anxiety needs to clarify the precise nature of these 'targets' before further assumptions can be made.

The factor that best predicted cognitive anxiety was 'Perceived Readiness', which incorporated items concerning perceptions of mental and physical readiness, level of fatigue, and effectiveness of recent training. 'Attitude Towards Previous Performance' also proved to be a significant predictor of cognitive anxiety, containing items that probed the athlete's reactions to performance in his previous race and races during the previous four weeks. The third predictor of cognitive anxiety was 'Position Goal'. Specifically, cognitive anxiety was positively related to the difficulty of the goal and negatively related to the athlete's perception of whether he could achieve the goal. This finding indicates the possibility of an interesting relationship between goal setting and anxiety which has received little research attention, although Cale and Jones (1989) have reported findings to suggest that goal difficulty is an important mediator of both cognitive anxiety and self-confidence. They found that cognitive anxiety rose and self-confidence fell just before the attempted performance of very difficult goals and that somatic anxiety was not affected by goal difficulty. This confirms that difficult goals themselves are sources of cognitive anxiety and underlines the importance of identifying just how much anxiety is generated by goals of varying difficulty. Goal setting has been acknowledged as a powerful strategy for enhancing motivation and self-confidence (Locke and Latham, 1985), but there are certain circumstances under which goal setting might be harmful to an athlete. Goals may be dysfunctional if an individual is already stressed or under pressure or when the assignment of a specific, difficult goal may create excessive pressure and degrade performance (Earley, Connolly and Ekegren, 1989). Such consequences of possible overmotivation by goal setting may explain why a position goal should predict cognitive anxiety. The implication, therefore, is that athletes must resist setting overambitious goals if they are to avoid imposing excess pressure upon themselves. Hardy, Maiden and Sherry (1985) performed a study which may be of some practical help to the coach trying to set goals for competition which themselves do not generate too much additional anxiety. They used the CSAI-2 with a varsity soccer team, and showed that cognitive and somatic anxiety were very high just before an important match, but much lower on the days before and after. Each player was asked to perform a ball control task, with various levels of goal difficulty, at these times. Significantly, both goal acceptance and goal attainment scores decreased whilst anxiety levels increased as the competition approached. Findings such as these are also relevant in the context of research that has examined the influence of performance as opposed to outcome goals. There is substantial research evidence to suggest that athletes who adopt interpersonal goals, that inevitably involve social comparison, perceive sport competition as stressful and thus feel incompetent when they have less ability than others (Duda, 1985; Ewing, 1981; Roberts, 1986). Maehr and Nicholls (1980) and Roberts (1986) theorized that task-oriented athletes are not as subject to stress and anxiety of social comparison or competition as they focus on enjoyment inherent in performing without concern for self-enhancing comparison or demonstration of ability to others. In support of this prediction,
Vealey and Campbell (1988) found state anxiety (a unidimensional measure was used) to be negatively related to task orientation in a group of adolescent skaters. One possible explanation may be that in adopting a 'performance' approach, the athlete is not subjected to external pressures and retains an internal locus of control. Vealey and Campbell reported that a positive characteristic of performance orientation is the control over competence and success that it creates.

The results from the investigation reported in this chapter showed that none of the five PRQ factors significantly predicted somatic anxiety. These findings support, therefore, Martens et al.'s (1990) proposal that performance expectancies prior to competition are more strongly related to cognitive anxiety than to somatic anxiety. The failure of the PRQ factors to predict somatic anxiety is perhaps not surprising since none of the factors related to conditioned pre-race stimuli. It should be noted, however, that during the development of the PRQ the runners did not identify such variables as contributing to how they feel one hour before a race. Further investigation closer to the start of a race, however, may reveal other variables that do emerge as predictors of somatic anxiety. Current knowledge of the temporal patterning of somatic anxiety suggests that this response increases both considerably and rapidly close to the onset of the event. It may be that the significant elevations in somatic anxiety occur closer to the start of the event than one hour before and perhaps suggests the need to measure responses as near to the start of race time as is practically possible. This may result in athletes identifying variables such as the need to complete their warm-up routine without interference and the size and nature of the crowd.

Martens et al. (1990) proposed that cognitive anxiety and self-confidence are elicited by the same antecedent conditions. The findings from the study reported in this chapter provide partial support for this proposal, in that 'Perceived Readiness' was the most significant predictor of both self-confidence and cognitive anxiety. However, the other predictor of cognitive anxiety, 'Attitude Towards Previous Performance', failed to significantly predict self-confidence. Furthermore, the results showed that a factor not significantly related to cognitive anxiety, 'External Environment', was a further significant predictor of self-confidence. These findings provide general support for Martens et al.'s (1990) proposal that performance expectations are antecedents of both cognitive anxiety and self-confidence. At a more precise level, however, the findings suggest that cognitive anxiety and self-confidence share some common antecedents which contribute to performance expectations but that there are also factors which may be unique to each. These findings are interesting in the context of the argument that has raged concerning the independence of these two subscales. This study provides evidence that lends support to the view that the two scales are independent. Martens et al. (1990) have suggested that self-confidence and cognitive anxiety are at opposite ends of a cognitive evaluation continuum. This suggestion originally arose as an explanation of the self-confidence component which was first identified by iterative factor analysis of the CSAI-2 items. However, as Parfitt, et al. (1990) have pointed out, because Martens et al.'s iterative factor analysis extracted these two factors orthogonally, they cannot be conceptualised as lying along the same continuum.
Practical Implications

In addition to the theoretical ramifications of these findings, the results from this study also appear to have important implications at an applied level for coaches, practising sport psychologists, and athletes involved in middle-distance running. Favourable perceptions of readiness correspond to both lower levels of cognitive anxiety and greater self-confidence. It is widely acknowledged that self-confidence is critical to successful performance and one technique for improving confidence is to use and control thoughts appropriately. Coaches can help athletes reach this state by structuring training programmes so that the athletes come to perceive themselves as being physically and mentally ready. Use of self-talk can facilitate perceptions of readiness and replace self-defeating thoughts with positive ones. Coaches can also use past performance as a means of decreasing cognitive anxiety by manipulating attitudes towards that performance. This may involve minimizing the importance of the last race, if performance was disappointing, or stressing the recency of success if performance was satisfying.

The emergence of the 'External Environment' factor as a predictor of self-confidence reveals the importance athletes attach to performing in conditions they consider suitable. Negative reactions to the external conditions can damage self-confidence so that the athlete would benefit from modifying such self-defeating cognitions. Pointing to the fact that some athletes believe they are entitled to ideal conditions, Gauron (1984) identified this as a prime example of irrational thoughts and encouraged athletes to cultivate the skill of reframing; that is, creating alternative frames of reference or different ways of looking at the world. This may take the form, for example, of emphasizing that inclement weather or poor track conditions will also affect all of the other competitors. Equally, any feelings of unfavourable treatment can also produce blaming or external attributions. Rarely is anything gained by making excuses or assigning faults to others. This type of thinking allows the athlete to abdicate all responsibility - a non-productive form of cognition. Athletes must learn to replace external attributions with attributions that are in their control. The attitude of the coach can be influential in this situation in that athletes often learn their attributions from their coaches (Bunker and Williams, 1986). If coaches usually blame failure on external factors, athletes will too. This subtly leads athletes to expect failure under similar future circumstances (e.g. bad weather, poor officiating). However, if coaches and sport psychologists provide appropriate internal attributions for individual athlete and team success and failure, they will help athletes eliminate some of their feelings of external control and inappropriate, superstitious thinking. This, too, involves cognitive control and there are a number of further approaches to changing and restructuring cognitive patterns (e.g. rational emotive therapy; Ellis, 1962).

Coaches and practising sport psychologists can clearly benefit, therefore, from an identification of the factors that are related to increased cognitive anxiety and reduced self-confidence. Coaches who possess an awareness of such factors are in a position to pre-empt the
onset of anxiety that may occur when performers are exposed to such stimuli. To quote a proverb, "to be forewarned is to be forearmed", and this will inevitably mean that coaches are better equipped to facilitate the preparation of their athletes.
CHAPTER 3

GENDER DIFFERENCES IN PRE-COMPETITION TEMPORAL PATTERNING AND ANTECEDENTS OF ANXIETY AND SELF-CONFIDENCE

The previous chapter examined a number of situational variables as potential antecedents of the CSAI-2 components in a population of male middle-distance runners. The findings supplied evidence to suggest that the anxiety components may have antecedents that are unique to each, as well as providing an insight into the specific situational sources of anxiety in that population. The experiment that is reported in this chapter also investigated situational antecedents of the CSAI-2, but in this instance male and female performers from team sports were examined. Furthermore, the study employed a different methodology in using the time-to-event paradigm whereby measurements were taken on five separate occasions during the week preceding an important competition.

This line of research is valuable because it has been suggested that absolute levels of arousal may be less important than patterns of change. Landers (1978) and Mahoney and Avener (1977) commented that the early studies in this area (which are reviewed in detail shortly) demonstrated that the more successful or experienced performers seemed to reduce or control their arousal levels in the crucial moments just prior to competition whilst those less experienced could not. Of far greater significance, therefore, and of greater utility to the researcher is the patterning of responses. A 'one-off' absolute measure does not really allow the researcher to infer whether the anxiety levels of the performer are under control. Hence, an increasing number of sport psychology researchers have adopted the time-to-event paradigm in an attempt to establish the nature of the patterning of anxiety (Gould et al., 1984; Krane and Williams, 1987; Martens et al., 1990). Consequently, a great deal of the research into the competitive anxiety response has focused on the period leading up to competition. Silva and Hardy (1984) identified four further reasons for this; firstly, the assumption that the athlete's mental set prior to competition can affect subsequent performance; secondly, the assumption that the athlete has some control over his or her mental preparation during the pre-competition period; thirdly, at a practical level, this period is much more accessible to researchers than the period of competition itself; and, finally, if pre-competition anxiety is a negative source of performance variance then the sport psychologist can assist in developing an appropriate pre-competition state. A fifth and crucial reason that can perhaps be

3.1 As alluded to in the previous chapter, researchers have tended to use the terms arousal and anxiety interchangeably. For the sake of convenience and in the context of this thesis, the term anxiety will be used in this chapter. This is also appropriate considering that the majority of research in this area has utilized the CSAI-2 as its psychometric device.
added to this list is that the time-to-event paradigm provides valuable information in terms of implications for the actual timing of intervention strategies. However, little research has been conducted in the area of temporal patterning which has adopted a multidimensional approach to the measurement of anxiety. In many ways this situation reflects the research concerning antecedents of anxiety where considerably more work using the unidimensional perspective has been performed. Some individual difference research (e.g. Jones and Cale, 1989a; Krane & Williams, 1987; Martens et al., 1990) has been conducted, but clearly this is a vast area. Consequently, the study reported in this chapter focuses on one particular individual difference variable, that of gender and the potential difference that this interpersonal variable may have on the patterning of anxiety.

The review of literature preceding this study is divided into four sections. The first section concentrates on the relevant literature from test anxiety research while sections two to four focus on research from the competitive anxiety literature. Section two reviews studies that have utilised a unidimensional perspective of anxiety; section three details the research that has continued this line of investigation but from a multidimensional perspective; and the final section concentrates on the influence of gender differences on the anxiety response. The introduction to this chapter concludes with an outline of the purpose of this study and examines the rationale for including antecedent variables in the investigation.

**FINDINGS FROM THE TEST ANXIETY LITERATURE CONCERNING TEMPORAL PATTERNING 3.2**

As has been established in the previous chapter, although some stimuli would be expected to elicit both worry and emotionality, the two are thought to be elicited by different cues. As emotionality is considered to be a conditioned reaction to the cues associated with the start of a testing or evaluative situation it is expected to be at its greatest level just prior to and at the beginning of the test and to dissipate over the course of the exam as attention is directed to the task itself. Emotionality, therefore, should show its most marked elevations at the beginning of an exam and should drop off rapidly after the test has commenced as the conditions producing immediate situational anxiety have subsided. Worry, on the other hand, is conceived to be a cognitive-attentional response to cues of evaluation and possible failure. Worry, therefore, would be expected to remain at a relatively stable level in relation to the situation as long as the evaluative cues remain salient and no other information or experience alters the estimated degree of possible failure (Deffenbacher, 1980). Changes in evaluative output, either manipulated in the experimental

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3.2 Antecedents of the anxiety response have previously been discussed in Chapter 2. Consequently, the next two sections concentrate on the temporal patterning of the anxiety components.
design or inferred from changes in performance expectations, would be expected to increase or decrease worry level. Thus, worry is hypothesized to co-vary with external and/or internal cues relating to evaluation and possible failure, whereas emotionality is hypothesized to co-vary with the with the beginning of a test or with situations which refocus attention on these cues (Deffenbacher, 1980).

Research involving use of the time-to-event paradigm first appeared in the test anxiety literature. For example, emotionality significantly increased from five days before an exam to the beginning of the examination (Spiegler et al., 1968). These authors administered five worry items and five emotionality items from the TAQ to 21 psychology students on three occasions: five days before, immediately before, and just after a required coursework examination. The results revealed that worry remained stable over the three administrations while emotionality was significantly greater immediately prior to the exam as compared to five days before. Post-exam responses revealed that emotionality had returned to the same levels as five days previously. These observations have generally received support from other studies in the worry-emotionality area. Doctor and Altman (1969) also examined these two components of test anxiety in relation to temporal changes, but in a more limited way in that they only measured responses before and after the examination. Consistent with previous research, they too reported significant reductions in emotionality scores following completion of the examination, but only found partial support for the findings concerning worry. They found that low worry subjects remained stable but that high worry subjects reported reduction in their worry scores. Morris and Engle (1981) also reported a significant decrease in emotionality, but not worry, scores from pre-test to post-test. Therefore, emotionality has been shown to vary as a function of the temporal proximity to exams while worry has been shown to remain constant.

Related to these findings, evidence has also been provided to show that cognitive anxiety does not increase significantly throughout testing unless the students' performance expectancies change (Morris and Fulmer, 1976). These authors reported two studies which investigated the effects of item-by-item feedback regarding the correctness of the response on worry and emotionality levels in college exams. In study 1, worry decreased with feedback, and emotionality was unaffected. In study 2, however, both worry and emotionality increased with feedback and with increased test importance (manipulated by having the test count as usual, only be able to help a student's grade, or have no impact on grade). In reviewing the literature in the previous chapter of this thesis, reference was made to the research that has identified different antecedents of the anxiety components, and it is relevant to briefly mention these studies again as it helps to clarify the theoretical basis from which predictions are made concerning the temporal patterning. For example, Morris and Liebert (1969) demonstrated that worry increased as the difficulty of the WAIS items increased but that emotionality was not affected. Morris and Liebert (1973) found that emotionality was responsive to threat of shock but not to verbal persuasions of failure. The reverse was true for worry. These studies showed that worry level rose with conditions which increased
the saliency of evaluation or possible failure. The important thing to mention here is that it was only a manipulation of performance expectancy that caused the worry responses to alter. In the studies where there was no manipulation, worry remained constant. The only apparent exception to this patterning for worry was the reduction of the response as a function of feedback in study 1 reported by Morris and Fulmer (1976). On closer inspection, however, this test was relatively easy and the feedback informed subjects they were doing relatively better than expected and, therefore, worry decreased.

As has been established, without experimental manipulation, studies consistently report a dissipation in emotionality following the onset of the event. However, the findings for emotionality from the studies that have deliberately enforced some manipulation are also worthy of mention as they again serve to reinforce the theoretical predictions concerning the temporal patterning of the emotionality response. With the exception of Morris and Fulmer (1976, study 2), emotionality increased in these studies. The explanation for this may lie in the nature of the tasks. Significant elevations in emotionality occurred during very difficult tasks with clear feedback that subjects were not doing well. In such situations, subjects may not remain absorbed in the task and may, therefore, periodically re-focus on the test circumstances. This would re-elicit emotionality and explain such an elevation. This possible explanation has major implications for sport psychology. When relatively poor performance is clear, subject attention may occasionally shift to cues of the evaluative setting (e.g. hostile crowds), re- arousing emotionality.

To recap, therefore, without experimental manipulation or alternative reason for changes in expectations, emotionality is predicted to dissipate once the event has begun and worry is predicted to remain stable. These theoretical predictions concerning the temporal patterning of worry and emotionality have subsequently been examined and adopted by sport psychologists and these investigations are discussed shortly.

FINDINGS FROM THE COMPETITIVE ANXIETY LITERATURE CONCERNING TEMPORAL PATTERNING

Research into the temporal patterning of competitive anxiety followed the traditional path taken by sport psychologists by initially adopting a unidimensional perspective and then, more recently, a multidimensional approach to the measurement of the concept. Both approaches are important to our understanding in the sense that the unidimensional approach first generated an awareness of individual differences in anxiety responding, whilst the multidimensional conceptualisation established that the differential patterning for the components as predicted in the test anxiety literature was equally applicable to the sporting situation. As we shall see, these findings have undoubtedly provided the coach and practising sport psychologist with a better-informed capacity to assist athletes in the management of pre-competitive anxiety.
Unidimensional Competitive Anxiety Studies

The growth of research that has examined the temporal patterning of the competitive state anxiety response stems largely from the series of studies conducted by Fenz and his colleagues with parachutists (e.g. Fenz, 1975; Fenz and Epstein, 1969; Fenz and Jones, 1972). These investigations have made a considerable contribution to the body of knowledge in this area. Fenz and Jones (1972) assessed both respiration rate and heart rate of experienced versus novice jumpers (only one previous jump) during the jump sequence, which began with the jumper's arrival at the airport. Subjects consisted of 14 novice and 16 experienced sport parachutists. A polygraph was used to assess heart and respiration rate. Because the patterns of respiration rate and heart rate were highly compatible, Figure 3.1 only presents the heart rate data. This figure shows the patterns of heart rate of the experienced and novice jumpers from the seven points at which the data was collected over the duration of the jump sequence. It is interesting to note that both groups exhibited similar increases in heart rate up until point 4 (engine warm-up) in the jump sequence. Once the plane took off and gained altitude, the novice jumpers continued to increase their heart rates until they reached the jump run. However, after the take-off the experienced jumpers showed a levelling off that was followed by a decrease in heart rate at the jump run. Therefore, despite the fact that at point 3, (in the aircraft), the heart rate of the experienced parachutists was somewhat higher than those of the novices, by the time of the actual jump, experienced jumpers were substantially less anxious than their novice counterparts. Fenz and Jones (1972) also examined performance by having two experienced jumpers rate the quality of the jump. They found evidence that tends to endorse the implications of these findings in that amongst the experienced parachutists, those who performed well exhibited a reduction in anxiety levels in the latter stages of the jump sequence whilst the poorer performers reported increased anxiety right up until they left the plane. This differential patterning based on performance was replicated within the group of novice parachutists as well.

Fenz's (1975) study also examined the relationship between patterns of anxiety about a parachute jump and skill level in which anxiety was measured via heart rate, respiration rate and subjective assessment on a number of occasions prior to the jump (e.g. on arriving at the airport, in jump gear, at 2000 feet, at final altitude). Differences in pre-jump state anxiety patterns between good versus poor and experienced versus inexperienced parachutists were again examined. The results revealed that while the novice (and poor performing) jumpers produced a sharp increase in physiological activity and reported an increase in anxiety and fear up to the moment of the jump, experienced (and good performing) parachutists produced an inverted-V shaped response pattern, i.e. a sharp initial increase was followed by a sharp decrease, so that prior to the jump, responses were only slightly above normal levels.

Numerous other studies have utilised a global measure of state anxiety to examine the pre-competition temporal patterning of individuals differing in skill level (e.g. Gould, Weiss and...
Figure 3.1: DATA FROM FENZ AND JONES (1972)

Heart Rate

Arriving at Airport
In jumper
In aircraft
Engine warmup
1000 feet
2000 feet
Jump run

Jump Sequence

- Novice
- Experienced
Weinberg, 1981; Highlen & Bennett, 1979; Huddleston and Gill, 1981; Mahoney & Avener, 1977; Meyers, Cooke, Cullen & Liles, 1979). Gould, Horn & Spreeman (1983b) also investigated the influence of trait anxiety. Mahoney and Avener's study compared gymnasts who qualified for the 1976 United States Olympic team with gymnasts who made the trial but did not qualify for the team. Responding to a specially designed questionnaire, the gymnasts rated their typical degree of anxiety at the various stages of competition: 1 week prior to the competition, 1 day, 1 hour, dressing at the competition, warming up, chalking up before best and worst events, and while performing best and worst events. (Men's gymnastics involves competing on six separate pieces of apparatus, and although the authors did not specify exactly what they meant by 'best' and 'worst' event, it is presumably based on the assumption that each gymnast has an apparatus on which he feels more/less comfortable). Their findings showed the qualifiers to have a different patterning of anxiety to the less successful non-qualifiers, with the successful gymnasts reporting higher levels of anxiety prior to the competition. More specifically, the qualifiers experienced greater anxiety 1 hour prior to the meet, whilst getting changed, and also whilst warming up. However, during the crucial moments of actual performance this situation was reversed so that the successful gymnasts experienced considerably less anxiety than their non-successful counterparts. In particular, it is interesting to note that whilst performing their worst event, the anxiety levels of the unsuccessful gymnasts were as high as any previous stage, whereas the Olympic qualifiers had reduced their anxiety levels to below what they were one day prior to competing. These findings were congruent with Fenz and Jones (1972) whose findings revealed that the more successful performers appeared to have a greater capacity to control their anxiety in the period just prior to performing.

Highlen and Bennett (1979) found some support for these findings by reporting that differential skill levels could be distinguished by differences in the anxiety patterns of wrestlers. Similar to the Mahoney and Avener study, comparisons were made between qualifiers and non-qualifiers for selected wrestling tournaments. Anxiety was measured by the 'Wrestling Questionnaire' that was specially designed for the study by the authors (adapted from the inventory used in the Mahoney and Avener study, 1977). This scale asked the wrestlers to 'rate their usual anxiety' at various times before and during competition. Both groups exhibited extremely high levels of anxiety during anticipation of competing against a tough opponent, but the qualifiers were consistently lower in anxiety during the actual competition.

Gould et al. (1981) attempted to extend and replicate the Highlen and Bennett (1979) findings, using a sample of 49 collegiate wrestlers. Unlike the previous studies, when the anxiety patterns of place-winning and non-place-winning wrestlers were compared, few differences in anxiety were evident. All wrestlers, regardless of their success, exhibited an inverted-V pattern of pre-competitive anxiety as measured by the 'Psychological Preparation In Wrestling Questionnaire' that was adapted from the scale developed by Highlen and Bennett (1979). Thus, the Highlen and Bennett (1979) anxiety results were not replicated. It must be pointed out, however, that 'anxiety' increased at each stage of testing prior to competition and then reduced once the competition had
begun. It is important to realise that the questions asked the performers to typically rate their responses in these situations which permitted assessment of anxiety levels during performance. This patterning, therefore, was perhaps a reflection of the athletes perceiving 'anxiety' in predominantly somatic terms. In other words, the rapid increase in the response prior to competing, followed by dissipation of the response once the event had begun, reflects the predicted patterning of the CSAI-2 somatic anxiety subscale. This immediately suggests the need for a multidimensional approach, because it is assumed that anxiety was being viewed in this way then one has little indication of the patterning of any cognitive component of anxiety.

Gould et al. (1983b) also performed an examination of the competitive anxiety patterns of junior elite wrestlers and relationships between success, years wrestling experience, age, trait anxiety and competitive state anxiety levels. Anxiety was again assessed by asking the athlete to rate how anxious he was on an 11-point Likert scale (ranging from 1 = 'no anxiety' to 11 = 'very anxious') at various times before and during competition. Specifically, the subjects rated their typical level of anxiety '1 week prior to a major competition', '24 hours before a major competition', '1 hour before competition', '2 minutes before competition', and 'during the actual competition' against their toughest and weakest opponents. Contrary to previous studies, no significant differences were found in competitive anxiety patterns between successful and less successful as well as more and less experienced wrestlers. In addition, age was not found to be related to competitive anxiety. Similarly, although significant anxiety differences were found between high as compared to low trait anxious wrestlers at the various stages of testing, the temporal patterning for both these groups was identical, with both high and low trait anxious athletes conforming to the inverted-V described earlier.

Although these findings suggest that skill level differences may mediate the temporal patterning of the anxiety responses, the research is not entirely conclusive as evidenced by the lack of support for the previous findings reported by the two Gould et al. studies (1981, 1983b). It is also interesting to note the method of gathering the anxiety responses. The vast majority of these studies asked respondents to 'typically rate their anxiety' in a given pre-competition or competition-related situation. This inevitably involves some retrospection and whilst valuable information can be gleaned from this method, some athletes may have difficulty accurately reflecting on their responses. Consequently, there appears the need to assess anxiety responses at the time if at all possible. There is also an important need to utilise a multidimensional approach to the measurement of anxiety. As mentioned a little earlier, research in the test anxiety literature has demonstrated that these two components of anxiety dissociate under the time-to-event paradigm and hence warrant separate measurement.
Predictions concerning the temporal patterning of the multidimensional competitive anxiety components are based largely on the research that was carried out as part of the construct validation of the CSAI-2. Martens et al. (1990, study 2) examined the temporal patterning of CSAI-2 responses in a sample of 45 high school wrestlers and 40 gymnasts competing at the 1982 National Championships. Based upon evidence from the test anxiety literature, the authors hypothesized that somatic anxiety would be considerably lower several days before competition than would cognitive anxiety and that somatic anxiety would tend to increase rapidly once athletes were actually present at the competition site. On the other hand, unless the athletes' evaluations of performance expectancy changed during the period assessed, cognitive anxiety should remain relatively constant. The wrestlers were administered the CSAI-2 on five occasions during the pre-competition period: 2 days before competing, 1 day before, 2 hours before, 1 hour before and, finally, 15 to 20 minutes before their competition. The gymnasts responded to the questionnaire on four occasions: 4 days before, 1 day before, 2 hours before and within 5 minutes of the start of their first competitive routine. The findings revealed that both the wrestlers and the gymnasts provided support for the hypotheses. Somatic anxiety was lower several days before competition but increased rapidly once athletes were at the competition site just prior to competition. The unchanging pattern of cognitive anxiety in both samples also supported predictions. The findings for self-confidence also followed a similar pattern to that of cognitive anxiety, although a slight reduction in the response at the final stage of testing in the wrestling sample was reported.

This pattern of change in the CSAI-2 components was substantiated by Gould et al. (1984). The CSAI-2 was administered to 63 high school volleyball players 1 week, 48 hours, 24 hours, 2 hours, and 20 minutes before competition. As predicted, only somatic anxiety significantly increased as the time of competition approached, and cognitive anxiety and self-confidence remained stable over time. Although Jones (1991) has commented that the patterning of self-confidence appears to be somewhat less consistent, support for the patterning predicted by Martens et al. (1990) and Gould et al. (1984) has subsequently been forthcoming in studies involving cricket players (Jones, Cale and Kerwin, 1988), hockey players (Jones and Cale, 1989b), and rowers (Ussher and Hardy, 1986). In Ussher and Hardy's study, eight experienced rowers responded to the CSAI-2 on four occasions, two weeks before competition (Time 1), 1 day before (Time 2), 2 hours before (Time 3) and 2 weeks after competition (Time 4). The results revealed that cognitive anxiety was elevated throughout the experimental period (Times 1, 2 and 3), whilst somatic anxiety was elevated only at Times 2 and 3. Self-Confidence assumed the opposite trend to cognitive anxiety in that an elevation in self-confidence was recorded after the competition.

Parfitt and Hardy (1987) conducted several similar investigations with basketball, hockey, soccer and netball players. In each case, subjects responded to the CSAI-2 on at least three
occasions: 2 days before a competition (Time 1), 1 hour before a competition (Time 2), and 2 days after a competition (Time 3). Findings showed a significant elevation in cognitive anxiety at times '1' and '2', except in the case of the soccer players when it was elevated at 'Time 2'. Self-confidence was significantly depressed at times '1' and '2', except in the basketball experiments where there was no effect. Somatic anxiety was significantly elevated at 'Time 2' for all the experimental groups. These findings provide further confirmation of the dissociation of cognitive and somatic anxiety under a time-to-event paradigm.

Although some support has been found for the predictions that were proposed by Martens et al. (1990), findings such as those reported above, suggest that certain factors may mediate the temporal patterning of the CSAI-2 components. Some researchers have examined whether the patterning of competitive state anxiety may differ as a function of certain individual difference variables. Type of sport (Krane & Williams, 1987; Martens et al., 1990), gender (Jones & Cale, 1989b), and competitiveness (Swain and Jones, in press) have been the nature of the variables scrutinized. Krane and Williams' (1987) study reported differential temporal patterning between golfers and gymnasts, having administered the CSAI-2 to both groups 24 hours, 1 hour and 10 minutes prior to competition. Specifically, somatic anxiety increased during the pre-competition period in the gymnasts at both the stages of testing but remained stable in the golfers. Both groups displayed changes in the patterning of cognitive anxiety and self-confidence but in the opposite direction; cognitive anxiety increased in the gymnasts but decreased in the golfers as the competition approached, and self-confidence decreased in the gymnasts but increased in the golfers as the event neared. Krane and Williams argued that a possible explanation for these findings may have been the difference in experience and skill levels between the two groups, with the gymnasts being both less skilful and less experienced than the golfers. Based on the research reviewed earlier, these authors hypothesized that less experienced athletes are not as capable of self-regulation of thought and, consequently, are more prone to suffer from worry as a competition approaches. However, having acknowledged the potential influence of experience, the findings from Krane and Williams (1987) supported Martens et al.'s (1990) predictions that subjectively-scored sport athletes (i.e. gymnasts) would be higher in cognitive and somatic state anxiety and lower in self-confidence than objectively-scored sport athletes (i.e. golfers). Martens et al. argued that this should be the case because of the increased uncertainty and lack of control over the outcome of an athlete's performance in subjectively-based sports. Martens et al. (1990) made two further predictions concerning differing sport type and their influence on competitive anxiety; individual versus team sports and contact versus non-contact sports. They argued that individual sport athletes would be higher in cognitive and somatic state anxiety and lower in self-confidence than team sport athletes because in individual sports the threat of evaluation is maximized; that is, the diffusion of responsibility for performance errors is minimized (Scanlan, 1975). The final comparison that was made between contact and non-contact sports, hypothesized that higher cognitive anxiety and lower self-confidence would be demonstrated in contact sports due to the
increased threat arising from personal confrontation. Interestingly, it has also been speculated that athletes in contact sports would have a greater probability of having acquired conditioned somatic anxiety responses than athletes in non-contact sports (Martens et al., 1990). Simon and Martens (1979) earlier reported that contact sports elicited higher state anxiety than did non-contact sports. As part of the CSAI-2 construct validation research that was described briefly in Chapter 1, Martens and his colleagues provided empirical support for every prediction except that subjectively-scored sport athletes did not report significantly greater somatic anxiety than their objectively-scored sport counterparts. However, it must be pointed out that Martens et al. (1990) made no predictions concerning the temporal patterning of the responses with regards sport-type differences. The implication from Martens' work was that although absolute anxiety levels may differ, the patterning would remain the same across these different types of sport.

Swain and Jones (in press) examined the relationship between 'competitiveness' and competitive state anxiety in a sample of 60 male university track and field athletes on five separate occasions in the period prior to an important competition. Subjects responded to the CSAI-2 1 week, 2 days, 1 day, 2 hours and finally, within 30 minutes of the start of their respective events. They also completed the Sport Orientation Questionnaire (SOQ) (Gill and Deeter, 1988) as a means of establishing levels of competitiveness. The results revealed that the patterning differed as a function of competitiveness, with the two groups (high and low competitiveness) reporting differential temporal patterning for cognitive and somatic anxiety. Cognitive anxiety in the high competitive group did not change over experimental period. In the case of the low competitive group, however, cognitive anxiety tended to show a progressive increase as the time to compete neared. Specifically, cognitive anxiety was greater at 1 day, 2 hours and within 30 minutes than at 1 week before and greater at the within 30 minute stage that at 2 days and 1 day before. In the case of somatic anxiety, differential temporal patterning again emerged with the low competitive group reporting an earlier elevation than the high competitive group. The temporal patterning for self-confidence revealed that both groups remained stable over the first three stages and then decreased on the day of competition.

What this study, as well as that of Krane and Williams (1987), demonstrates is that various individual difference variables may mediate the theoretical predictions concerning the pre-competition temporal patterning of the CSAI-2 components. A further interpersonal variable that has been shown to influence these predictions is gender. Gender is acknowledged as an important interpersonal factor in competitive sport (Gill, 1988) and, furthermore, Jones and Cale (1989a) reported differential pre-competition temporal patterning for cognitive anxiety, somatic anxiety and self-confidence in males and females. The following section of the review concentrates on the variable of gender and the study by Jones and Cale (1989a), as it forms an integral part in the investigation described in this chapter.
Gender and the Temporal Patterning of the CSAI-2 Components

Research findings have demonstrated that females score higher than males on competitive trait anxiety (Gill, 1988; Martens, 1977). The suggestion has also been made that gender differences in expectancies of success or failure may be an important factor in determining competitive anxiety. Gill, Gross, Huddleston and Shifflett (1984) proposed that competitive situations actually exaggerate gender differences in achievement cognitions, with females generally reporting less confidence and lower expectancies of success than males (Benton, 1973; House, 1974; Lenney, 1977). Lenney (1977) emphasised, however, that these differences vary according to the task and the situation, with gender differences being particularly evident in tasks perceived as masculine. This is clearly relevant in the context of sport as competitive sport has generally been considered a male domain (Harris, 1979), a gendered cultural form that has been dominated by men and masculinity (Theberge, 1985). This stems historically from the argument that women are not suited, because of their innate physical and emotional characteristics, to competitive sports because they are conducive to the arousal of aggression (Dunning, 1986; Hargreaves, 1985). Thus, when exposed to competition, males may not experience as much anxiety as females. It has been proposed, therefore, that the traditional socialisation of the sexes favours males in preparation for athletic competition as males are taught a competitive orientation to life more so than females (Andersen and Williams, 1987; Lewko and Ewing, 1980). In general, females have been socialized along other lines (e.g. nurturing and compassion). Consequently, numerous authors (e.g. Ahlgren and Johnson, 1979; Olds and Shaver, 1980) have also proposed that males are more competitive than females. Gill's (1988) findings support this proposal; males scored higher than females on competitiveness and win orientation (as measured by the SOQ) and females scored higher than males on goal orientation. Gill concluded that females seem to focus more on personal goals and standards that reflect a non-competitive achievement orientation, whereas males focus more on interpersonal comparison and winning.

The focus of the study reported in this chapter is on gender differences in pre-competition state anxiety levels and antecedents. To date, little research has examined gender differences in the CSAI-2 subscales, but during its validation, Martens et al. (1990) did find that females scored higher on cognitive and somatic anxiety and lower on self-confidence than males one hour prior to a competition. The specific purpose of this investigation was to replicate and extend a study carried out by Jones and Cale (1989a) that found differential pre-competition temporal patterning of cognitive anxiety, somatic anxiety and self-confidence in males and females. Jones and Cale's sample comprised male and female subjects drawn from various teams representing the same university who were due to play in the quarter-final stage of the 1988 English and Welsh Universities' Athletic Union Championships. They administered the CSAI-2 to the subjects at six
stages during the pre-competition period: 2 weeks, 1 week, 2 days, 1 day, 2 hours, and within 30 minutes prior to the start of their respective matches.

In the case of cognitive anxiety, as shown in Figure 3.2, males showed no changes during the pre-competition period. Females, on the other hand, reported a gradual elevation in cognitive anxiety as the competition neared. The emergence of a gender difference at the within 30 minute stage also revealed that females were more cognitively anxious immediately prior to competition than males. As shown in Figure 3.3, the results for somatic anxiety showed no increases in the males until the day of competition, whereas somatic anxiety in females increased at an earlier stage (two days before) in the pre-competition period. However, no gender differences were evident at any of the stages. Self-confidence, as illustrated in Figure 3.4, remained stable in males but decreased in females on the day of the competition. Furthermore, females exhibited lower self-confidence than males one day before competition and also on the day of competition.

Therefore, the temporal patterning of the CSAI-2 components in males supported multidimensional anxiety predictions that cognitive anxiety and self-confidence remain relatively unchanged during the pre-competition period, and that somatic anxiety does not increase until just prior to competition (Martens et al., 1990). The temporal patterning for females in Jones and Cale’s (1989a) study for cognitive anxiety and self-confidence was contrary to these findings, however, and suggested that females may not conform to the patterning predicted by Multidimensional Anxiety Theory. In a study with female gymnasts that was referred to earlier, Krane & Williams (1987) also found an increase in cognitive anxiety and a decrease in self-confidence as the competition approached.

Jones and Cale (1989a) suggested that an explanation for these findings may be traced to gender differences in reporting symptoms of anxiety. It has generally been found that females have a greater willingness to report more feelings, particularly of an unpleasant nature, than males (Briscoe, 1985). Bradburn (1969) attributed this difference to socialisation patterns, with males being encouraged to learn tight control over their emotions whilst females are allowed a greater degree of emotional expressiveness. Several authors have similarly drawn attention to the possible effects of the greater social acceptability of the reporting of anxiety by females than males (e.g. Durkin, 1987). However, anti-social desirability instructions, as described by Martens et al. (1990), were communicated to the subjects and Jones and Cale were only alerting the reader to a potential reason for the gender differences that they found.

Although the findings of Jones and Cale (1989a) did reveal these interesting gender differences in the temporal patterning of the CSAI-2 subscales, they were purely descriptive in nature and it was not possible to accurately explain them. Consequently, the study reported in this chapter examined the reliability of Jones and Cale's findings and investigated situational variables as the potential source of any gender differences. No research to date has examined possible gender differences in anxiety and self-confidence antecedents, but it has been generally proposed that cognitive anxiety, somatic anxiety, and self-confidence are elicited by different antecedent
Data from Jones and Cole (1989a)

Figure 1.2: Temporal Patterning of Cognitive Anxiety

![Graph showing temporal patterning of cognitive anxiety for males and females.]

Figure 1.3: Temporal Patterning of Somatic Anxiety

![Graph showing temporal patterning of somatic anxiety for males and females.]

Figure 1.4: Temporal Patterning of Self-Confidence

![Graph showing temporal patterning of self-confidence for males and females.]
conditions (Martens et al., 1990). As the previous chapter suggested, precursors of cognitive anxiety and self-confidence are hypothesized to be those factors related to the athlete’s perceived ability, which is essentially generated from previous competitive experiences (Feltz, 1984; Gould et al., 1984), and performance expectancies (Martens et al., 1990), whereas somatic anxiety is hypothesized to be predicted by reactions to environmental stimuli associated with competition, such as the competition site. Clearly, performance expectancies are mediated by numerous situational factors, and this investigation attempted to incorporate such potential variables. The situational variables measured in this study were based on those that previously have been identified as mediating performance expectancies such as perceived importance of the competition, prior knowledge of the opponent’s ability, past performance, expectancy of success, and perceived readiness. Sanderson & Ashton (1981), for example, identified that perceived importance of the competition led to variations in the level of anxiety experienced. This assertion is corroborated in the model of competitive anxiety (Martens et al., 1990) discussed in Chapter 2, which identified the importance of the competition as one of the two key constructs behind the elicitation of anxiety. A distinction was made between individual and match importance as Martens et al. (1990) suggested that team sport performers sometimes hold different intra-individual perceptions as to the importance of ‘playing well’. For example, a particular match that was of little significance to the team’s end of season position may be of considerable importance to the individual. A player may have been performing poorly in recent matches and needs to play well to retain their position in the team. Although a strong relationship naturally exists between these two items it was decided to differentiate between them based on Martens et al.’s (1990) comments. Wandlizak, Potter and Lorentzen (1982) argued that prior knowledge of the opponent’s ability was an important determinant of pre-match anxiety levels. They suggested that it was in the 50/50 situations against well matched opponents that anxiety levels were at their greatest. This ties in with the other key construct in Martens et al.’s model, that of uncertainty about the outcome. Past performance was included because of the importance attached to it by Bandura in his theory of self-efficacy (1977). Bandura argued that recent performance accomplishments in a particular situation were the primary source of related self-confidence, and consequently, through the ‘mechanism’ of self-confidence, exerted an influence on anxiety. In other words, the greater the self-confidence, the lower the levels of anxiety that are experienced. An item regarding expectancy of success was included as it represents the nature of performance expectations held by the athlete, that are seen as crucial in mediating the predicted temporal patterning of the CSAI-2 components. Finally, a perceived readiness item was included as a result of the findings from the investigation reported in the previous chapter which identified that a perceived readiness factor, which incorporated aspects of mental and physical preparedness, was a predictor of pre-competition cognitive anxiety and self-confidence.
STUDY 2
Purpose of the Study

The purpose of the investigation reported in this chapter was to replicate and extend the work of Jones and Cale (1989a). Subjects completed the CSAI-2 on five occasions prior to the same type of competition used by Jones and Cale. They also responded to the selected situational variables on each occasion.

Based on the findings of Jones and Cale (1989a), the following hypotheses were examined: (a) cognitive anxiety in females would increase during the pre-competition period, but would remain stable in males during this time; (b) somatic anxiety in females would increase earlier during the pre-competition period than in males, and (c) self-confidence in males would remain stable in the pre-competition period but would decrease in females on the day of competition.

No specific hypotheses were formulated regarding the antecedents of the CSAI-2 components as no previous research has examined gender differences. However, in accordance with the studies that have examined the antecedents of multidimensional anxiety, it was expected that those situational variables related to performance expectancy that were included in this study ('Rating of the Opposition'; 'Think Win'; 'Perceived Readiness'; 'Past Performance') would be more likely to relate to cognitive anxiety and self-confidence, and the items associated with environmental stimuli ('Individual' and 'Match Importance') would be more likely to relate to somatic anxiety.

METHOD

Subjects

The subjects for this study were drawn from athletes competing in the 1989 quarter-finals of the English and Welsh Universities' Athletic Union Championship, thus replicating the sampling procedure of Jones and Cale (1989a). The subjects in this study comprised 28 males (mean age = 21.04; S.D. = 1.67) and 28 females (mean age = 21.31; S.D. = 1.28). Male subjects comprised field hockey (N=13; mean age = 21.31; S.D. = 1.60) and rugby (N=15; mean age = 20.80; S.D. = 1.74) players; female subjects comprised field hockey (N=13; mean age = 20.23; S.D. = 1.09) and netball (N=15; mean age = 21.00; S.D. = 1.36) players. All subjects had at least 6 years of competitive experience in their respective sports.
Instrumentation

Competitive State Anxiety Inventory - 2

Precompetition levels of anxiety and self-confidence were measured via the CSAI-2, (Martens et al., 1990) which can be seen in Appendix I and details of which are described on page 32.

Antecedent Items

Six antecedent items were constructed to examine situational variables and were generated based on factors previously identified as mediating performance expectancies. The items that were selected measured match and individual importance, perceptions of the standard of the opposition, perceptions of one’s recent performances, perceived readiness, and, finally, expectancy of success. The items and response scales are presented in Figure 3.5.

Procedure

The CSAI-2 and the antecedent items were administered to the subjects at five stages during the precompetition period; 1 week, 2 days, 1 day, 2 hours, and within 30 minutes prior to the start of the competition. Jones and Cale (1989a) had administered the CSAI-2 two weeks prior to the competition but this stage of testing was eradicated for the purposes of the study reported here as it was felt that interim results could prove to be a confounding variable. All teams had games just prior to a week before the competition that might have affected responses during the testing period. Practical limitations meant that at the final stage of data collection the subjects did not complete the CSAI-2 at exactly the same time. However, all subjects responded to the questionnaire within 30 minutes prior to the start of their respective matches.

At all stages, the questionnaires were administered by the team captain, coach, or experimenter, using the standardized instructions recommended by Martens et al. (1990) (see Appendix I). The subjects were assured of the confidentiality of individual responses.

Figure 3.5: Antecedent Items

(1) How important is it for your team to do well in this match?

<table>
<thead>
<tr>
<th>Not at all Important</th>
<th>Extremely Important</th>
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(2) How important is it for you personally to do well in this match?

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(3) To what extent do you think that your team will win this match?

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<th>6</th>
<th>7</th>
<th>Very much so</th>
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(4) In relation to your own team, how do you rate the opposition?

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<th>Much weaker</th>
<th>Much stronger</th>
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(5) How have you been performing in matches over the past few weeks?

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<thead>
<tr>
<th>Very Poorly</th>
<th>Extremely well</th>
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(6) How prepared (physically and mentally) do you feel for this match?

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<tr>
<th>Not at all</th>
<th>Extremely</th>
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RESULTS

The data were analysed by means of two statistical techniques. Firstly, analyses of variance were employed in order to determine whether males and females differed in their responses to the CSAI-2 and situational variables. The second stage of the analyses involved the implementation of stepwise regression analyses to determine which, if any, of the situational variables best predicted each of the CSAI-2 components.

Analyses of Variance

Cognitive anxiety, somatic anxiety, self-confidence and situational variable scores were compared between the five conditions and between gender by means of two-way analyses of variance (gender by time-to-competition) with repeated measures on the second factor. Follow-up Tukey tests were employed to determine between which means significant differences occurred. Means and standard deviations are presented in Table 3.1.
Table 3.1: Time-to-Competition Means and Standard Deviations for CSAI-2 Subscales and Antecedent Items

<table>
<thead>
<tr>
<th>Subscales and Antecedent Items</th>
<th>1 Week</th>
<th>2 Days</th>
<th>1 Day</th>
<th>2 Hours</th>
<th>&lt;30 Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COGNITIVE ANXIETY</strong> :</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males mean</td>
<td>19.04</td>
<td>18.18</td>
<td>18.57</td>
<td>19.07</td>
<td>19.43</td>
</tr>
<tr>
<td>S.D.</td>
<td>4.38</td>
<td>4.24</td>
<td>4.74</td>
<td>5.06</td>
<td>5.12</td>
</tr>
<tr>
<td>Females</td>
<td>19.50</td>
<td>20.07</td>
<td>19.57</td>
<td>21.43</td>
<td>22.86</td>
</tr>
<tr>
<td>S.D.</td>
<td>5.61</td>
<td>5.71</td>
<td>5.67</td>
<td>6.62</td>
<td>6.72</td>
</tr>
<tr>
<td><strong>SOMATIC ANXIETY</strong> :</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>11.50</td>
<td>11.21</td>
<td>12.43</td>
<td>15.50</td>
<td>17.50</td>
</tr>
<tr>
<td>S.D.</td>
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<td>2.28</td>
<td>3.65</td>
<td>5.09</td>
<td>6.57</td>
</tr>
<tr>
<td>Females</td>
<td>12.82</td>
<td>11.75</td>
<td>12.04</td>
<td>15.54</td>
<td>19.07</td>
</tr>
<tr>
<td>S.D.</td>
<td>3.81</td>
<td>3.11</td>
<td>3.06</td>
<td>4.52</td>
<td>4.88</td>
</tr>
<tr>
<td><strong>SELF-CONFIDENCE</strong> :</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>29.00</td>
<td>28.82</td>
<td>29.14</td>
<td>27.82</td>
<td>26.71</td>
</tr>
<tr>
<td>S.D.</td>
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<td>4.33</td>
<td>4.29</td>
<td>5.24</td>
<td>5.40</td>
</tr>
<tr>
<td>Females</td>
<td>26.36</td>
<td>27.11</td>
<td>25.89</td>
<td>23.79</td>
<td>22.93</td>
</tr>
<tr>
<td>S.D.</td>
<td>5.17</td>
<td>4.35</td>
<td>5.14</td>
<td>4.40</td>
<td>4.56</td>
</tr>
<tr>
<td><strong>ANTecedent Items</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATCH IMPORTANCE:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>8.61</td>
<td>8.36</td>
<td>8.50</td>
<td>8.71</td>
<td>8.86</td>
</tr>
<tr>
<td>S.D.</td>
<td>0.96</td>
<td>1.14</td>
<td>0.98</td>
<td>0.44</td>
<td>0.95</td>
</tr>
<tr>
<td>Females</td>
<td>8.36</td>
<td>8.07</td>
<td>8.43</td>
<td>8.43</td>
<td>8.61</td>
</tr>
<tr>
<td>S.D.</td>
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<td>1.95</td>
<td>1.00</td>
<td>1.76</td>
<td>0.54</td>
</tr>
<tr>
<td>INDIVIDUAL IMPORTANCE:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>8.56</td>
<td>8.11</td>
<td>8.18</td>
<td>8.39</td>
<td>8.61</td>
</tr>
<tr>
<td>S.D.</td>
<td>0.35</td>
<td>0.81</td>
<td>1.11</td>
<td>0.96</td>
<td>1.44</td>
</tr>
<tr>
<td>Females</td>
<td>8.04</td>
<td>7.89</td>
<td>8.04</td>
<td>8.14</td>
<td>8.18</td>
</tr>
<tr>
<td>S.D.</td>
<td>1.01</td>
<td>0.95</td>
<td>0.92</td>
<td>0.96</td>
<td>1.01</td>
</tr>
<tr>
<td>OPPOSITION RATING:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>3.54</td>
<td>4.07</td>
<td>3.93</td>
<td>3.96</td>
<td>4.07</td>
</tr>
<tr>
<td>S.D.</td>
<td>1.75</td>
<td>1.72</td>
<td>1.86</td>
<td>1.95</td>
<td>1.11</td>
</tr>
<tr>
<td>Females</td>
<td>3.79</td>
<td>4.00</td>
<td>4.00</td>
<td>4.21</td>
<td>4.43</td>
</tr>
<tr>
<td>S.D.</td>
<td>1.56</td>
<td>2.01</td>
<td>1.95</td>
<td>1.35</td>
<td>1.36</td>
</tr>
</tbody>
</table>
Cognitive Anxiety

The gender by time-to-competition interaction for cognitive anxiety was significant \((F(4,216)=2.85; p<.05)\) and is shown in Figure 3.6. Cognitive anxiety in the males did not change over the experimental period. In the females, however, cognitive anxiety remained relatively stable over the first 3 stages of testing but then increased significantly at both of the following stages. The results from the follow-up tests (see Appendix 12) on the female sample also showed that cognitive anxiety at the within 30 minute stage was significantly higher than at the 2 hours stage. A comparison of gender scores at specific stages during the pre-competition period showed cognitive anxiety to be higher in females than in males at the 2 days before, 2 hours before and the within 30 minute stages. See Table 3.2 for analysis of variance summary.

Table 3.2: Analysis of Variance Summary Table for Cognitive Anxiety

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F-test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENDER (A)</td>
<td>1</td>
<td>234.06</td>
<td>234.06</td>
<td>1.92</td>
<td>.172</td>
</tr>
<tr>
<td>Subjects w. groups</td>
<td>54</td>
<td>6580.91</td>
<td>121.87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeated Measure (B)</td>
<td>4</td>
<td>183.19</td>
<td>45.80</td>
<td>6.93</td>
<td>.001</td>
</tr>
<tr>
<td>AB</td>
<td>4</td>
<td>75.48</td>
<td>18.87</td>
<td>2.86</td>
<td>.025</td>
</tr>
<tr>
<td>B x subjects w. groups</td>
<td>216</td>
<td>1427.73</td>
<td>6.61</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Somatic Anxiety

There was no significant interaction between gender and time-to-competition for somatic anxiety, \((F(4,216)=0.90; p=0.46)\), nor was there a significant main effect of gender.
Figure 3.6: TEMPORAL PATTERNING OF COGNITIVE ANXIETY

TIME-TO-COMPETITION vs. COGNITIVE ANXIETY

- Males
- Females
(F(1.54)=0.60; p=0.44). However, a time-to-competition main effect, (F(4.216)=43.58; p<0.01), 
did emerge and is shown in Figure 3.7. Follow-up Tukey tests (see Appendix 12) revealed that 
somatic anxiety for both the males and females was higher at the within 30 minute and 2 hours 
periods than at any other time, and it was also higher at the within 30 minutes stage than at 2 hours 
before. Thus, increases in somatic anxiety in both genders were only evident on the day of 
competition itself. See Table 3.3 for analysis of variance summary.

Table 3.3: Analysis of Variance Summary Table for Somatic Anxiety

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F-test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENDER (A)</td>
<td>1</td>
<td>26.41</td>
<td>26.41</td>
<td>.60</td>
<td>.441</td>
</tr>
<tr>
<td>Subjects w. groups</td>
<td>54</td>
<td>2369.23</td>
<td>43.86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeated Measure (B)</td>
<td>4</td>
<td>1875.91</td>
<td>468.98</td>
<td>43.58</td>
<td>.001</td>
</tr>
<tr>
<td>AB</td>
<td>4</td>
<td>38.80</td>
<td>9.70</td>
<td>2.86</td>
<td>.464</td>
</tr>
<tr>
<td>B x subjects w. groups</td>
<td>216</td>
<td>2324.49</td>
<td>10.76</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Self-Confidence

The interaction between gender and time-to-competition for self-confidence was marginally 
significant, (F(4,216)=2.27; p<0.06), and is shown in Figure 3.8. Self-confidence in the males 
remained stable over the first 3 stages of testing but then decreased significantly at both of the 
following stages. The results from the follow-up tests (see Appendix 12) on the male sample also 
showed that self-confidence at the within 30 minutes stage was significantly lower than at 2 hours 
before competition. Females showed a similar reduction in self-confidence, but at an earlier stage 
in the pre-competition period. Specifically, the results showed a progressive decrease from 2 days 
prior to competition (although it should be noted that there was no significant difference in self-
confidence between the 1 week and 1 day pre-competition stages). A comparison of gender scores 
at specific stages during the pre-competition period showed self-confidence to be higher in males 
than females at every stage of testing. See Table 3.4 for analysis of variance summary.

Table 3.4: Analysis of Variance Summary Table for Self-Confidence

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F-test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENDER (A)</td>
<td>1</td>
<td>755.71</td>
<td>755.71</td>
<td>8.06</td>
<td>.006</td>
</tr>
<tr>
<td>Subjects w. groups</td>
<td>54</td>
<td>5063.37</td>
<td>93.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeated Measure (B)</td>
<td>4</td>
<td>381.91</td>
<td>95.48</td>
<td>18.18</td>
<td>.001</td>
</tr>
<tr>
<td>AB</td>
<td>4</td>
<td>47.75</td>
<td>11.94</td>
<td>2.27</td>
<td>.062</td>
</tr>
<tr>
<td>B x subjects w. groups</td>
<td>216</td>
<td>1134.34</td>
<td>5.25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 17: Temporal Patterning of Somatic Anxiety

Figure 18: Temporal Patterning of Self-Confidence
Antecedent Items

The following section of the results reports the analyses of variance performed on the six antecedent items measuring situational variables. The results revealed one significant gender by time-to-competition interaction, for the item called 'Think Win', as well as significant time-to-competition main effects for 'Match Importance', 'Individual Importance' and 'Rating of the Opposition'. The analyses of the two remaining antecedent items, 'Perceived Readiness' and 'Recent Performances in Competition', revealed no interactions or significant main effects for either time-to-competition or gender.

'Think Win'

The gender by time-to-competition interaction for 'Think Win' (i.e. 'To what extent do you think you will win?') was significant (F(4,216)=3.53; p<0.01) and is shown in Figure 3.9. The follow-up Tukey tests (see Appendix 12) indicated that the extent to which males thought they would win remained stable over the experimental period. However, the results revealed a trend towards a progressive decrease in the females' belief that they would win as the competition neared. 'Think Win' was significantly greater at one week before than at all the other stages and was lowest at the 2 hours and the within 30 minutes stages of testing. A comparison of gender scores at specific stages showed 'Think Win' to be higher in males than females at both the 2 hours and within 30 minutes stages. See Table 3.5 for analysis of variance summary.

Table 3.5: Analysis of Variance Summary Table for 'Think Win'

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F-test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENDER (A)</td>
<td>1</td>
<td>6.60</td>
<td>6.60</td>
<td>1.74</td>
<td>.193</td>
</tr>
<tr>
<td>Subjects w. groups</td>
<td>54</td>
<td>205.31</td>
<td>3.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeated Measure (B)</td>
<td>4</td>
<td>2.49</td>
<td>.62</td>
<td>1.69</td>
<td>.154</td>
</tr>
<tr>
<td>AB</td>
<td>4</td>
<td>5.20</td>
<td>1.30</td>
<td>3.53</td>
<td>.008</td>
</tr>
<tr>
<td>B x subjects w. groups</td>
<td>216</td>
<td>79.51</td>
<td>.37</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

'Match Importance'

A significant time-to-competition main effect that emerged for the 'Match Importance' item (F(4,216)=6.97; p<0.01) and is shown in Figure 3.10. Follow-up tests (see Appendix 12) revealed that the males and females reported a gradual increase in perceptions of the importance of the match from 2 days before to the start of the competition. 'Match Importance' was higher at the within 30 minutes stage than at all the other stages of testing. See Table 3.6 for analysis of variance summary.
Figure 3.9: TEMPORAL PATTERNING OF 'THINK WIN'

Figure 3.10: TEMPORAL PATTERNING OF 'MATCH IMPORTANCE'

TIME-TO-COMPETITION
Table 3.6: Analysis of Variance Summary Table for 'Match Importance'

<table>
<thead>
<tr>
<th>Source</th>
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<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F-test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
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<td>3.66</td>
<td>3.66</td>
<td>1.17</td>
<td>.284</td>
</tr>
<tr>
<td>Subjects w. groups</td>
<td>54</td>
<td>168.33</td>
<td>3.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeated Measure (B)</td>
<td>4</td>
<td>7.95</td>
<td>1.99</td>
<td>6.97</td>
<td>.001</td>
</tr>
<tr>
<td>AB</td>
<td>4</td>
<td>.45</td>
<td>.11</td>
<td>.39</td>
<td>.813</td>
</tr>
<tr>
<td>B x subjects w. groups</td>
<td>216</td>
<td>61.60</td>
<td>.29</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

'Individual Importance'

The significant time-to-competition main effect that emerged for the 'Individual Importance' item (F(4,216)=6.01; p<0.01) is depicted in Figure 3.11. Follow-up tests (see Appendix 12) indicated that the importance of the competition to the individual followed a similar temporal patterning to that of 'Match Importance', in that responses tended to progressively increase from 2 days prior to competing. Specifically, the event was perceived as being more important to both males and females 2 hours and within 30 minutes of the 'event' than it was 2 days before as well as being more important at the within 30 minute stage than at one day before. See Table 3.7 for analysis of variance summary.

Table 3.7: Analysis of Variance Summary Table for 'Individual Importance'

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F-test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENDER (A)</td>
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<td>6.60</td>
<td>6.60</td>
<td>2.12</td>
<td>.151</td>
</tr>
<tr>
<td>Subjects w. groups</td>
<td>54</td>
<td>168.36</td>
<td>3.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeated Measure (B)</td>
<td>4</td>
<td>5.44</td>
<td>1.36</td>
<td>6.01</td>
<td>.001</td>
</tr>
<tr>
<td>AB</td>
<td>4</td>
<td>1.27</td>
<td>.32</td>
<td>1.40</td>
<td>.223</td>
</tr>
<tr>
<td>B x subjects w. groups</td>
<td>216</td>
<td>48.89</td>
<td>.23</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

'Rating of the Opposition'

The significant time-to-competition main effect that emerged for the 'Rating of the Opposition' item (F(4,216)=4.41; p<0.01), is depicted in Figure 3.12. Follow-up tests (see Appendix 12) showed that 'Rating of the Opposition' for males and females remained stable from 2 days prior to competition onwards. However, 'Rating of the Opposition' was significantly lower 1 week before the event than it was at the within 30 minute stage. See Table 3.8 for analysis of variance summary.
Figure 4.11: Temporal patterning of 'individual importance'.

Figure 3.12: Temporal patterning of 'rating of the opposition'.

Males
Females
Table 3.8: Analysis of Variance Summary Table for 'Rating of the Opposition'

<table>
<thead>
<tr>
<th>Source</th>
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<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F-test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENDER (A)</td>
<td>1</td>
<td>2.06</td>
<td>2.06</td>
<td>.25</td>
<td>.62</td>
</tr>
<tr>
<td>Subjects w. groups</td>
<td>54</td>
<td>446.74</td>
<td>8.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeated Measure (B)</td>
<td>4</td>
<td>10.54</td>
<td>2.63</td>
<td>4.41</td>
<td>.002</td>
</tr>
<tr>
<td>AB</td>
<td>4</td>
<td>1.62</td>
<td>.41</td>
<td>.68</td>
<td>.608</td>
</tr>
<tr>
<td>B x subjects w. groups</td>
<td>216</td>
<td>129.04</td>
<td>.597</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Regression Analyses

In order to examine which of the situational variables best predicted each of the CSAI-2 components in males and females, separate stepwise multiple regression analyses were performed for each of the time-to-competition stages of testing.3.2 The results showed that different antecedent items predicted the multidimensional anxiety components for males and females.

**Cognitive Anxiety**

For the females, as Table 3.9 indicates, the item 'Perceived Readiness' predicted cognitive anxiety at all five stages of testing. It was the sole predictor on three of these occasions, accounting for 25% of the variance both 2 days before and within 30 minutes of the competition, and 21% 1 week before. The relationship was negative in that the greater the perceived readiness the lower the cognitive anxiety and vice-versa. At the two remaining stages, 'Perceived Readiness' combined with the item 'Individual Importance' as a predictor to account for 29% of the variance 1 day before and 42% of the variance 2 hours before: specifically, the greater the perceived individual importance of the competition, the greater was the cognitive anxiety.

Different items emerged as significant predictors of cognitive anxiety in the male subjects. At 2 days and 1 day before the competition the items 'Rating of the Opposition' and 'Match Importance' combined to account for 29% and 32% of the variance respectively. In both cases, the relationships with cognitive anxiety were positive. However, the sole predictor on the day of competition was the item 'Think Win', accounting for 33% of the variance at the 2 hours stage and 26% at the within 30 minutes stage. This relationship was negative in that the greater the confidence of victory, the lower the cognitive anxiety, and vice-versa.

3.2. It should be emphasized that the sample size for such an analysis is relatively small but does satisfy Tabachnick and Fidell's (1983) recommendation that when using stepwise regression analyses the number of subjects should be at least four or five times as large as the number of variables.
### Table 3.9: Stepwise Multiple Regression Summary: Significant Predictors of Cognitive Anxiety

<table>
<thead>
<tr>
<th>Male Item</th>
<th>Female Item</th>
<th>( r^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Anxiety 1 Week</td>
<td>Perc Read</td>
<td>0.21</td>
</tr>
<tr>
<td>Cognitive Anxiety 2 Days</td>
<td>Perc Read</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>Match Import</td>
<td>0.29</td>
</tr>
<tr>
<td>Cognitive Anxiety 1 Day</td>
<td>Indiv Import</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>Perc Read</td>
<td>0.29</td>
</tr>
<tr>
<td>Cognitive Anxiety 2 Hours</td>
<td>Perc Read</td>
<td>0.24</td>
</tr>
<tr>
<td></td>
<td>Indiv Import</td>
<td>0.42</td>
</tr>
<tr>
<td>Cognitive Anxiety &lt;30 Mins</td>
<td>Perc Read</td>
<td>0.25</td>
</tr>
</tbody>
</table>

**Somatic Anxiety**

As shown in Table 3.10, somatic anxiety was not predicted by any of the antecedent items for the females, but the item 'Rating of the Opposition' was significantly and positively related to somatic anxiety in males 2 days, 1 day and 2 hours prior to competition. 24% of the variance was the most accounted for by this item, at the 2 hours before competition stage.

### Table 3.10: Stepwise Multiple Regression Summary: Significant Predictors of Somatic Anxiety

<table>
<thead>
<tr>
<th>Male Item</th>
<th>Female Item</th>
<th>( r^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Somatic Anxiety 1 Week</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Somatic Anxiety 2 Days</td>
<td>Rate Opp</td>
<td>0.16</td>
</tr>
<tr>
<td>Somatic Anxiety 1 Day</td>
<td>Rate Opp</td>
<td>0.19</td>
</tr>
<tr>
<td>Somatic Anxiety 2 Hours</td>
<td>Rate Opp</td>
<td>0.24</td>
</tr>
<tr>
<td>Somatic Anxiety &lt;30 Mins</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Self Confidence**

'Perceived Readiness', as indicated in Table 3.11, emerged as the major predictor of self-confidence in females at every stage of testing except for 1 week before competing, where no predictors materialized. At 2 hours prior to competition, 'Perceived Readiness' combined with
'Individual Importance' accounted for 56% of the total variance. Similarly, these two items combined to account for 32% of the variance at the within 30 minutes stage of testing. The relationship was positive in that the greater the 'Perceived Readiness' the greater the self-confidence, and vice-versa.

The 'Think Win' item that was found to be a significant predictor for males of cognitive anxiety also proved to be the primary predictor of self-confidence in males, with the relationship being a positive one. In particular, 'Think Win' was the sole predictor of self-confidence on the day of competition, accounting for 39% of the explained variance at the within 30 minutes stage of testing and 26% at the 2 hours before competition stage.

### Table 3.11: Stepwise Multiple Regression Summary: Significant Predictors of Self-Confidence

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Confidence 1 Week</td>
<td>Perc Read</td>
<td>0.39</td>
</tr>
<tr>
<td>Self-Confidence 2 Days</td>
<td>Think Win</td>
<td>0.21</td>
</tr>
<tr>
<td>Self-Confidence 1 Day</td>
<td>Rate Opp</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>Indiv Import</td>
<td>0.40</td>
</tr>
<tr>
<td>Self-Confidence 2 Hours</td>
<td>Think Win</td>
<td>0.29</td>
</tr>
<tr>
<td>Self-Confidence &lt;30 Mins</td>
<td>Think Win</td>
<td>0.39</td>
</tr>
<tr>
<td></td>
<td>Indiv Import</td>
<td>0.32</td>
</tr>
</tbody>
</table>

### DISCUSSION

This study represented a replication and extension of Jones and Cale's (1989a) examination of gender differences in the pre-competition temporal patterning of cognitive anxiety, somatic anxiety and self-confidence. It also examined situational factors that might be associated with any gender differences. The results for cognitive anxiety were very similar to those of the original study and essentially supported the first hypothesis. For the male subjects, cognitive anxiety remained stable over the experimental period. Cognitive anxiety in the females, on the other hand, remained stable over the first three stages of testing and then significantly increased on the day of competition. This finding differs slightly from Jones and Cale, who reported a progressive increase in female cognitive anxiety throughout the pre-competition period. Despite this small difference in the temporal patterning for the females in the two studies, the results offer further
support that differential temporal patterning of cognitive anxiety may exist between males and females. In view of the fact that a change in cognitive anxiety is predicted to occur if performance expectancies change during this period, it is interesting to note that the situational item related to this factor, 'Think Win', decreased in females as the competition approached, thus revealing a reduction in performance expectations. Although no explanation can be forwarded as to why this may have been the case, the fact that 'Think Win' decreased in females perhaps provides an explanation for the elevations in female cognitive anxiety.

The findings for somatic anxiety did not endorse the differential patterning in Jones and Cale's (1989a) study, and thus failed to support the second hypothesis. In the study reported here, both genders followed the same patterning, with increases only in evidence on the day of competition. This finding does support, however, Martens et al.'s (1990) predictions concerning the temporal patterning for somatic anxiety. The marginally significant interaction that emerged for self-confidence in this study revealed similar, but not identical, findings to the original investigation and thus partially supported the third hypothesis. Females again reported progressive reductions in self-confidence from the 2 days before stage, but male self-confidence also decreased on the day of competition instead of remaining stable.

In summary, these results do not exactly replicate Jones and Cale's findings. Although the discrepancies in the findings of the two studies are somewhat difficult to explain, they do, nonetheless, offer further support that cognitive anxiety and self-confidence follow a differential pre-competition patterning in males and females. One possible explanation may be that the nature of Jones and Cale's sample included subjects from an individual sport (squash) and, due to practical considerations, the present study included only subjects from team sports. The notion that pre-competition temporal patterning of anxiety and self-confidence may vary as a function of type of sport warrants further investigation.

In addition to the differential pre-competition temporal patterning of cognitive anxiety and self-confidence, the results of the regression analyses showed that different factors predicted cognitive anxiety, somatic anxiety, and self-confidence in males and females. For the males, the items 'Think Win', 'Rating of the Opposition' and 'Match Importance' emerged as the significant predictors of cognitive anxiety. 'Think Win' was a predictor at both stages on the day of competition, and the other two items combined as predictors both 2 days and 1 day prior to competition. For somatic anxiety, on the other hand, 'Rating of the Opposition' emerged as a predictor on three occasions. Self-confidence in males was most frequently predicted by the item 'Think Win', which was again the sole predictor on the day of competition itself, as it had been for cognitive anxiety.

It must be pointed out, however, that the regression analyses revealed that 'Think Win' did not predict cognitive anxiety in the female subjects.
In the case of females, cognitive anxiety was predicted by 'Perceived Readiness' at every stage of testing and also by 'Individual Importance' at 1 day and 2 hours before the competition. However, no significant predictors were found for somatic anxiety at any stage. Female self-confidence, on the other hand, was significantly predicted by 'Perceived Readiness' and 'Individual Importance'. These two items combined as predictors at each of the last three stages of testing. In other words, the same antecedents emerged as predictors of both cognitive anxiety and self-confidence for the female subjects.

A possible explanation for the emergence of the 'Perceived Readiness' and 'Individual Importance' items as predictors for females and not for males in this particular study could be related to gender differences in sport orientation and reasons for participation. Gill (1988) suggested that females seem to focus more on personal goals and standards whereas males focus more on interpersonal comparison and winning. Hence, items which ask the athlete to evaluate the suitability of his or her physical and mental preparation and that ask how important it is personally for them to do well, because of their personal nature, would be more expected to relate to cognitive anxiety and self-confidence in females than in males. Gill's proposal is further supported by the emergence of the 'Think Win' item as the major predictor of cognitive anxiety and self-confidence in males. Such an item, because it focuses on interpersonal comparison and winning, would be more expected to relate to cognitive anxiety and self-confidence in males than in females.3.4

The findings for somatic anxiety are somewhat surprising, with 'Rating of the Opposition' predicting somatic anxiety in males at three of the five stages of testing. No other situational variable predicted somatic anxiety in males. Furthermore, no predictors of somatic anxiety emerged at any stage in the females. Multidimensional Anxiety Theory suggests that perception of opponent's ability should be related to cognitive anxiety rather than somatic anxiety as it represents an item that concerns expectations of success. However, simply thinking about the opposition when completing the questionnaire could provoke an increase in the somatic anxiety response because the athlete may mentally picture himself at the competition site. The athlete may, therefore, be subconsciously exposing himself to the environmental stimuli which are thought to elicit a somatic response.

These findings concerning the largely non-significant relationships between somatic anxiety and the antecedent items are not that surprising and can possibly be further explained by the nature of the items themselves. The majority of the six items were items that one would expect to

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3.4 In the discussion section of Chapter 2 it was suggested that personal goals are likely to be less anxiety-provoking than interpersonal goals and yet in this investigation females have reported higher levels of anxiety. However, this is not contradictory as the findings in this study merely indicate a relationship between certain situational factors and the anxiety components. It does not compare within groups or examine the types of goals that the athletes may have set.
relate to cognitive anxiety and/or self-confidence. Martens et al. (1990) indicated that somatic anxiety is a reflexive response to environmental stimuli associated with the onset of an evaluative event and is elicited by factors such as perception of playing conditions, crowds and game importance. Of the additional items administered in this study, therefore, 'Match Importance' and 'Individual Importance' were the only two that could be included as antecedents expected to predict somatic anxiety, and neither emerged as a significant predictor. However, this very point requires further comment. The fact that 'Individual' and 'Match Importance' items were 'expected' to relate to somatic anxiety (and not cognitive anxiety and self-confidence) was based on the view held by Martens et al. (1990) and Gould et al. (1984) that game importance is one of the environmental stimuli associated with conditioned somatic responses. Presumably, these authors made this assertion because 'game importance' does not directly relate to performance expectations. Surely, however, the importance of the match has a potential influence on cognitive anxiety because of the fear of failure element that is attached to it. This would also explain why the 'importance' items emerged as predictors for cognitive anxiety and self-confidence in this study.

The findings of this study may have important implications at an applied level for coaches and performers involved in team sports. In particular, they suggest that favourable perceptions of readiness correspond to lower levels of cognitive anxiety and higher self-confidence in females and that expectations of success have the same influence on males. Therefore, coaches can assist female athletes by structuring training programmes so that they come to perceive themselves as being physically and mentally ready. Similarly, male athletes would appear to benefit from the pre-competition preparations that stress the team's ability to win. Similarly, the differential temporal patterning that emerged for cognitive anxiety and self-confidence also has important implications. For example, the increase in female cognitive anxiety on the day of competition as well as their earlier reductions in self-confidence suggests that the implementation of mental preparation strategies during the pre-competition period may need to be structured to meet the specific needs of male and female athletes.

In summary, the findings from this study support the notion of differential temporal patterning of the multidimensional anxiety components in males and females. They also suggest that the antecedents of cognitive anxiety, somatic anxiety and self-confidence may differ between males and females. Clearly, in order to maximize the use of appropriate intervention techniques, further research needs to be carried out to establish whether different antecedents predict anxiety at different times in the crucial phase prior to competition.

Furthermore, the sparcity of research alluded to earlier in this chapter in reference to potential gender differences in anxiety and self-confidence antecedents can equally be applied to our understanding of other factors that may influence the predictors of competitive state anxiety. Chapter 2 argued that the literature would undoubtedly benefit from an examination of whether the antecedents differ depending on the nature of the sport concerned and proffered Martens et al.'s
(1990) classification of sports into objective versus subjective, individual versus team and contact versus non-contact as a suitable framework for such an investigation.

Further directions for future research can also be suggested. The studies reported by Gould et al. (1981, 1983b), and Fenz and his colleagues reported reductions in anxiety just prior to and actually during performance when the questions were asked retrospectively. Researchers who currently use the time-to-event paradigm and make state anxiety measurements as they actually occur may need to obtain assessments closer to the start of the event than 30 minutes before, as was the case in this investigation. Clearly, this poses procedural problems but substantial alterations to anxiety levels or the precise nature of that anxiety may be happening in those last 30 minutes prior to competing. However, do we know for sure that once an event starts, then somatic anxiety will dissipate? In view of the vastly ranging nature of different sports this appears a dangerously general assumption to make, especially when research from the test anxiety literature has suggested that manipulations in performance expectancies have resulted in elevations in emotionality (as well as worry). Evidently, there are some sports where, intuitively, we would expect performers to become completely immersed in the task and, therefore, no longer have the capacity to respond to the situational cues associated with the start of the event that may have elicited somatic anxiety in the first place. For example, sports that themselves are relatively short in duration or do not involve a great deal of decision-making such as some swimming and Track and Field events may fall into this category. However, there are numerous other sports that allow the performer to dwell on mistakes and provide the time to constantly reassess their performance expectations. Sports like golf, all racket sports and even team sports like basketball, provide natural breaks in play that may actually cause performers to re-focus on the circumstances of their performance and thus, possibly cause an increase in somatic anxiety. If researchers could identify that this was the case then this too would have major implications for the assistance that they could provide to sports performers. For example, the relaxation procedures that athletes often learn to use are designed to control their anxiety levels prior to competition. However, how skilled are these same athletes at initiating the relaxation response in the matter of seconds at their disposal to calm themselves down following a bad line call or a bad mistake. Clearly, this is common sense but perhaps researchers have over-emphasized the importance of gathering information a week in advance of a competition at the expense of exploring ways of assessing anxiety levels during competition. To a certain extent this has been due to the relative ease of data collection but determined efforts to overcome this methodological problem are bound to prove fruitful. It would possibly lead to more sports psychologists working with athletes in realistic 'on-the-spot' simulation training sessions where the athlete will respond to the situational stressors that effect him or her during the competition by implementing a brief relaxation strategy 'on-the-spot'. Naturally, this will only be possible once the athlete has gradually learnt the ability to relax in more conducive surroundings in the first place.
Similarly, researchers may also wish to consider whether the antecedents of anxiety and self-confidence differ as a function of skill level. Several studies have found differing levels of anxiety (e.g., Martens et al., 1990) and differential temporal patterning (e.g., Fenz, 1975; Mahoney & Avener, 1977) between highly skilled and less skilled performers. Whether the precursors of this anxiety vary according to the performer's age, experience or stage of learning is a further area for investigation.
CHAPTER 4

FREQUENCY AND DIRECTION DIMENSIONS OF THE COMPETITIVE STATE ANXIETY RESPONSE

This chapter reports two separate but sequential investigations which examine the potential existence of additional dimensions of the competitive state anxiety response. Whilst the CSAI-2 is proving to be influential within sport psychology and has led to an advancement of our knowledge of the competitive state anxiety response, it is important to recognise, like the majority of other state anxiety measures, that it is based on a somewhat limited dimension of anxiety (Jones, 1991). A number of sport psychologists (Burton, 1990; Jones, 1991; Parfitt et al., 1990) have suggested that researchers attempting to gain a greater understanding of competitive state anxiety can benefit from examination of dimensions other than just the intensity of the response (i.e. the amount or level of anxiety) which the CSAI-2 measures. These authors have argued for the need to also incorporate the anxiety dimensions of 'frequency' and 'direction' in making assessments of the response. 'Frequency' refers to how often the athlete experiences his or her anxiety whereas 'direction' represents the label the athlete puts on his or her anxiety in terms of whether it is facilitative or debilitative in relation to performance. This is important in view of the fact that the CSAI-2 items represent symptoms that are just purported to signify anxiety. In other words, valuable information can be gained from assessments other than those which simply indicate how much anxiety is being experienced.

The first study reported in this chapter details an investigation which examines the frequency of 'cognitive intrusions' about a forthcoming event, as well as responses to the CSAI-2, in a sample of 97 Track and Field athletes. The term 'intrusions' essentially refers to the extent to which one's mind is occupied with thoughts about the upcoming event and this concept is discussed in greater detail in the following section. The second study developed this investigation in two ways. Firstly, the 'frequency' of specific anxiety cognitions was measured (as opposed to competition-related cognitions) and, secondly, the further dimension of direction was incorporated. This was achieved by administering a modified CSAI-2 scale by including separate subscales for frequency and direction, to a sample of 49 Track and Field athletes.
STUDY 3.1: CHANGES IN COMPETITIVE STATE ANXIETY RESPONSES AND COGNITIVE INTRUSIONS AS A FUNCTION OF THE PROXIMITY OF COMPETITION

Jones (1991) has commented that the limited nature by which anxiety is currently measured is particularly evident when viewed in the context of its use in the time-to-event paradigm. As discussed in the previous chapter, Multidimensional Anxiety Theory predicts that cognitive anxiety and self-confidence should remain stable in the period leading up to a competition, providing that expectations of success do not change during that time, whereas somatic anxiety is predicted to elevate rapidly and close to the start of the event. The intuitive basis for the proposition that somatic anxiety increases just prior to competition appears to be established. Less well established, perhaps, is the proposal that cognitive anxiety remains constant during the period leading up to competition. The dissonance identified above may have its source in the assumptions underlying the measurement of cognitive anxiety. The items that comprise the cognitive anxiety subscale of the CSAI-2 include statements such as 'I am concerned about this competition', 'I am concerned about losing' and 'I'm concerned about performing poorly'. Predictions concerning the temporal patterning of cognitive anxiety imply that responses are likely to be the same on this subscale at, say, 1 week and 30 minutes prior to the start of the competition in question. The assumption here is that responses on the cognitive anxiety subscale represent the same intensity of the symptoms, but one factor not taken into account is the frequency of the symptoms. So the same score for cognitive anxiety on both occasions may represent the intensity of the cognitive anxiety response, but does it actually represent the same cognitive state on both occasions? (Jones, 1991). Almost certainly, cognitive 'states' will differ as the contest nears.

Jones (1991) and Parfitt et al. (1990) have introduced the notion of cognitive intrusions which may serve to increase our understanding of the temporal patterning of the CSAI-2 responses. To date, their introduction of this concept is purely speculative but it is a potentially insightful attempt to provide a greater understanding of the anxiety response in the context of the time-to-event paradigm. Jones argued that cognitions regarding the upcoming event, depending on the importance of the event, are likely to be less frequent one week before than within 30 minutes before. Consequently, even if cognitive anxiety scores are the same on both occasions, it is likely that the frequency of 'cognitive intrusions' is much greater at within 30 minutes than at one week. If cognitive intrusions are thought of in terms of the amount of time which cognitions about a specific event occupy an individual's thoughts then, intuitively, a cognitive state in which, say, 10% of the time is taken up by cognitive intrusions 1 week before is a very different state from that in which 95% is taken up by cognitive intrusions 30 minutes before. Related to this notion of 'cognitive intrusions', Jones (1991) has further
speculated that perhaps the increases in somatic anxiety that tend to occur on the day of competition may be a function of the athlete reaching a 'cognitive intrusion' threshold which is associated with arrival at the competition site. In other words, the athlete's percentage thinking time has increased to a certain point or threshold that results in or contributes to substantial increases in somatic anxiety.

As in the previous chapter, the purpose of this investigation, therefore, was to investigate the pre-competition temporal patterning of cognitive anxiety, somatic anxiety and self-confidence, paying particular attention to the intensity of anxiety symptoms but also the frequency of cognitive intrusions. The design used was based on Jones and Cale's (1989a) study in that the CSAI-2 was administered on five separate occasions during the period leading up to competition. An additional 'percentage thinking time' item was included at each of the five stages of testing. Furthermore, a number of in-depth interviews were conducted with a cross-section of the sample in order to examine in greater detail the nature of the athletes' cognitions. Gould and Krane (in press) have commented that the strength of the qualitative approach is the fact that it allows detailed assessments of athletes' emotions and cognitions and that anxiety-performance investigators would do well to utilize such an approach.

Based on previous research in the anxiety literature which has tended to show differential temporal patterning between males and females for the multidimensional anxiety components (Jones and Cale, 1989a), separate hypotheses were generated for males and females for the CSAI-2 components. The following hypotheses were examined:

1. Cognitive anxiety would increase in females, but would remain stable in males during the pre-competition period;
2. Somatic anxiety in females would increase earlier during the pre-competition period than in males;
3. Self-confidence in males would remain stable during the pre-competition period, but would decrease on the day of competition in females;
4. Based on information provided from a pilot study, 'Percentage Thinking Time' was hypothesized to exhibit a progressive increase during the pre-competition period, although due to the exploratory nature of this investigation, no predictions were offered in terms of differences between males and females.

4.1 The hypotheses generated for this investigation differ slightly from the findings reported in the previous study, because they were formulated based on the published work of Jones and Cale (1989a).

4.2 The pilot study that is referred to in the next section involved 14 Rugby Union players and was carried out in order to determine the appropriate wording of the 'Percentage Thinking Time' question. This study indicated marked elevations in 'Percentage Thinking Time' as the match approached. Although only 14 subjects were used in this pilot study, such was the extent of the increases that the fourth hypothesis was made.
METHOD

Subjects

The subjects examined in this study were drawn from athletes who competed for Loughborough Students Athletics Club in one of two prestigious athletics meetings during the 1989 season. The first meeting was a match between Loughborough University and West London Institute of Higher Education, and the second was a triangular event between Loughborough University, British Polytechnics and the Midland Counties AAA's. The sample comprised 37 female (mean age = 20.51 years; S.D. = 3.75) and 60 male (mean age = 21.85 years; S.D. = 3.4) athletes from a wide variety of both track and field events. Track athletes (N=73) were drawn from those runners competing in the: 100 metres (N=7); 400 metres (N=9); 110/400 metres hurdles (N=8); 800 metres (N=17); 1500 metres (N=16); 2000 metre steeplechase (N=4); and 3000 metres (N=12). Field event athletes (N=24) were drawn from those performers competing in the: long jump (N=7); high jump (N=5); pole vault (N=3); hammer (N=4); javelin (N=3); and discus (N=2).

Instrumentation

Competitive State Anxiety Inventory-2 (CSAI-2)

Pre-competition levels of anxiety were measured via the CSAI-2 as described in Chapter 2 and shown in Appendix I.

'Percentage Thinking Time' Item

A single item, "To what extent is the event occupying your mind at this stage?", was also included, and was completed immediately prior to implementation of the CSAI-2. This item was initially piloted on fourteen Rugby Union players in the week preceding an end of season match, as well as five Track and Field athletes in the week prior to an early season competition, in order to establish the most suitable instructions and the precise nature of the response scale. Following feedback from these performers the response scale ranged from 0-100% with gradations at every 5%. The instructions asked the subjects to rate what percentage of the time the event was occupying their mind at this stage and are shown in Appendix 3.

Procedure

Pre-Competition Questionnaire Administration

Following the procedure adopted in the investigation reported in Chapter 3, the CSAI-2 and the 'Percentage Thinking Time' item were administered to the subjects at five stages during
the pre-competition period: 1 week, 2 days, 1 day, 2 hours and finally within 30 minutes of the start of their event. Subjects were asked to respond in accordance with the standardised instructions as recommended by Martens et al. (1990) (see Appendix 1). All subjects were assured of the confidentiality of individual responses.

**Interview**

The primary purpose of the interviews was to examine the nature of the thoughts and feelings experienced by the athletes in the period leading up to competition, and in so doing, provide additional information to that gleaned from the questionnaire data. All the interviews were completed within three days of the event.

**Participants**

The participants were ten athletes (six males and four females) who were selected in order to represent a cross-section of the sample as a whole. For example, four middle-distance runners were chosen as they had accounted for a third of the total sample. The remaining six interviewees included two sprinters, two throwers, a high jumper and a hurdler. All ten athletes had competed for Loughborough University in one of the two meetings described earlier. Interestingly, two of these participants were full international competitors and the remaining eight were all elite student performers. (Brief biographies of all ten athletes are presented in Appendix 9a)

**Design of the Interview Schedule**

A standardized format was used for the interview schedule in which each participant was asked an identical sequence of questions. In accordance with Patton's (1980) detailed information and recommendations on the sequencing and phrasing of questions that promote rapport and recall and elicit open-ended responses when they are desired, the interview schedule was divided into five separate parts. **Part 1** was a brief introductory section, whilst Parts 2 and 3 asked athletes about their thoughts and feelings prior to competition. More precisely, **Part 2** asked the athletes about their more usual or *typical* thoughts and feelings at the stage in question, whereas **Part 3** posed similar questions but specific to the match in which they had just provided questionnaire data. The final two parts of the interview followed a similar pattern in that **Part 4** asked the athletes to talk about their *typical* anxiety experiences at the particular stages prior to competition, whilst **Part 5** requested them to specifically consider the anxiety that they had experienced during the period leading up to the recent West London Institute or British Polytechnics match. All 10 interviews were conducted within three days of the relevant competition. Details of each part of the interview schedule are provided below (see Appendix 10a for the complete schedule).
Part 1: (Introductory Comments): This part of the interview followed standard procedures for establishing rapport and orienting participants to the interview process. Use of the data, reasons for taping the session, confidentiality, and the issues to be pursued in the interview were discussed.

Part 2: This general part was included not only to establish the nature of the athlete's normal thoughts and feelings but also to examine whether the feelings experienced prior to the matches employed in this study were different in any way or relatively typical. The questions were designed to facilitate retrospection and participants were asked questions about how they generally felt before competition. It was emphasized that the interviewer was particularly interested in the nature of the thoughts and feelings the athlete experienced in the period leading up to competition. Participants were then asked to concentrate on their typical thoughts and feelings at the five stages prior to competition previously outlined. Firstly, they were asked to think about how they generally feel one week before competition and, if possible, to quantify the amount of time their mind is usually occupied by the event at this stage. This was followed by discussion of what form their thoughts would normally take at this stage. Also, at this stage athletes were asked to generally describe their physical state and level of self-confidence in relation to their event.

This line of questioning was then pursued by asking the athletes the same set of questions in the context of each of the remaining stages of testing. At the four remaining stages the additional question was also asked, "do these thoughts and feelings you normally experience at this time differ in any way from those you typically experience earlier, or are they more/less of the same?".

Part 3: In this part the athletes were asked to think back to the series of questions they answered in the period leading up to the meetings in question. This part was included in order to enable a comparison between the interview responses and the questionnaire responses to the 'Percentage Thinking Time' item, as well as an examination in greater detail of the precise content of that event-related thinking. The athletes were provided with the information about their 'Percentage Thinking Time' and questioned as to whether this was a normal profile. They were asked to think back to their thoughts on each of the five occasions and to discuss the nature of their thoughts at each of these stages and whether they altered in any way or whether they remained the same but occurred more frequently.

Part 4: In this part the athletes responded to questions about any thoughts and feelings of anxiety they generally tended to experience in the lead up to a competition. This part was included in order to distinguish between the comments made about thoughts and feelings and actual anxiety symptoms experienced. Again, the format was directed by addressing the same five stages of testing and athletes were asked if they generally experienced anxiety at any of the stages and if so what the symptoms were.
Part 5: Athletes were again asked to think back to the series of questions they answered prior to the meetings in question. They were provided with the information about responses to the CSAI-2 and questioned as to whether these were normal profiles for the three components. This section was included as it enabled a comparison against the general comments about anxiety but also because it allowed a comparison between the actual responses to the CSAI-2. The athletes were asked to think about their anxiety 'experiences' on each of the five occasions and to discuss the extent and nature of their anxiety at each of these stages.

RESULTS

Questionnaire Data

In order to examine whether the responses to the CSAI-2 and the 'Percentage Thinking Time' item had changed as a function of the proximity of competition and also to establish whether any differences had emerged between the males and females, the questionnaire data was analysed by means of two-way analyses of variance. Whilst this procedure proved a suitable technique for analysing the CSAI-2 data, it was found to be inappropriate for examining differences in responses to the 'Percentage Thinking Time' item. Therefore, in order to determine between which means significant differences existed, the non-parametric Kolmorogorov-Smirnov test was used to analyse the responses to this item. This was followed by use of the Page L trend test to determine if there was any patterning to the 'Percentage Thinking Time' responses. Examination of the questionnaire data was completed by performing a correlational analysis to assess the nature of the relationships between the dependent variables. The following sections describe these various analyses in detail.

Analyses of Variance

Cognitive anxiety, somatic anxiety, self-confidence and the 'Percentage Thinking Time' item scores were compared between the five conditions and between gender by means of two-way analyses of variance (gender by time-to-competition) with repeated measures on the second factor. Follow-up Scheffe tests were employed to determine between which means significant differences were evident. Scheffe tests were used in this investigation due to the unequal sizes of the male and female samples. Means and standard deviations are presented in Table 4.1.

The CSAI-2 norms provided by Martens et al. (1990), which have been generated from research that has administered the scale not later than an hour before competition, provide interesting comparisons with the 'within 30 minutes' values in this investigation. Specifically, cognitive anxiety in males is relatively low with only 38% of respondents in the norm group
for Track and Field reporting lower scores than the 18.4 reported by this sample. However, 69% of respondents in the norm group reported lower levels of cognitive anxiety than the value of 23.2 reported by females in this study. Similarly, female self-confidence in this investigation was lower than levels of self-confidence reported by the norm group. The levels of somatic anxiety that were experienced at the within 30 minute stage of this study, however, corresponded with the somatic anxiety levels of the norm group with 50% of respondents reporting less somatic anxiety than a score of 19. The differences in the responses for cognitive anxiety and self-confidence between the norms and the females in this study, may be explained by the fact that the population on which the Track and Field norms are based are predominantly male.

Table 4.1: Means and Standard Deviations for 'Percentage Thinking Time Item' and CSAI-2 Subscale Scores

<table>
<thead>
<tr>
<th></th>
<th>1 Week</th>
<th>2 Days</th>
<th>1 Day</th>
<th>2 Hours</th>
<th>&lt;30min</th>
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<td>'Percentage Thinking Time'</td>
<td></td>
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</tr>
<tr>
<td>Males Mean</td>
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<td>26.08</td>
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<td>Females</td>
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<td>Cognitive Anxiety</td>
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<td></td>
</tr>
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<td>Males</td>
<td>16.77</td>
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<td>17.23</td>
<td>17.33</td>
<td>18.43</td>
</tr>
<tr>
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</tr>
<tr>
<td>Females</td>
<td>17.57</td>
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<td>20.35</td>
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</tr>
<tr>
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<td>6.11</td>
<td>5.79</td>
<td>6.70</td>
</tr>
<tr>
<td>Somatic Anxiety</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
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<td>11.48</td>
<td>12.93</td>
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<tr>
<td></td>
<td>2.13</td>
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<td>3.28</td>
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<td>6.21</td>
</tr>
<tr>
<td>Females</td>
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<td>11.16</td>
<td>15.87</td>
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<tr>
<td></td>
<td>0.44</td>
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<td>2.10</td>
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<td>5.61</td>
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<tr>
<td>Self-Confidence</td>
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<tr>
<td>Males</td>
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<td>26.78</td>
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<td>3.57</td>
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88
Cognitive Anxiety

The gender by time-to-competition interaction for cognitive anxiety was significant (F(4,380)=27.23; p<.01) and is shown in Figure 4.1. Cognitive anxiety in males was constant from 1 week to 2 hours before but then increased at the final stage of testing. In the case of the females, however, the results suggest a progressive increase in cognitive anxiety as the competition approached. The results of the follow-up tests on the female sample are shown in Appendix 12 and revealed that cognitive anxiety increased at every stage of testing apart from between 2 days and 1 day, and 2 hours and 30 minutes. Furthermore, females were more cognitively anxious than males at every stage except at 1 week before. See Table 4.2 for analysis of variance summary.

Table 4.2: Analysis of Variance Summary Table for Cognitive Anxiety

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F-test</th>
<th>P value</th>
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<tr>
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<td>1165.99</td>
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<tr>
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<td>.001</td>
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<td>.001</td>
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<tr>
<td>B x subjects w. groups</td>
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<td>1437.42</td>
<td>2.39</td>
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</tbody>
</table>

Somatic Anxiety

There was no significant interaction between gender and time-to-competition for somatic anxiety (F(4,380)=1.10; p=0.36), nor was there a significant main effect of gender (F(1,95) =2.41, p=0.12). However, a time-to-competition main effect did emerge and is shown in Figure 4.2. The follow-up tests, as shown in Appendix 12, indicated that somatic anxiety for both males and females was higher at the within 30 minute stage and 2 hour periods than at any other time and also higher at the 30 minute stage than at 2 hours before. Thus, increases in somatic anxiety in both genders were only evident on the day of competition itself. See Table 4.3 for analysis of variance summary.

Table 4.3: Analysis of Variance Summary Table for Somatic Anxiety

<table>
<thead>
<tr>
<th>Source</th>
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<th>Mean Square</th>
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</table>
Figure 4.1: TEMPORAL PATTERNING OF COGNITIVE ANXIETY

Figure 4.2: TEMPORAL PATTERNING OF SOMATIC ANXIETY
Self-Confidence

The gender by time-to-competition interaction for self-confidence was significant (F(4, 380) = 16.02; p < .01) and is shown in Figure 4.3. Self-confidence in males remained stable over the first four stages of testing, but decreased at the within 30 minute stage. Specifically, self-confidence was lower at the final stage but there was no change between the 2 hours before and within 30 minutes stages. Females, on the other hand, reported a reduction in self-confidence throughout the pre-competition period apart from 1 week to 2 days and 2 days to 1 day. They also displayed significantly less self-confidence than males at all of the final three stages of testing. The results of the follow-up Scheffe tests are shown in Appendix 12. See Table 4.4 for analysis of variance summary.

Table 4.4: Analysis of Variance Summary Table for Self-Confidence

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F-test</th>
<th>P value</th>
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<td>2155.04</td>
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</tr>
</tbody>
</table>

'Percentage Thinking Time'

As mentioned earlier, although analyses of variance proved a suitable technique for analysing the CSAI-2 data, it was found to be inappropriate for examining differences in responses to the 'Percentage Thinking Time' item. It was discovered that the data from this item did not display the homogeneity of variance that is required for this procedure as significant F values for both males and females demonstrated that significant differences in the variance existed. This finding automatically violates the assumption of homogeneity of variance that is necessary in using analyses of variance. Therefore, the two-way ANOVA that was originally performed on this particular data reported an interaction between males and females and yet the follow-up Scheffe tests revealed that no real differences existed. Consequently, a Kolmogorov-Smirnov test was performed to confirm that significant differences did not exist between male and female percentage thinking time responses. As expected, the results revealed that no gender differences emerged at any of the five stages of testing.

It was then decided to examine whether a significant trend or patterning to these results had emerged. Therefore, a Page L trend test was conducted. This test is appropriate when the researcher is looking at trends between a number of 'conditions'; that is to say, when in the light of previous experience, he/she can predict the ordering of the results under various experimental treatments. It was, therefore, hypothesized from the pilot work that a
Figure 4.3: TEMPORAL PATTERNING OF SELF-CONFIDENCE

SELF-CONFIDENCE

1 WEEK 2 DAYS 1 DAY 2 HOURS 30 MINS

TIME-TO-COMPETITION

Males
Females
progressively increasing trend would emerge. This hypothesis was supported in both males and females (Males $L=3288.5; p<.01$; Females $L=2022.5; p<.01$), with both groups demonstrating elevations in the amount of time that their mind was occupied by the event throughout the pre-competition period. The mean 'Percentage Thinking Time' values that the athletes reported increased from 6% a week before, to 16% 2 days before, to 27% 1 day before, to 57% 2 hours before and, finally, to 84% at the within 30 minute stage. The temporal patterning for both males and females is shown in Figure 4.4.

**Correlations**

In order to examine the associations between the variables in this study, correlations were calculated to determine the nature of the interrelationships between each of the CSAI-2 components and the 'Percentage Thinking Time' item at each of the five stages of testing and these findings are reported in Table 4.5. In view of the differential temporal patterning that emerged between males and females for cognitive anxiety and self-confidence, it was decided to perform separate gender-based analyses. Based on the findings of Swain, Jones and Cale (1990) that suggested that the magnitude of some of the interrelationships may change during the pre-competition period, it was decided to examine if significant differences had emerged in the nature of the interrelationships as a function of the proximity of competition. To evaluate whether differences were significant between the interrelationships at the various times of testing, statistical procedures recommended by Garrett (1966) were employed. The findings for the relationship between cognitive and somatic anxiety tended to indicate a progressive increase in the magnitude of the relationship for both males and females. In the case of the males, the relationship was significantly stronger at the 2 hours before and the within 30 minutes stages than it was a week before competition. The findings for the females revealed that the interrelationship was significantly stronger at 1 day, 2 hours and within 30 minutes prior to the start of the competition than at both the first two stages, although no differences existed between the final three stages of testing. The results also showed a similar patterning to the interrelationships between 'Percentage Thinking Time' and somatic anxiety, in that the magnitude of the correlations tended to increase as the event approached in both the male and female sample. Specifically, in the case of the males, the relationship was significantly stronger at the final stage than it was at both the 1 week before and 2 hours before stages. The findings for the females revealed significantly greater relationships at both stages on the day of competition than all the preceding stages.
Figure 4.4: TEMPORAL PATTERNING OF PERCENTAGE THINKING TIME
Table 4.5: Pearson Intercorrelations For Independent Variables Over Time

<table>
<thead>
<tr>
<th></th>
<th>Males 1 Wk</th>
<th>Males 2 Dys</th>
<th>Males 1 Dy</th>
<th>Males 2 Hr</th>
<th>Males 30m</th>
<th>Females 1 Wk</th>
<th>Females 2 Dys</th>
<th>Females 1 Dy</th>
<th>Females 2 Hr</th>
<th>Females 30m</th>
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</thead>
<tbody>
<tr>
<td>Cog/Som Anx</td>
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<td>.54</td>
<td>.60</td>
<td>.74a</td>
<td>.73b</td>
<td>.09a</td>
<td>.14b</td>
<td>.62ab</td>
<td>.65ab</td>
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<tr>
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<td>-.47</td>
<td>-.43</td>
<td>-.57</td>
<td>-.59</td>
<td>-.53</td>
</tr>
<tr>
<td>Som/Self-Conf</td>
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<td>-.57</td>
<td>-.54</td>
<td>-.53</td>
<td>-.49</td>
<td>-.32</td>
<td>-.45</td>
<td>-.59</td>
<td>-.56</td>
<td>-.57</td>
</tr>
<tr>
<td>%TT/Cog Anx</td>
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<td>.43</td>
<td>.47</td>
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<td>.29</td>
<td>.22</td>
<td>.26</td>
<td>.25</td>
<td>.18</td>
<td>.19</td>
</tr>
<tr>
<td>%TT/Som Anx</td>
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<td>.22b</td>
<td>.48</td>
<td>.46</td>
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<td>.55abc</td>
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<td>-.09</td>
<td>-.07</td>
<td>-.04</td>
</tr>
</tbody>
</table>

a; b; ab; abc p<.05

Interview Data

The material presented in this section is based on a qualitative analysis of the interviews with the ten selected athletes. Representative interview quotes are presented throughout this section to illustrate the basis upon which statements are formulated. Complete interview transcripts of three of these athletes are presented in Appendix 11a.

The athletes' statements generally demonstrated that a week before competition their thoughts about the forthcoming event were infrequent - "I'd say I think about a meet 10% of the time at this stage, in the sense that I think about it in a dull moment - but just momentarily" (Athlete 1), "I don't think much about competing that far ahead - so much can happen in between" (Athlete 3) and "When it's a whole week away, I think I only think about it at training or if someone I'm with happens to mention it" (Athlete 5). Although these comments come from Part 2 of the interview which concerned general thoughts and feelings prior to an important competition, they also reflected the type of specific responses made in relation to the athletics meetings used for the purpose of this study. For example, one athlete commented "I definitely wasn't thinking about Borough Road at that time. It crossed my mind very occasionally, but that was only if someone asked if I was running or something" (Athlete 8). Comments such as these serve to support the responses from the questionnaire data in this study. The mean value of the ten athletes interviewed showed that 4.5% of the time was spent with the mind being occupied by thoughts about the race, (as compared to 6.1% for the sample as a whole), with a range from 0% to 15%. All the athletes who were interviewed retrospectively reported a percentage thinking time very similar to their actual reported levels.

In terms of the experience of anxiety at this 1 week before stage, none of the athletes reported experiencing much anxiety concerning the event: "As far as anxiety or nerves are concerned I'm never worried a week before unless I'm carrying an injury" (Athlete 1) and "A
week before I'm experiencing no nerves at all in that physically I'm very calm. I'm not specifically thinking about the event either" (Athlete 3). This was a general comment across the interviewees, although in the case of major championships some athletes said they tended to have occasional worries about their readiness at this stage but even in these cases the worry was relatively fleeting: "Very occasionally, I might just worry about being sharp enough. You never know what might happen. I might wake up with a cold or something out of my control and so I sometimes hope to myself that that doesn't happen because that could blow a lot of hard work. But to be honest, in a few seconds that thought has gone" (Athlete 6). The more specific questions about anxiety experienced in the West London and British Polytechnic matches served to support these general comments, although the two athletes interviewed who were senior internationals reported that the West London match in which they competed was, naturally, not as anxiety-provoking as their international appearances. The remainder of the interviewees acknowledged that the meetings used in this investigation elicited relatively typical responses and thought patterns. Comments relating to a week before were similar in nature to the general remarks: "I remember being a bit concerned - a bit worried about beating the other Loughborough lads. But I certainly didn't sit and fret about it" (Athlete 4), and "I wasn't the slightest bit nervous before, well certainly not until the morning before anyway" (Athlete 8). These comments tended to support the CSAI-2 somatic anxiety responses for the group as a whole (mean = 10.4; i.e. very low), but not the cognitive anxiety scale (mean = 17.1; moderate). Possible reasons for this latter finding are discussed later.

2 days and 1 day before competing the athletes reported that the event tended to feature progressively more in their thoughts. These were both general comments and specific to the two meetings in question. In so doing, they endorsed the findings from the questionnaire data in that the mean percentage thinking time of the interviewees increased to 14% of the time 2 days before to 24% of the time a day before. (This compares with group values of 16% and 27% at the same two stages). For example, one athlete's competition-related cognitions changed from "I'm not specifically thinking about the event now (1 week before)" to "I'm certainly thinking about it more at this stage. There's just a kind of gradual building towards it (2 days before)" to "At this stage (1 day before) I'm thinking about it a lot. There's been a sudden shift because there's no going back" (Athlete 2). This 'profile' was largely representative of the interviewees as a whole.

The reporting of symptoms of anxiety 2 days and 1 day before tended to suggest slight elevations in cognitive anxiety. From a general point of view, comments from one particular athlete, for instance, typify the general responses that emerged: "At this stage (2 days before), I'm not really worried about the race unless I'm feeling under the weather, or if my last session went badly. If I felt tired doing that session then that wouldn't be good. But with 2 days to go you can always get plenty of rest so it wouldn't worry me that much" to "If I'm still feeling tired the day before then I'll maybe worry a bit more. In the evening before I sometimes have
negative images about running badly, about getting beaten by someone who is supposed to be slower than me" (Athlete 3). Another athlete remarked "Two days before I'm a little bit more concerned because that's it. There's no more time to get in shape or whatever" (Athlete 6). These extracts also allude to the apparent importance that recent training sessions appear to have in the athlete's perception of their readiness and the subsequent effect they have on expectations of success. Evidence such as this supports the finding from the investigation reported in Chapter 2 with a sample of middle-distance runners where a perceived readiness factor was a predictor of both cognitive anxiety and self-confidence. Comparing these comments to those made about the more specific instance of the competitions in this study, it is clear that some athletes did experience some worry prior to competing at this stage, whilst others did not. Some athletes were concerned that they 'weren't going well enough' or blamed pressures of examination revision as a stressor because of lack of preparation, whereas other athletes reported no increases in anxiety whatsoever from the one week before stage. Both specifically and generally, athletes reported no significant elevations in somatic anxiety until the day of competition and this is supported by the questionnaire data where the response remained stable over the first three stages of testing.

Two hours before competing, the interviewees reported that there was a considerable change in their percentage thinking time both generally and in the context of the specific event for which they had provided empirical data. This supported the mean increase in percentage thinking time to 60% that was revealed from the questionnaire data by the interviewees and also reflects the increase to 57% by the group as a whole. Athletes commented that their mind was usually occupied at this stage with thoughts about tactics, things that they must or must not do, mention of key words to say to themselves such as 'tempo' or 'rhythm', looking at other competitors, the need to concentrate and to get themselves in the 'right frame of mind', what targets they had in mind, and so on, but on a fairly relaxed level. "I'm just clueing in at this stage - but in a relaxed sort of way. I'm not totally switched in yet but going through things while trying to stay loose" (Athlete 5). The responses to the questions concerning anxiety revealed that the athletes considered they did become more cognitively anxious at this stage in that the occurrence of occasional negative thoughts would enter their mind. "I do wonder now and again. A few 'what if' thoughts...what if I lose my rhythm or I can't concentrate" (Athlete 2). "Now, (2 hours before) I'm not thinking about me at all - just about the other runners, I'm wondering what form they're in and if they look good then that worries me. I experience a lot of physical nerves now. Sometimes I say to myself "Why do I do it ?" (Athlete 2). These findings tend not to be supported by the questionnaire data for the male subjects which revealed that the response essentially remained stable.

Athletes again commented at this 2 hours before stage that the meeting elicited anxiety that was fairly typical of their normal responses. As far as somatic anxiety was concerned, evidence was provided, both generally and specifically, to support the empirical data for the
response. Marked elevations in 'butterflies', trips to the toilet, increased respiration and heart rate were reported and the data for somatic anxiety endorses this by revealing significant increases on the day of competition for both males and females: "I definitely got butterflies - I always do. that's fairly normal. I don't know why. It's just one of those things. I got a dry, sticky throat as well and I can remember finding it hard to swallow. Sunday was worse because it was so humid but I do normally feel the need to drink" (Athlete 1).

At the final stage, within 30 minutes of the event, the athletes acknowledged, with the exception of one, a further increase in the extent to which their mind was occupied in that the thoughts were much the same as at 2 hours before, but were now much more intense: "Now is when I'm really focused in. I'm thinking things like 'smooth, smooth, lift; smooth, smooth, lift to myself'" (Athlete 5). Again, the two meetings involved in this study appear to have elicited typical responses: "Yes, my routine was bang on, I always use that last half-hour to really get my concentration right. Sometimes I get distracted but not often. My concentration was good on Wednesday" (Athlete 6). The findings from the empirical data revealed that the minds of the ten interviewees were occupied 88% of the time with thoughts of the upcoming event as compared to a group mean of 84% of the time.

Both cognitive and somatic anxiety levels were reported to have further increased at this stage. The somatic responses at these matches conformed with typical responses and the feelings appeared to become more continuous but not necessarily more intense: "Whereas before, in the afternoon. I am nervous, but it comes and goes in spurts. Now, it's not really any different but it happens more often. No pauses, it's with you all the time to the line" (Athlete 3). As far as cognitive anxiety is concerned, some athletes displayed considerable activity: "This is the worst part (30 minutes before). You just want to get on with it. I'm trying to hide my nerves but I can't bear to be near other people" (Athlete 2) and "I usually manage to convince myself that something is not quite right! At Borough Road I told myself that revising all morning left me drained because it happened to me once before" (Athlete 9). Comments such as these and the general consensus from both the males and females was that cognitive anxiety does tend to increase at this latter stage. The empirical data from this investigation supported an elevation at the final stage in both males and females but, interestingly, in the context of the predictions from Multidimensional Anxiety Theory, subjects felt that cognitive anxiety at this final stage was substantially greater than any experienced a week before. Some revealing comments from an international athlete summarise this feeling well. This particular 1500 metre runner reported a stable temporal patterning for his cognitive anxiety: "You can't start to compare the state or mood you're in - or not for me anyway. A week before everything is still fairly distant. Yeah, of course, I want to do well. Of course, I don't want to let myself down - but that's a general thing, the way I am. I'm always keen to do well. You could ask me about the AAA's in July and I'd say I was concerned - but that's not the same as the sort of
concern I get on the start line or warming-up. That's a totally different feeling. It's with me all the time. There's no getting away from it" (Athlete 3).

As reported earlier, the empirical findings for self-confidence did not conform to the predicted patterning but the interviews served to support these results and provide potential explanations as to why this was the case. The extracts also suggest reasons as to why relatively few studies have found support for theory predictions in that a number of athletes reported generally feeling slightly less self-confident just prior to competing. The following extracts are drawn from an athlete (Athlete 6) who competed in the British Polytechnics match and whose CSAI-2 data revealed a reduction in self-confidence at the final stage of testing. This temporal patterning conformed with the data from the male group as a whole. Her comments changed from: "A week before I'm pretty cool. Feeling pretty good. I think it's easy to be fairly confident at that point because you're not really under pressure" to "(Two days before) My confidence was still pretty good. I think the only reason it might ever change over that time was if I had a lousy training session - where I felt like crap - but in this case my training went o.k. So my confidence was the same" and "the thing is with my confidence on the day, and this happens to me a lot, is that it's suddenly crunch time and its very easy to be confident sitting at home or chatting to someone - but then at the end of the day you've got to get out and do it - and I think, 'oh, maybe not'". On the day of competition she specifically commented that: "The reason why my confidence went down a bit, I know it did, was because of who was there. At the start of the week, I thought 'oh British Polys, they'll be no good' - but then I started warming-up and I suddenly realised they had some good runners, so all of a sudden, whereas I thought 'yeah, I'm in with a shout here', I knew I might struggle". Another athlete commented (from a general perspective) on why her self-confidence tended to decrease when at the track: "On the day you're confronted with everything. People everywhere. There's usually a crowd and instead of thinking about the race in a relaxed atmosphere at home, it's very different to the hostile surroundings you get. People are pretending to be nice to each other and I don't like that. It makes me suspicious! It's far more difficult to get rid of any doubts about yourself at the track than it is if you're away from it all" (Athlete 2). Another athlete reported a specific reduction in self-confidence due to a poor training session on the previous Saturday morning (four days prior to competing): "George put me through a time trial and it went badly. I just ran out of steam. I felt o.k. warming up - not tired or anything. I just tied up when I shouldn't have. Now that got me down and dented my hopes" (Athlete 9).

Material such as this appears to provide corroborating evidence for the questionnaire data in that the 'Percentage Thinking Time' patterning was endorsed both generally and specifically by a sample that was representative of the group as a whole, both in terms of their events and their questionnaire responses. The interview findings for the CSAI-2 components supported the questionnaire data for somatic anxiety patterning in that anxiety appeared not to be elicited at the first three stages but increased at both stages on the day. The interviews also
tended to support the predicted temporal patterning for female cognitive anxiety, but not the patterning of the male response. Male interviewees, although tending to report stable cognitive anxiety, which virtually conformed to theoretical predictions, remarked that, in reality, elevations in their 'worry' did occur in the meetings included in this study, and did so generally as well. The findings for self-confidence also provide evidence that the interviews endorsed the questionnaire data by revealing that the subjects had experienced reductions in their self-confidence. Clearly, the information generated from use of this methodology supports the belief that interviews allow detailed assessments of athletes' emotions and cognitions.

DISCUSSION

The purpose of this investigation was to examine the frequency of cognitive intrusions in conjunction with the pre-competition temporal patterning of cognitive anxiety, somatic anxiety and self-confidence in males and females. Of particular significance was the inclusion of the frequency variable as a means of examining the theoretical predictions concerning the temporal patterning of these CSAI-2 components from a slightly different perspective. Multidimensional Anxiety Theory predicts that cognitive anxiety becomes elevated some time before competition and remains elevated up to and during the event itself. Somatic anxiety, on the other hand, tends to increase rapidly and close to the start of the event. Self-confidence follows a similar patterning to that of cognitive anxiety in that it is presumed not to change during the pre-competition period. The hypotheses for this study for the male subjects reflected these theoretical predictions whereas differential temporal patterning was hypothesized for the females based on the work of Jones and Cale (1989a).

The results of the analyses of the questionnaire data showed that cognitive anxiety in males remained stable from 1 week to 2 hours before and only increased at the within 30 minute stage. Cognitive anxiety in females, on the other hand, tended to increase progressively throughout the pre-competition period. This provided general support for the first hypothesis, therefore, but not exactly, due to the increase in males at the final stage of testing. Support was not found for the second hypothesis as somatic anxiety in males and females followed the same patterning by increasing both rapidly and close to the start of the competition. Female somatic anxiety had been hypothesized to increase earlier than in males. However, these findings do conform to theoretical predictions and support the findings reported in the previous chapter. Self-confidence in males remained stable over the first four stages, but decreased at the final stage of testing whereas females reported a reduction in self-confidence throughout the pre-competition period. Consequently, support was not found for hypothesis three as male self-confidence did not remain stable and females reported earlier reductions in self-confidence than expected and continued to decrease. Clearly, therefore, neither male nor female self-confidence
conformed to theoretical predictions that the response should remain stable during this time. However, as mentioned in the previous chapter, the support for this prediction has been inconsistent and the interview extracts perhaps give an indication as to why this is the case. Athletes referred to the relative ease of being confident away from the event but as soon as they were actually confronted with their 'rivals' and the event as a whole, confidence sometimes decreased. However, the results did provide further evidence for differential temporal patterning between males and females for self-confidence. A further possible explanation for the findings for cognitive anxiety and self-confidence may be related to changes in performance expectancies. Theory predicts that the temporal patterning for both these components should remain stable unless such changes occur. However, the interview data revealed the significance of training sessions during the week as an indication of future performance. Track and Field athletics is a sport in which success and failure, certainly in performance terms, is dependent on the physical and mental state of the individual alone; therefore, the information conveyed from training sessions close to the event, can be crucial. Although this is a generalisation based on the responses of the interviewees in this study, a number of athletes indicated dissatisfaction with training sessions which led to a reduction in self-confidence in particular.

In an attempt to probe the appropriateness of the predictions generated from use of the time-to-event paradigm, this study also asked athletes about their thoughts as the competition approached. The temporal patterning of the 'Percentage Thinking Time' item revealed stark differences in the amount of time that individuals were thinking about the event in the period leading up to competition. Both genders reported a progressive increase in the amount of time that the event occupied their mind, increasing from 6% of the time 1 week before, 57% 2 hours before and 84% at the within 30 minute stage. These findings support the progressive increase predicted in the fourth hypothesis. Findings such as these suggest that dimensions potentially relevant to our understanding of the concept of anxiety are not being measured by the CSAI-2. The CSAI-2 assesses the intensity of the anxiety response but this may not provide a complete picture of the extent to which anxiety is elicited. The 'frequency' of the response may well be a dimension that contributes to the overall concept of what is currently termed 'anxiety'. In this study cognitive anxiety in the males did not change from 1 week to 2 hours before, yet competition-related cognitions increased from 6% of the time to 60% of the time. It is important to point out at this stage that an increase in cognition about an event does not mean that the individual is necessarily more anxious, especially if these cognitions are task-related. However, a cognitive state in which 6% of the time is occupied by thoughts about a specific competition (i.e. 1 week before) is likely to be different from one in which 60% of the time is devoted to such thoughts.

The information gained from the interviews support the data obtained via the 'Percentage Thinking Time' item. Subjects reported that the frequency of cognitive intrusions increased as the competition neared. As alluded to earlier, a number of these intrusions may
have been facilitative in that they were appropriately task-focused and, therefore, in this context 'intrusions' may be an inappropriate term to use due to its negative connotations. Perhaps a more accurate term would be cognitive 'activity'? However, some of these intrusions do appear to be negative and specifically anxiety-related. The interviews appear to suggest that worry, apprehension and other traditional conceptualizations of cognitive anxiety do not in fact remain constant in males, which is contrary to what the CSAI-2 data tends to indicate. All ten athletes, without exception, reported greater levels of anxiety, both cognitive and somatic, on the day of competition than at other stages in the pre-competition period. Most of the athletes acknowledged that some thoughts existed regarding the event as early as a week before, and certainly 2 days before, and occasionally these thoughts were anxiety-provoking in nature. However, these thoughts occurred so infrequently as to not make any impact in the pre-event preparation of the athlete. Outside normal training routines (i.e. thoughts about the event naturally tended to surface at training, as sessions were tailored towards the upcoming event), all the athletes reported little intrusion of the event at the first two stages of testing. In comparison there appeared an escalation in reports of anxiety a day before and then particularly at both stages on the day of competition.

The question remains then why do the scores for cognitive anxiety appear relatively constant, especially in males, during the pre-competition period? One possible explanation may be that when asked about a forthcoming event, athletes will often respond in a similar fashion regardless of how impending the event may be, because cognition about that event is being forced upon them by the mere fact that someone is inquiring about it. As has already been identified, the items that comprise the cognitive anxiety subscale of the CSAI-2 measure the intensity of the symptoms but not the frequency. Hence, the same score on two separate occasions in the pre-competition period may represent the same intensity of the cognitive anxiety response but not the same cognitive anxiety state because the frequency of that intensity is so different. Another question which needs to be addressed and one which is clearly related is the case of the specific example of cognitive anxiety 1 week before where a mean value for males and females of 17 was reported, and yet the interviews suggested that little or no cognitive anxiety was being experienced at this stage. There is an implication that some of the items may not accurately reflect anxiety in the sense in which it is meant; that is, as a negative, dysfunctional state. For example, it appears that 'strong' responses to the item, 'I am concerned about this competition', do not necessarily mean that the athlete is anxious in a debilitating manner. For many of the athletes, scores of '3' (moderately so') or '4' (very much so'), in response to this item merely reflect the perceived importance to do well and the need for the athlete to 'get his act together' and prepare well for this particular competition. In this sense 'concern' about the competition is seen as as positive and facilitative to the upcoming performance. This issue is discussed at length in the second part of this chapter and also Chapter 5.
The correlational analyses revealed the possibility of an interesting relationship between 'Percentage Thinking Time' and somatic anxiety and provides some initial evidence in support of Jones' (1991) notion of a cognitive intrusion threshold. The findings identified weak relationships at the initial stages of testing and then significantly stronger relationships as the event approached. Whilst the correlational design does not permit any assertion that an increase in 'Percentage Thinking Time' up to a certain point or 'threshold' will cause an increase in somatic anxiety, the relationship that has emerged between these two variables allows a tentative suggestion in that direction. This speculation is certainly more plausible than increases in somatic anxiety causing an increase in 'Percentage Thinking Time' especially when one considers that the 'Percentage Thinking Time' displayed a progressive increase in temporal patterning throughout the pre-competition period. In other words, it had started to increase before any elevations in somatic anxiety took place.

This leads to a discussion of the connection between cognitive anxiety and somatic anxiety as the correlation findings in this study suggest a similar alteration in the magnitude of this relationship as the event approaches; that is, cognitive and somatic anxiety exhibited greater covariance as the competition neared. Morris et al. (1981a) suggested that the two anxiety components may co-vary in stressful situations because these situations contain elements related to the arousal of each. Borkovec (1976) supported this notion of covariance at times of high stress but believed that a more appropriate explanation may be that each component of anxiety may serve a conditional function for the other component. For example, if a particular stimulus elicits a strong somatic response, this response may be a sign to the individual that there is reason to worry. In the sporting context, athletes often acquire conditioned somatic responses during the pre-competition phase due to stimuli such as warm-up routines, pre-game preparation and crowds in the stands. Conditioned somatic responses may then be instrumental in causing the athlete to start worrying because s/he is feeling certain somatic symptoms of anxiety. Alternatively, cognitions in the form of negative self-talk and images of failure may cause elicitation of somatic responses. It should be emphasized, however, that somatic anxiety as measured by the CSAI-2 represents perception of the physical response rather than an objective indicator. The discussion earlier concerning Jones' (1991) concept of cognitive intrusions can perhaps be linked with both arguments. Firstly, the 'conditioned' somatic response may occur because the threshold that he referred to has been reached. Conversely, as 'Percentage Thinking Time' increases, it may increase the likelihood of negative self-talk and images of failure which in turn elicits somatic anxiety.

A number of other studies have provided evidence to support this notion of covariance at times of high stress. Karteroliotis and Gill (1987), in a study examining the relationship between the CSAI-2 subcomponents and physiological measures via a laboratory-based task reported correlation coefficients of 0.41, 0.59 and 0.03 in the pre-test, mid-test and post-test conditions respectively. Gould et al. (1984, study 2) conducted an investigation using the time-
to-event paradigm and found the weakest cognitive/somatic anxiety relationship was 1 week before competition. Swain et al. (1990) reported that the relationship between the CSAI-2 components changed as the time of competition approached. In compliance with the notion that the components of state anxiety are related to each other in highly competitive situations, Swain et al. found that the interrelationships between the subcomponents became stronger as the time to compete neared. Following an analysis conducted from two separate studies that had also employed the time-to-event paradigm the intercorrelations between cognitive anxiety and somatic anxiety were found to have increased from 0.28 a week before competition to 0.57 within 30 minutes of the competition. These findings suggest, therefore, that the relationship between cognitive anxiety and somatic anxiety may change as the competition nears (i.e. increases in cognitive anxiety may be associated with increases in somatic anxiety, or vice versa, as the event nears). The findings from these correlation-based studies, which have essentially examined individual differences, are, therefore, not reflected in findings based on group means which demonstrate a dissociation (i.e. differential temporal patterning) between the two immediately before competition. The correlational findings from the investigation reported in this chapter provide even stronger support for this, as r values in excess of 0.7 were found for both males and females at the final stage of testing.

These findings are interesting in the context of the presumed 'independence' of these two anxiety components. Since the CSAI-2 was derived on the basis of principal components analysis with varimax rotation that yielded orthogonal factors, it is sometimes mistakenly assumed that the cognitive and somatic anxiety subscale scores are, therefore, statistically independent. On the contrary, subscale scores derived from unweighted item scores (i.e. summing the scores for the items on each subscale) are highly correlated with one another as is the case with the CSAI-2 (Smith, 1989). Indeed, Martens et al. (1990) performed a meta-analysis for 15 studies which have employed the CSAI-2 and the mean correlation for cognitive and somatic anxiety was 0.63, indicating considerable common variance in pre-competitive situations. However, this is not arguing against the need for separate measurement of these two components which has been forwarded throughout this thesis because it seems clear that they differentially affect certain factors that sport psychologists are interested in. As previously mentioned, sport psychologists have repeated evidence to endorse the distinction between cognitive and somatic anxiety in studies which show them to have different antecedents, different temporal characteristics and performance consequences and also indicate they sometimes respond differentially to interventions. Clearly, therefore, the greater specificity of this scale has advanced our understanding of anxiety. Nonetheless, it is important for researchers to be aware of the fact that the subscales are substantially intercorrelated and that this raises some challenging methodological issues. These issues are discussed in greater detail in Chapter 6.
This evidence of increasing covariance as time-to-competition approaches is an interesting one within the context of the recent debate regarding the independence of cognition and emotion. The ongoing controversy regarding the primacy of cognition versus affect in human experience (Lazarus, 1982, 1984; Zajonc, 1980, 1984) stems from the basic argument of whether cognition or affect somehow dominates or 'comes first' as a prime mover. Lazarus has emphasized the pervasiveness of cognitive appraisal in emotional experience, while Zajonc has defended emotional responding as more basic. Lazarus (1982) argued that anxiety is particularly prone to primacy of cognition because it "always involves symbolic threats, is anticipatory, and occurs under conditions of ambiguity" (p.1023). Whilst a great deal of their debate revolves around an issue of semantics, Lazarus categorically rejects the likelihood of independence of affect from cognition, let alone the possibility of an affective primacy, whereas Zajonc firmly believed that affect could be generated in the absence of prior cognition. However, as Neiss (1988) has argued, neither cognition nor affect really causes the other. Emotional experiences include cognitive components such as appraisal (Frijda, 1985), but the fact that appraisal can affect subsequent emotion is not a reason to assign primacy to cognition because emotion affects cognition as well (Sperry, 1982). The temporal patterning findings from this study suggest that whilst there is evidence of sufficient independence to warrant the separate measurement of cognitive and somatic anxiety, their interaction and potential interdependence is something not to be ignored.

In summary, the evidence provided from both the questionnaire and interview data from this investigation provide initial justification for questioning the assumptions concerning the CSAI-2 components that have been generated from use of the time-to-event paradigm. The possibility appears to have emerged of a further dimension of anxiety (i.e. frequency) that may assist our understanding of this complex concept. A truer reflection, for example, of what actually occurs in the crucial period leading up to competition may be the result of the interaction between frequency and intensity. However, it is important to reiterate that an increase in cognitions, in terms of the extent to which the mind is occupied by thoughts about the event, does not necessarily mean that the individual has become more anxious, although evidence from the interviews has suggested the frequency of the anxiety-related cognitions may increase during this period as well. Athletes did comment on experiencing anxiety a week before competing, but this experience was extremely sporadic when compared to how persistent it became closer to the event. It appears that future investigations need to examine the contribution of this potential dimension of anxiety frequency. The additional detailed information that was gained as a result of these interviews supports the view that a qualitative approach can contribute considerably to investigations of the anxiety-performance relationship as it permits in-depth assessments of athlete's emotions and cognitions (Gould and Krane, in press). Furthermore, evidence from the interviews indicated that some of the symptoms that the CSAI-2 seeks to measure, may not be perceived as negative in relation to the upcoming
competition. Comments from some of the interviewees draw attention to the benefits that can be gained from experiencing elevations of cognitive and somatic anxiety. This too serves to challenge the viability of the intensity-alone approach and provides a further area for investigation.
STUDY 3.2: INTENSITY, FREQUENCY AND DIRECTION DIMENSIONS OF COMPETITIVE STATE ANXIETY

The findings from the previous investigation (Study 3.1), raised concerns over the assumptions concerning cognitive anxiety that have been generated from previous research using the time-to-event paradigm. Theoretical predictions state that cognitive anxiety remains stable during the pre-competition period, and yet in Study 3.1, although the intensity of cognitive anxiety did not change between 1 week and 2 hours before competition, competition-related cognitions increased from 6% of the time to nearly 60% of the time. This suggests that although symptoms of cognitive anxiety may well be of the same level of intensity, thinking about the event occurs considerably less frequently at 1 week as compared to 2 hours before. As the discussion of the previous study emphasized, a cognitive state in which 6% of the time is occupied by thoughts about a specific competition is likely to be very different from one in which 60% of time is devoted to such thoughts. In the former case, thoughts about the event are likely to be only very fleeting and transitory, whereas in the latter case thoughts about the event are likely to be far more sustained. Multidimensional Anxiety Theory assumptions, therefore, may be rather limited because they fail to take this notion into account and thus, they restrict a greater understanding of the competitive state anxiety response prior to competition.

However, as was argued in discussing the findings of Study 3.1 the fact that the athletes' minds were increasingly occupied by thoughts about the event does not necessarily mean that they were becoming more anxious, and before the theoretical assumptions can be further criticised, this line of investigation may benefit from an examination of whether actual anxiety symptoms occupy the mind more frequently as well. It was decided, therefore, to consider the frequency of actual anxiety symptoms themselves and not just cognitions about the event. In addition to frequency, it has also been suggested that another dimension, how the athletes interpret these anxiety symptoms, should be considered. Jones and Hardy's (1990b) interviews with elite athletes suggested that a number of international performers did not necessarily view their anxiety as negative. Consequently, based on the speculations of Burton (1990), Parfitt et al., (1990) and Jones (1991) which are discussed shortly, it was felt that the perception of those symptoms warranted examination; therefore, the additional dimension of the 'direction' of the anxiety symptoms was also included. In this context, 'direction' refers to the nature of the anxiety-related cognitions; are they positively or negatively oriented? Two individuals experiencing the same levels of 'anxiety' may interpret their response in differing ways - one as anticipatory excitement and facilitating, the other as a sign of vulnerability and as debilitating. This is supported by recent findings that show cognitive anxiety does not necessarily debilitate performance and can actually facilitate it (e.g. Parfitt & Hardy, 1987), and the same for somatic anxiety (Jones and Cale, 1989b), which suggests that not all anxiety
symptoms may necessarily be perceived as negative. Clearly, the directional labelling that is attached to an 'anxiety' response is a variable worthy of consideration.

This second part of this chapter details, therefore, an investigation designed to extend the findings of the previous study and is presented in the following way. The first section will review the general psychology literature that has examined anxiety from a bidirectional perspective: that is, an approach that considers the positive and negative effects of anxiety; the second section will then detail the various studies in sport psychology that have alluded to or specifically examined this notion of 'positive' and 'negative' anxiety; and the remaining three sections will describe the methodology, results and discussion of the investigation, respectively.

A BIDIRECTIONAL CONCEPTUALIZATION OF ANXIETY

Neiss (1988) commented that the "recurrent conceptual problem (of examining anxiety) has been caused by the tendency of individuals to face important challenges, such as exams, in mixed states". (p.357). By 'mixed states', Neiss was referring to the different emotions that people experience in challenging situations, a number of which are not necessarily debilitating. However, investigators have commonly labelled the entire range of emotional responses to evaluation as anxiety and have not distinguished between facilitative and debilitative states. Thus, anxiety has been almost universally employed to describe what Sarbin (1968) and Sarason (1978) viewed as an extremely broad continuum of states, ranging from "virtual immobilisation in face of potential criticism to exhilaration at the prospect of receiving accolades" (Sarason, 1978; p.193). However, researchers are increasingly forwarding an operationalization of a bidirectional conception of anxiety where interpretations of physiological and cognitive reactivity to a stressful situation are viewed as crucial in determining the emotional response.

As has occurred in the past, much can be learned from developments in the test anxiety literature. Wine (1980) has proposed a bidirectional model of test anxiety which supports this notion of positive and negative dimensions and argues for even greater specificity of the state anxiety response. Wine's (1980) model is based on the observation that the cognitive structures and self-statements of low-test anxious individuals are not simply the opposite of that of the high-test anxious individuals, but rather differ qualitatively. For example, high test anxious individuals may be negatively self-preoccupied before an examination. This self-preoccupation may involve absorption in social evaluative cues which interfere with memory storage of task information as well as being associated with inaction and "behaviour constriction" (Wine, 1980; p.376). Conversely, it is highly unlikely that low test anxious persons will be positively self-preoccupied. Although low-test anxious individuals have a high generalised belief in their own self-efficacy, they are highly unlikely to be cognitively preoccupied with talking to
themselves about 'how wonderful they are'. Indeed, as Wine (1980) continues, the contents of consciousness of low-test anxious individuals probably reflect current concerns such as "What are the demands of this situation?" and "What can I do to meet these demands?". Thus, their self-statements will vary from situation to situation and will reflect their processing of cues that are perceived as relevant in each situation. In short, cognitions are likely to be situation-specific or problem-solving in nature.

Wine (1980) believed that low-test anxious persons are less likely than high-test anxious persons to interpret the situation as evaluative in nature but when they do, they are more likely to see the evaluation as positive than negative. In other words, the stressor, (i.e. the examination) only takes on meaning as a function of individual interpretation. When negative evaluation is clear-cut, it is interpreted as a challenge and an opportunity to exercise their problem-solving skills. In other words, even if a negative appraisal of the situation is made, certain individuals will not experience negative and debilitating anxiety as a result. This is clearly interesting in the context of this thesis because Wine argued that even anxiety that is the result of a negative subjective evaluation is not necessarily negative. That is, certain individuals may perform some form of cognitive restructuring to deal with the 'problem'. Equally, our knowledge of Multidimensional Anxiety Theory tells us that 'cognitive activity' is not the only expression of reactions to stress. When physiologically aroused, low-test anxious people are likely to interpret the arousal as energy, alertness, and being 'switched on', and will direct that energy to the situational demands, whereas high test anxious individuals will interpret arousal as distress. Geen's (1980) belief that the labelling of internal states predicts behaviour is consistent with the thinking of Wine. Geen proposes that there is an interaction between what he termed emotional arousal and cognitive arousal and this is depicted in Figure 4.5. He argued that high-test anxious people will label physiological arousal (or emotional arousal as he termed it), in terms of the worry (or cognitive arousal) also elicited by the test, with the result being anxiety that is negative and dysfunctional. However, Geen would also argue that a combination of high physiological arousal from a potentially threatening task, such as an examination, but a relative tendency to label cognitive arousal in terms other than worry, could produce a strong positive emotion such as curiosity or interest and, consequently, approach tendency. Therefore, Geen's proposals further endorse the opinion that subjects will react differently to high levels of arousal. Equally, individuals will function differently under conditions of low threat. Geen suggested that the high-test anxious will still experience high cognitive arousal but will attach to it a label of less anxiety. On the other hand, the low-test anxious subject who is given a test that is basically non-threatening will experience both low physiological arousal and cognitions unrelated to worry. This results in an emotional state of indifference and disinterest. Although Geen (1980) did not really discuss individual differences in anxiety preferences, his work is important to mention because it suggests that individuals will differ in their reactions to high threat situations.
Figure 4.5: Interaction Between Emotional and Cognitive Arousal as a Function of Test Anxiety

<table>
<thead>
<tr>
<th>Nature of the task</th>
<th>Test Anxiety</th>
<th>Emotional Arousal</th>
<th>Cognitive Arousal</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>High threat</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>&quot;Anxiety&quot; (High)</td>
</tr>
<tr>
<td>Low threat</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>&quot;Anxiety&quot; (Low)</td>
</tr>
<tr>
<td>High threat</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>&quot;Interest&quot;</td>
</tr>
<tr>
<td>Low threat</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>&quot;Indifference&quot;</td>
</tr>
</tbody>
</table>

In this context, Alpert and Haber's (1960) intriguing theoretical derivations regarding debilitative versus facilitative components of anxiety, described as the nature of the interpretations which the individual places on emotional reactivity, merits further attention. Alpert and Haber's (1960) Achievement Anxiety Test (AAT) was devised to indicate not only the presence or absence of test anxiety, but also whether the anxiety facilitates or debilitates test performance, or perhaps has no effect on it at all. They forwarded the proposal that an anxiety scale should measure the presence and intensity of both kinds of anxiety responses, those which facilitate performance and those which interfere with it. If an individual scored low on both of these scale components, he/she would be considered to be unaffected by anxiety-provoking cues. In other words, the facilitating effects of anxiety would then be measured independently and not inferred from the absence of negative responses. This independent measure allows for the possibility of the absence of both types of response as well as for the presence of either one. The AAT was constructed to provide two such independent measures of anxiety, a scale measuring the facilitating effects of anxiety on achievement performance (AAT+), and a separate scale measuring the debilitating effects of anxiety on achievement performance (AAT-) (Alpert and Haber, 1960). Inspection of the items on the facilitatory anxiety scale reveals that they deal predominantly with working well under pressure. The facilitating scale includes items such as 'Nervousness while taking a test helps me to do better' with a five point response scale ranging from 'it never helps' to 'it often helps', and 'I work most effectively under pressure when the task is very important', with responses ranging from 'always' to 'never'. Debilitating anxiety scale items include 'Nervousness while taking an examination or test hinders me from doing well' ranging 'always' to 'never', and 'In a course where I have been doing badly, my fear of a bad grade cuts down my efficiency' with
responses ranging from 'never' to 'always'. Alpert and Haber reported test-retest reliability of 0.83 and 0.87 for the two scales.

Theoretically, those researchers who have designed psychometric anxiety devices on the basis that anxiety is exclusively detrimental would predict that two such supposedly independent measures of anxiety would, in fact, be highly and negatively correlated; that is, if an individual had a great deal of facilitating 'anxiety', he would experience little anxiety at all and vice-versa. This is the assumption underlying the vast majority of anxiety scales because it allows researchers to use only the debilitating index and to infer facilitating 'anxiety' from the absence of debilitation (e.g. all the items of the TAS are unidirectional, that is, anxiety responses are either debilitating or not (e.g., 'While taking a course examination, to what extent do you worry? Worry a lot ....(to)... Worry not at all')). This assumption appears invalid. Evidence has shown that these two constructs of debilitating and facilitating anxiety form moderate relationships (Alpen and Haber, 1960; Feij, 1975; Couch, Garber and Turner, 1983). This supports the view that the subject does not experience positive or facilitating anxiety because of low responses to the normal debilitating anxiety scale or, equally, that high responses on a debilitating scale automatically mean that the athlete is experiencing anxiety that is detrimental. Therefore, an individual can possess a large amount of anxiety that is not debilitating.

Alpert and Haber (1960) reported that correlations between the two scales ranged between -0.34 and -0.48 for four different samples, with an average correlation of -0.37. Although this correlation is significant, it is not as high as other anxiety researchers would imply or require as an assumption for the use of their debilitating scale, and therefore provides evidence that it is wrong to assume that anxiety is negative. Furthermore, as Alpert and Haber pointed out, the important question is whether when predicting an academic performance score there is any advantage in using both AAT scales rather than using conventional scales such as the AAT- or the TAS. Multiple correlations using both the AAT+ and AAT- scales to predict grade point average were significantly better predictors than the AAT- scale alone or the TAS for three separate samples. Thus, the AAT appeared to justify itself by leading to a significantly stronger prediction of academic performance scores than conventional debilitating anxiety scales (Alpert and Haber, 1960). As Neiss (1988) commented, Alpert and Haber's contribution lies in the recognition that absence of debilitating anxiety does not imply an absence of affect.

Stronger support for the existence of facilitating and debilitating anxiety came from the factor analytic investigation of the AAT performed by Lin and McKeachie (1979). They found a debilitating anxiety factor and a facilitating anxiety factor and reported that the debilitating factor accounted for 14% of the variance in test performance and the facilitating factor explained an additional 10.8%. Indeed, the vast majority of work concerning this issue has seemingly been undertaken in the educational psychology domain and, virtually without exception, the psychometric device used in these investigations appears to have been the AAT.
Munz, Costello and Korabek (1975), Hudesman and Wiesner (1978), Gaeddert and Dolphin (1981), Couch et al. (1983) and Carrier, Higson, Klimoski and Peterson (1984) are all examples of studies that support the notion of facilitating anxiety and hence endorse the value of distinguishing between facilitating and debilitating anxiety in psychometric terms. Carrier et al. (1984), for instance, in a study involving American high school children reported that a high facilitative anxiety group were more efficient in their note-taking than a high debilitating anxiety group.

Herrmans (1967) developed a similar questionnaire in Dutch, the Prestatie Motivatie Test (PMT), with the following three subscales: achievement motivation; debilitating anxiety, and facilitating anxiety, with these latter two concepts being analogous to the negative (AAT-) and positive (AAT+) achievement anxiety concepts of Alpert and Haber (1960). Herrmans also reported a moderate correlation between his two scales (-0.42), which supports the view that a directional dimension warrants measurement. Feij (1975) used the PMT in his investigation of the relationship between various personality measures (such as Eysenck’s Personality Inventory (EPI) (Eysenck and Eysenck, 1968) and Cattell’s 16 Personality Factor Scale (1965) and debilitating and facilitating anxiety. He found a negative significant correlation between the two anxiety scales of similar proportions (-0.33) to that of Herrmans (1967). Feij reported that facilitating anxiety was related to the personality disposition of impulsiveness (as measured by the EPI and a factor related to the construct of extraversion) and adventurousness (16 PF 'H'), whereas debilitating anxiety was not, which suggests that a degree of independence exists between the two constructs. Feij also made the observation that ‘facilitating anxiety’ is not really anxiety, presumably because it does not have connotations of a dysfunctional state. In fact, he likened facilitating anxiety to the concept of optimal arousal level but, unfortunately, failed to elaborate on what is a provocative and potentially enlightened observation.

Surprisingly, little empirical research has pursued this issue within sport psychology. Moormann and Van der Knoop's (1987) study appears an exception, although the authors acknowledged that their investigation was restricted by the lack of a suitable psychometric device for the sporting context. They found the PMT to have low predictive value in the context of ice dancing performance. However, as they emphasized, this scale, as was the AAT, was constructed primarily for intellectual activities. Furthermore, both these scales and the studies that have utilized them, conceptualize anxiety from a global, undifferentiated perspective.

Eysenck (1984), working in the experimental psychology domain, has provided some proposals that may serve to explain why the notion of anxiety as negative has been challenged. He has suggested that this type of positive anxiety effect is a result of effort serving as a compensatory factor that increases the attentional resources allocated to the task. Eysenck (1984) suggested that as anxiety effectively reduces working memory capacity due to task-irrelevant cognitive activity or worry, it also impairs processing efficiency. However, Eysenck also argued that this reduction in effective capacity can be sometimes countered by an increase
in on-task effort. Consequently, performance may be maintained (or even enhanced) under conditions of high anxiety, but at the expense of utilising a greater proportion of the available resources. This implies that anxiety has the potential to exert a negative or positive effect upon performance via working memory capacity or effort, respectively. Thus, actual performance outcome depends upon the main demands of the task; that is, tasks with high memory demand will be negatively affected while tasks with low memory demand will be positively affected. This proposal may offer insight into how anxiety could positively affect performance.

Wine (1980) has argued that combining current test anxiety measurement with measures of positive orientations to achievement should improve predictive power in future test anxiety research. She has urged further measurement devices to be developed that are directed toward specific cognitive concomitants of test anxiety. This need is equally required in sport psychology. Limitations of existing measures of test anxiety are that they are devices designed only to measure the relative presence of test anxiety (Meichenbaum, 1980). In other words, they only measure the amount of anxiety that the individual is experiencing. They tell us, therefore, virtually nothing about low test anxious individuals. Certainly, there is a need for measurement devices which provide us with more precise information regarding the thoughts and feelings of all individuals. Given the purpose of test anxiety questionnaires to measure the presence of test anxiety, it seems likely, as mentioned earlier, that low test anxious persons may differ from each other in many more ways than high test anxious persons, ranging from a total lack of concern or motivation regarding evaluation to supreme self-confidence or very high levels of self-efficacy regarding evaluative situations. In fact, test anxiety measures do not even tell us much about high test anxious individuals. Although the evidence indicates that 'contents of consciousness' of high and low test anxious individuals differ and that high test anxious individuals react with worry and self-reports of high emotional reactivity in evaluative situations, we know little about the nature of the worry or cognitive structures associated with it. As Tobias (1980) has noted, test anxiety measures increase in their predictive powers when used in combination with measurement devices which assess positive orientations to evaluation such as need to achieve. These criticisms of psychometric measures in the test anxiety domain can also be levelled at those measures designed to measure competitive state anxiety.

Hollandsworth, Glazeski, Kirkland, Jones and Van Norman (1979) also reported that individuals differed considerably in their interpretations of their mental and physical state prior to an academic testing situation, with low test anxious subjects perceiving their pre-performance state as largely facilitating and high test anxious subjects perceiving their pre-performance state as predominantly debilitating. What is important, however, is that the low test anxious subjects appeared to be more physiologically aroused, as measured via heart rate and respiration rate, than the high test anxious subjects and yet they perceived this arousal as more positive, as measured by the AAT+ (Alpert and Haber, 1960). Similarly, Sewitch (1984)
found that high and low test anxious subjects did not differ in heart rate and electrodermal activity in simulated and actual scholastic examinations.

One general theory of motivation adds support to the raising of these issues and the potential advance that can be made as a result of their consideration. Social Learning Theory emphasises the informative function of physiological arousal. This is related to the work of Bandura (1977) who stated that physiological arousal is a source of efficacy information; yet it is the cognitive appraisal or labelling of that arousal that relates to self-efficacy (i.e. situation-specific self-confidence). Bandura argued that efficacy expectations develop and are changed through four major types of information which, in descending order of importance, are: performance accomplishments, vicarious experience, verbal persuasion and physiological arousal. In other words, it is the latter source that is important in the context of this discussion. The information conveyed by physiological arousal is presumed to affect perceived self-efficacy through judgemental processes. Bandura (1977) cited a number of factors, including appraisal of the source of arousal and past experiences on how arousal affects performance, that are likely to figure in the cognitive processing of emotional reactivity. Different personal interpretations of internal arousal, as frightened or 'fired-up', for example, will have a different impact on self-efficacy. Interpretations may reflect either a sign of vulnerability/coping deficiency or a sign of readiness. There is, however, a lack of research on this source of self-efficacy as the majority of work examining the theory has inevitably concentrated on the three primary sources of the concept. In one study, Lan and Gill (1984) did explore the relationship between self-efficacy and the response to stress but they were unable to change competitors' perceptions of anxiety or self-efficacy by telling them that increases in arousal is a typical response that is beneficial to good competitors.

Related to this notion of the importance of perception of emotional reactivity is Schachter's (1964) two factor theory of anxiety. Schachter's theory attempted to explain the interactional effect of cognitive and physiological processes upon emotional states. The basis of his theory was that it is the cognitive perception of the physiological state which determines how an individual reacts in a given situation. Schachter (1964) suggested that subjects label their physiological state with the cognitions available to them. More precisely, he stated that

"it could be anticipated that precisely the same state of physiological arousal could be labelled 'joy' or 'fury' or any of a great diversity of emotional labels, depending upon the cognitive aspects of the situation" (p.53).

The work of Thayer (1967, 1978) in the United States has also been influential in this area. Thayer (1967) devised an adjective checklist (the AD-ACL) to measure the total energy release of an organism. His original factor analysis of this scale revealed four orthogonal dimensions: General Activation (e.g. lively, active); Deactivation/sleep (e.g. tired, drowsy);
High Activation (e.g. jittery, fearful), and General Deactivation (e.g. calm, placid). Research attempting to utilise the inventory in Britain was hampered by some of the adjectives used and as a result the inventory was anglicised. Mackay, Cox, Burrows and Lazzerini (1978) re-factor analysed this version and obtained two bipolar factors, as opposed to Thayer's four monopolar ones. These were labelled 'stress' which was viewed as being related to negative affect, and 'arousal', which was deemed to relate to positive affect, and were a combination of high activation and general deactivation, and general activation and deactivation/sleep, respectively.

Thayer (1978) independently arrived at the same conclusions following further analysis of his original four factors. He labelled his bipolar factors Dimension A (General Activation and Deactivation/Sleep) and Dimension B (High Activation and General Deactivation) and these two dimensions each vary on a continuum from high to low energy expenditure. Dimension A was composed of adjectives which described some point on a continuum from energetic/vigorous to sleepy/tired. This corresponded to Mackay et al.'s (1978) 'arousal' factor. Conversely, Dimension B was composed of adjectives which described some point on a continuum from tense to placid and this corresponded to Mackay et al.'s 'stress' factor. To summarise, Dimension A appears to be related to the positive aspects of the stress response, whereas Dimension B appears to be related to the negative aspects of the stress response. Both Thayer's and Mackay et al.'s work suggests that a positive component (activation), and a negative component (anxiety), of the stress response need to be differentiated (Parfitt, 1988).

Further support for the work of Thayer is provided by Herbert, Johns and Dore (1976) who developed a Visual Analogue Scale (VAS) which required subjects to indicate along a continuum how they felt in relation to each item. These comprised two words defining the extremes of a bipolar scale. On factor analysing the VAS, Herbert et al. (1976) identified two orthogonal factors which were labelled alertness (e.g. alert/drowsy, interested/bored) and tranquility (e.g. tranquil/troubled, relaxed/tense). These factors can clearly be directly compared with the dimensions identified by Thayer (1978).

More recently, Hardy and Whitehead (1984) also established the need to distinguish between anxiety and the arousal-related construct of activation and in view of their evidence it is surprising that synonymous usage continues. They developed a 14-item questionnaire with each item selected as measuring some facet of arousal that had been previously reported in the literature and that might be perceived by the subjects (e.g. focus of attention, autonomic nervous system functioning, cognitive and somatic preparedness to respond). As part of the validation procedure, the authors decided upon two factors which were named cognitive activity and somatic activity. This validated, two-dimensional questionnaire was then administered to eight experienced rockclimbers together with Schwartz et al.'s (1978) Cognitive-Somatic Anxiety Questionnaire (CSAQ) on six separate occasions. They found that increases in activation did not necessarily accompany increases in anxiety. In certain conditions, activation was impaired, whilst anxiety increased, but in others this relationship did
not materialize. Interestingly, the mean intrasubject rank correlation between 'cognitive activation' and cognitive anxiety was -0.32 and was 0.41 between somatic activation and somatic anxiety. These relatively low to moderate correlations suggest the need to distinguish between the two constructs.

This notion of two components to the stress reaction is not a new one, although discussing them in terms of positive and negative effects may be. Evidence has been provided, therefore, from the general psychology literature that appears to challenge the view that anxiety is necessarily negative and stresses the value of attempts to measure the positive aspects of 'anxiety'. However, inference to this bidirectional approach is not exclusive to the general psychology literature. The following section examines the research within sport psychology that has made reference to, or implied that, 'positive' and 'negative' dimensions of anxiety may exist and also suggests the potential value of actually measuring directional perceptions of the 'anxiety' response.

**ADDITIONAL DIMENSIONS OF THE COMPETITIVE STATE ANXIETY RESPONSE**

**Further Semantic Clarification**

Before discussion of the various studies that have hinted at a bidirectional conceptualisation of competitive state anxiety, it would be beneficial to explain some of the terminology that is used in order to avoid any semantic confusion. Researchers have tended to fluctuate between references to the anxiety-performance and the arousal-performance relationship as if they are the same thing. Clearly, the relationship between 'anxiety', if defined in its strictest sense as dysfunctional and debilitating, and performance would be negative because anxiety is considered as a negative response. The arousal-performance relationship, however, is somewhat different, in that arousal tends to assume a more neutral connotation, until the individual places his or her own interpretation on the nature or appropriateness of that arousal for the situation in question. The following section cites various researchers using the terms anxiety and arousal synonymously. In fact, it would be clearer if they referred to these constructs, in the context in which they are described, as cognitive and physiological symptoms/activity. A bidirectional conceptualisation model would then incorporate the individual's interpretation of both these components. Therefore, it would only be correct to refer to anxiety as a negative interpretation of one's pre-competition cognitive (and physiological) symptoms or thoughts (and feelings). A positive interpretation of cognitive symptoms or thoughts can occur in threatening, potentially anxiety-provoking situations, as has been discussed earlier, but to label it as facilitating anxiety is a misnomer. A more appropriate term would be facilitating cognitive activity. As Neiss (1988) pointed out:
"The hedonically positive, facilitating state that some individuals experience in the face of a challenge cannot reasonably be referred to as anxiety. Although being psyched-up might have a slight fear component, and anxiety has been hypothesised to contain an element of excitement, these are nonetheless radically different states, both phenomenologically and in their effects on performance. Being psyched-up can be viewed as a relatively pure motivational state, whereas anxiety is a degenerate form of motivation" (p.358).

From an intuitive level, it seems that pressure sometimes brings out the best in an athlete whereas in others it brings out the worst. Therefore, this section discusses research that has emphasized the crucial importance of individual interpretations and attitudes towards one's pre-competition state and not made the assumption that anxiety has a blanket negative effect. In these cases, positive "anxiety" can be construed as the positive cognitive or physiological symptoms that some individuals experience in threatening situations.

The following section will refer to positive "anxiety", but this is done for convenience sake. This is purely to retain the terminology used by the relevant researchers and does not imply that positive 'anxiety' as such, exists.

Research Evidence

High levels of anxiety and arousal are typically conceptualised as being negative, a view that tends to be endorsed in the athletic performance literature. However, a number of sport psychology researchers are increasingly questioning this assumption. For example, investigations that have considered attention as a mediator of the arousal-performance relationship suggests something different. Several recent writers have argued that attention and cue utilisation may be the crucial factors in understanding this relationship. In a review of experiments employing a dual-task paradigm, Landers (1980) concluded that subjects maintaining performance on a primary task were less able to respond to secondary tasks while under stress. Landers (1978, 1980), relying on Easterbrook's (1959) cue utilisation theory, hypothesized that as performance anxiety increases, perceptual selectivity will also increase. At optimal levels of arousal this

\[\text{Some individuals may experience anxiety, as it is defined in this thesis, that is, as a negative evaluation to a threatening situation, but this may serve to activate coping resources. If this is the case, then the cognitive and emotional state that the individual then experiences can no longer be referred to accurately as anxiety.}\]
should facilitate action by increasing perceptual selectivity and eliminating task-irrelevant cues. However, this is accomplished without an excessive narrowing of attention that might eliminate some task-relevant cues. At low levels of arousal the athlete may fail to eliminate irrelevant stimuli due to an uncritical perceptual focus, while at high arousal levels the perceptual range may narrow to the point of eliminating valuable cues. This suggests that elevations of arousal are not negative. Equally, the studies examining athletes' patterns of anxiety prior to competitive events substantiates this notion. Mahoney and Meyers (1989) stated that the anxiety pattern studies (some of which were discussed in Chapter 3) indicate that athletes at all skill levels experience similar levels of pre-competition anxiety. These authors argued that it is not arousal alone which is central in the prediction of performance but rather the athlete's expectations, self-efficacy and strategies for managing and using that arousal.

This perspective allows us to consider the potentially energizing properties of anxiety and arousal. Both Shelton and Mahoney (1978) and Weinberg, Gould and Jackson (1980) found that subjects asked to 'psych-up' prior to performing a motor task often reported employing preparatory arousal strategies. Gould et al. (1983a), in their survey of champion high school wrestlers, not only found that two thirds of young men reported pre-match anxiety but that they often indicated that this 'anxiety' was beneficial to their performance. Specifically, a questionnaire was designed to assess anxiety and anxiety-related responses and two particular items on the scale asked to what extent nervousness 'hurt' the wrestlers' performance and to what extent nervousness helped performance, on a seven point likert scale from '1' ('always') to '7' ('never'). The mean values for the responses were 5.01 and 3.82 respectively. In other words, the wrestlers reported that on a number of occasions, anxiety was beneficial to them and not exclusively detrimental.

Seyle (1956) has labelled such positive stress as 'eustress'. Clearly, in the terms defined earlier in Chapter 1, stress was seen as a neutral phenomenon, but Seyle's 'eustress' refers to a positive, facilitating response to a stressor. As Harris (1970) observed, some individuals strive to raise their arousal levels rather than maintain homeostasis and this apparent paradox can be resolved "by the fact pleasure and pain are both drawn from the same reservoir of underlying excitement" (p.36). Special 'episodes' of superior functioning or intense experience related to positive anxiety and arousal have been labelled 'peak performance' (Privette, 1983), 'peak experience' (Maslow, 1971; Ravizza, 1977) or 'flow' (Csikszentmihalyi, 1975). These experiences are typically characterised by an intense focused awareness on the activity and on the self, with distracting stimuli being completely eliminated from the athlete's field. The flow experienced, according to Csikszentmihalyi, is most likely to occur when the individual's skills are equated to the challenge. If the task demands are greater than the individual's capability, the individual becomes anxious and worried and if the challenge does not meet the individual's skills, the individual becomes bored.
Mahoney and his colleagues were among the first in the sport psychology literature to challenge the notion that stressful situations were necessarily harmful to performance. They have referred to anxiety as a challenging ally to performance (Mahoney and Meyers, 1989) and provide evidence of the importance of individual differences in reactions to arousal in terms of its effects on performance. Mahoney and Avener (1977) compared those gymnasts who were selected for the 1976 United States Olympic team with those who made the Olympic trial but were not selected. Interviews suggested that the successful gymnasts had vastly differing interpretations of their anxiety than the less successful:

"Supplementing their subjective reports of anxiety level, verbal interviews suggested that the more successful athletes tended to 'use' their anxiety as a stimulant to better performance. The less successful gymnasts seemed to arouse themselves into near panic states by self-verbalisations and images that belied self-doubts and impending tragedies" (Mahoney and Avener, 1977; p.140).

In other words, anxiety was negative and debilitating for one group but positive and facilitating for the other. Mahoney, Avener and Avener (1983) also commented, in reference to the same study, that:

"The more successful athletes tended to view and even label their anxiety as a kind of 'high energy' that was necessary to and facilitative of their optimal performance. One of the gymnasts in this group even worried that he might not be anxious enough to attain the 'psych' he needed for this level of performance" (p. 82).

What Mahoney was referring to when he termed anxiety as an ally to performance is clearly not anxiety in its strictest sense. Rather, he was using the term to describe an appropriate and facilitative cognitive and physiological state that the athlete was experiencing in a stressful situation. This state may well involve high levels of arousal that are being interpreted as beneficial to performance but to label it as positive anxiety only serves to heighten the semantic confusion.

This notion is not dissimilar to the distinctions that have been made in Reversal Theory (Apter, 1982) between 'felt' and 'preferred' arousal. Felt arousal is the extent to which individuals feel themselves to be 'worked up' at any given time (Cox and Kerr, 1989). Preferred arousal is the level of arousal that the individual would have preferred at any given time rather than that which was actually experienced - with a discrepancy between preferred and felt arousal levels liable to be accompanied by the experience of negative emotions. Cox and Kerr (1989), in an investigation involving squash players, found that winners showed lower levels of arousal discrepancy than losers. This indicated that measuring arousal...
appropriateness rather than just arousal levels may prove to be a more predictive means of examining the arousal-performance relationship.

An interesting approach to the study of individual differences in relation to the anxiety-performance relationship is the work of Hanin (1980). Hanin proposes that each individual has a zone of optimal functioning (ZOF), and performance is optimised when an individual's anxiety level falls within this zone. ZOF Theory predicts that some individuals will exhibit high levels of performance when highly anxious, others when fairly relaxed and some when moderately anxious. In essence, ZOF takes an intraindividual approach in determining an individual's optimal level of anxiety. Hanin's empirical evidence for his theory reveals that athletes exhibit wide variations of their ZOF as it relates to actual performance and it appears that Hanin's (1980) ZOF Theory can have both practical and heuristic value to the study of anxiety and performance. However, if we consider the premise behind Hanin's research, we can see the value of actually measuring directional perceptions of anxiety levels. By assessing the interpretation of the appropriateness of the anxiety response, the researcher is provided with information that can automatically establish the athlete's ZOF. For example, if an athlete indicates that his anxiety is very positive then that is the pre-competitive state that is best for him. The assumption is that when in the ZOF then anxiety is appropriate and therefore, positive. So why not simply ask whether the thought or feeling the athlete is experiencing is positive or not? Essentially, it provides the same information but in a more concise way. Furthermore, a weakness of Hanin's work is that he does not distinguish between cognitive and somatic anxiety and yet the interviews reported in the previous investigation in this chapter, for example, indicates that individuals can prefer high levels of cognitive anxiety and low somatic anxiety or vice versa. This would suggest that there may be two separate ZOF's, one for each anxiety component.

Related to this notion of ZOF, Ebbeck & Weiss (1988) found that below average, average and above average performance in Track and Field events all occurred within the same pre-competitive state anxiety levels. Thus, the same level of anxiety (the unidimensional CSAI was used as the anxiety measure) produced outstanding performance for some athletes while it was detrimental to the performance of other athletes. This finding is central to the whole issue concerning direction and the problem of the intensity-alone approach. Ebbeck and Weiss' results found no significant relationship for anxiety and objective performance across five events. This may have been due to the interindividual analyses and the fact that the variation in anxiety responsiveness may have confounded the results. In this cross-sectional study it would have been interesting if the authors had measured directional perceptions of the anxiety levels and related those to performance. As the previous investigation in this thesis indicated, some athletes who reported similar levels of anxiety had completely different interpretations of that response in terms of the information it conveyed with regards their preparedness.
In another study (Landers, Christina, Hatfield, Daniels and Doyle, 1980), different heart rates, breath holds and shot placements within the cardiac cycle were found for different marksmen. In fact, the best performance scores for each marksman were associated with these individual tendencies in psychobiological states. One shooter achieved his best scores with a breath-held heart rate of 70bpm, whereas another shooter achieved his best performance scores with a heart rate of 120-130bpm. It would not be too speculative to suggest that these two shooters may have perceived these respective heart rates as positive in relation to their upcoming performance, based on previous experience. However, an intensity-alone approach would have distorted the 'real' relationship by comparing anxiety intensity (i.e. heart rate) with shooting performance. Thus, it is apparent that an individual's reactions to a given level of "anxiety" may be more important than the absolute level of anxiety, in determining its effects on performance.

Criticisms of the CSAI-2

Recently, researchers have begun to discuss this notion of the potentially positive effects of anxiety in the specific context of Multidimensional Anxiety Theory (Burton, 1990; Jones, 1991, Parfitt et al., 1990). In view of the various approaches that support the notion of independent positive and negative dimensions to the arousal response (e.g. Hardy and Whitehead, 1984; Thayer, 1978) it is perplexing, as Parfitt et al. (1990) have noted, that individuals' perceptions of their competitive state anxiety responses have received very little research attention within the sport psychology literature, and within the context of the CSAI-2 in particular. Burton (1990) commented on the variability in the degree to which particular individuals perceive 'anxiety-related symptoms' to be negative or detrimental to performance. He proposed:

"'I feel nervous' and 'I am concerned about this competition' are two items from the somatic and cognitive anxiety subscales of the CSAI-2, respectively. Both items represent pre-competitive feelings and cognitions about those feelings that may be perceived as positive and helpful in facilitating mental preparation and performance by some subjects. Thus, if subjects indicate that they are experiencing these symptoms intensely, those responses would be scored as anxiety even though the actual emotion experienced was excitement or appropriate attentional focus" (p.197).

Thus, future anxiety instruments need to incorporate a format that allows the subjects to categorise whether a particular symptom is negative and detrimental (i.e. anxiety) or a more positive and helpful emotion (e.g. excitement or motivation) that not only is unlikely to impair performance but may actually help it. It is for this very reason that this author believes that the
CSAI-2 has failed the 'acid-test', as Martens (1990) termed it, in terms of predicting the relationship between 'anxiety' and performance. By labelling two of the subscales of the CSAI-2 as cognitive and somatic anxiety, the authors are automatically attributing a negative direction to the responses. However, as Burton (1990) and Jones (1991) have suggested, an athlete may perceive the fact that he is concerned about his performance as positive and, therefore, experiencing an emotion that is far removed from traditional conceptualisations of anxiety. It is little wonder that the vast majority of studies have failed to support the predicted negative linear relationship between cognitive anxiety (as measured by the CSAI-2 subscale) and performance, because the questionnaire infers that the greater the levels of 'anxiety' the more negative the response. Clearly, for many people this is a correct assumption but for numerous others it is a dangerous and misleading association to make. The scale would be improved if it acknowledged that the 'cognitive anxiety' items measure a certain type of competition-related cognitions, and then allowed the individual to attribute a direction to those cognitions.

Neiss (1988), in his review of the arousal-motor performance relationship literature, also criticised the fact that numerous researchers had used the construct of arousal interchangeably with emotional constructs such as anxiety. From his convincing description of construct validation problems of arousal, it inevitably follows that predictive validity is problematic as well. Bird and Horn (1990) hinted at the possibility of low predictive validity of the CSAI-2 for performance. The CSAI-2 somatic items are perceptions of physiological arousal and hence the label of somatic anxiety is again inaccurate, as it implies a negative response. As Neiss (1988) pointed out, evidence suggests that 'performance-degrading dysphoric psychobiological states' and 'performance-enhancing euphoric ones' can occur at equal arousal levels. Global arousal then, can only serve to obscure the profound individual differences with which individuals approach important performances. It would not be outrageous to suggest that is exactly why the predicted somatic anxiety-performance relationship has also received little support. CSAI-2 somatic anxiety responses do not reflect the true nature of pre-competition physiological symptoms because the interpretation of the individual's experience is so different and not taken into consideration. For example, do two individuals with the same score on the somatic anxiety subscale of the CSAI-2 perceive that anxiety in the same way? Our experiential knowledge as well as an awareness of research such as that undertaken by Hollandsworth et al. (1979) and Landers et al. (1980), would suggest not. Somatic anxiety items of the CSAI-2 include 'My hands are clammy', 'My heart is racing', and 'I feel my stomach sinking'. These are arousal-based items and could clearly mean different things to different people. An athlete may interpret a racing heart, for example, as being 'pumped-up' and, therefore, positive or as an indication of being over-anxious and, therefore, negative. This interpretation is likely to have a differential effect on performance.
In comparison with the literature that has just been reviewed concerning the competitive state anxiety response, virtually nothing has been written concerning the directional perceptions of self-confidence. This is probably due to the vast amount of literature that indicates that the most consistent difference between elite and less successful athletes is the level of self-confidence professed by the elite (Gould, Weiss & Weinberg, 1981; Mahoney & Avener, 1977; Vealey, 1986). Therefore, a positive linear relationship has been predicted between self-confidence and performance with the underlying assumption that the more self-confident the athlete the better. Consequently, it has not been viewed necessary to consider the direction dimension of self-confidence and has therefore been perceived as redundant to measure. Indeed, Swain and Jones (1991) reported a correlation of 0.80 between self-confidence intensity and self-confidence direction in a study involving 48 gymnasts. However, intuitively, there are occasions when individuals can be over-confident or complacent and, therefore, high levels of self-confidence may not necessarily be considered as entirely positive.

The purpose of the second study reported in this chapter, therefore, was to specifically examine the three proposed dimensions of competitive state anxiety; intensity, frequency and direction. Track and Field athletes responded to a modified version of the CSAI-2, which included scales designed to assess these three dimensions on four separate occasions in the period leading up to an important competition. Frequency was assessed in a different way to that described in Study 3.1. Instead of measuring the general frequency of thoughts about the event, the frequency of actual anxiety symptoms were measured by assessing the frequency with which each individual item was experienced. As in the previous chapter, a number of interviews were conducted with a cross-section of the sample, in order to examine in further detail the nature of the athletes' cognitions and feelings. The relationship between these dimensions and performance was also considered to be of interest. In addition, therefore, an attempt was made to assess performance subjectively as a means of examining this relationship. Consequently, subjects rated how pleased they were with their performance immediately after having completed their event.

Based on previous research in the competitive anxiety literature, the following hypotheses were formulated for the intensity of the CSAI-2 components:

1. Cognitive anxiety intensity in females would increase during the pre-competition period, but would remain stable in males during the pre-competition period;
2. Somatic anxiety intensity in females would increase earlier during the pre-competition period than in males;
3. Self-confidence intensity in males would remain stable in the pre-competition period, but would decrease on the day of competition in females.

The first three hypotheses were the same as those proposed for study 3.1 and were again based on the findings of Jones and Cale (1989a).
Based on the findings from the previous study in this chapter, the following hypotheses were also examined:

(4) Cognitive anxiety frequency in both males and females would increase during the pre-competition period;

(5) Somatic anxiety frequency in both males and females would increase during the pre-competition period.

Due to the exploratory nature of this investigation no hypotheses were formulated regarding the temporal patterning of the remaining four anxiety variables. Neither were any hypotheses proposed regarding anxiety relationships with the subjective rating of performance.\(^4\,^5\)

**METHOD**

**Subjects**

The subjects examined in this study were 49 Track and Field athletes who competed for Loughborough Students Athletics Club in one of two athletics meetings during the 1990 season. The first meeting was the match between Loughborough University and West London Institute of Higher Education, and the second was the traditional annual match between Loughborough Students Past and Present and the AAA's. The sample comprised 22 female (mean age = 20.35 years; S.D. = 2.67) and 27 male athletes (mean age = 20.85 years; S.D. = 2.87) from a variety of both Track and Field events. Track athletes (N=36) were drawn from those runners competing in the 100 metres (N=5), 400 metres (N=8), 800 metres (N=13) and 1500 metres (N=10). Field event athletes (N=13) were drawn from those performers competing in the long jump (N=6), javelin (N=3) and hammer (N=4).

**Instrumentation**

**Competitive State Anxiety Inventory-2 - Modified Version - 1**

Cognitive anxiety, somatic anxiety and self-confidence were measured using a modified version of the CSAI-2. The intensity of symptoms was determined by using the existing CSAI-2 scale as used in the previous studies reported in this thesis. Alongside each of the 27 items, separate scales were constructed that related to frequency and direction. This modified scale

\(^4\,^5\)Predicted anxiety-performance relationships are based on more objective measures of performance, and the relative inconsistency of subjective measures is well documented (e.g. Weinberg, 1990).
had been piloted with the Loughborough University Mens basketball squad prior to their opening match in the 1990 UAU championships. Detailed post-completion discussions were held with the players as to potential improvements to the scale. The frequency scale asked "How frequently do you experience this thought or feeling at this stage?". So, for example, how often was the athlete experiencing 'self-doubts' about the forthcoming event. This was measured on a 7 point likert-type scale ranging from 1 ('not at all') to 7 ('all of the time'). Scores were calculated by summing the responses and ranged, therefore, from a low of 9 to a high of 63. The direction scale, on the other hand, asked "Do you regard this thought or feeling as negative (i.e. debilitating) or positive (i.e. facilitating) in relation to your upcoming performance?". This was also measured on a 7 point likert scale but this time from -3 ('very negative') to +3 ('very positive'). Scores were again calculated by summing the responses and thus ranged from a low of -27 to a high of +27. Total scores greater than zero represented a positive perception whereas those below zero revealed a negative perception of the response. The modified scale, complete with instructions is shown in Appendix 4.

Subjective Performance Measure

Following completion of their event, athletes were asked to rate how pleased they were with their performance, their time or distance and their position on a 9 point likert scale. The responses for each of the three items ranged from 1 ('extremely disappointed') to 9 ('extremely pleased') and are shown in Appendix 8. The reason for asking this type of question in three separate items was based on recommendations made by Ebbeck and Weiss (1988) who reported on the inconsistency of subjective assessments of performance made by the athlete and the coach. In their study, performance ratings made by the athletes and the coach over five separate Track and Field events produced inter-rater correlations ranging from 0.17 to 0.73. Therefore, as these authors pointed out, relationships between state anxiety and subjective performance may be different depending on what subjective measurement is used and urged researchers to be conscious of this potential difficulty. Consequently, three means of assessment were used in this investigation

4.6 These discussions led to the response scale for the frequency dimension being changed to a '1' to '7' likert scale as opposed to a range of percentages. The respondents felt that trying to conceptualise each of the 27 items in terms of a percentage proved too difficult.

4.7 The coach's subjective assessment was not included in this study because of the difficulty for the team coach to accurately assess performance for all 49 athletes. Furthermore, some athletes had home-based coaches who were not present at the appropriate meeting.
Procedure

Pre-Competition Questionnaire Administration

The modified CSAI-2 was administered on four occasions during the pre-competition period: 2 days before, 1 day before, 2 hours before, and finally, within 30 minutes of the start of their respective events. The two previous studies that have employed the time-to-event paradigm in this thesis (see Study 2 and Study 3.1), used the same four occasions but also included the earlier data collection point of one week before competition. However, in view of the relatively time-consuming nature of completing the scale that was designed for this investigation, it was decided to restrict administration to these four occasions in an attempt to ensure that all questionnaires were returned. The instructions asked the subjects to respond to the questions according to how they felt at that moment about the forthcoming event. It was emphasized that there were no right or wrong answers and that they should answer honestly.

Interviews

As in the previous study reported in this chapter, retrospective interviews were performed within three days following the competition in order to further examine the nature of thoughts and feelings that the athlete experienced in the period leading up to competition.

Participants

The participants were eight athletes (six males and two females) who were selected in order to represent a cross-section of the sample as a whole. These athletes included two sprinters, five 800/1500 metres runners and a thrower.

Design of the Interview Schedule

A standardized format similar to the one described in the previous study was used for the interview schedule, which was divided into five separate sections and can be seen in Appendix 10b. Part 1 was a brief introductory section and Part 2 asked the athletes about their typical experiences of anxiety prior to competition and whether they perceived them as being positive or negative in relation to their performance. Parts 3, 4 and 5 asked specific questions about the nature of the anxiety experienced by the athletes prior to the athletics meeting at which they had provided quantitative data: specifically, Part 3 asked the athlete to comment on the intensity of his or her symptoms; Part 4 focused on the frequency with which the athlete experienced his or her symptoms, and Part 5 asked the athlete to reflect on the direction of those symptoms in terms of whether they were facilitative or debilitative. The specific details of the schedule are described below:
Part 1 (Introductory Comments): This part of the interview followed standardised procedures for establishing rapport and orienting participants with the interview process as established in the first investigation in this chapter.

Part 2: Participants were asked about how they generally felt before competition. It was emphasized that the interviewer was particularly interested in the nature of the anxiety, if any, that the athlete experienced in the period leading up to competition. Participants then responded to a series of questions in which they were asked to concentrate on their normal feelings of anxiety at the four stages prior to competition previously outlined. Particular emphasis was placed on the individual's interpretation of that anxiety in terms of whether it was perceived as facilitative or debilitative in relation to the upcoming performance. This line of questioning was pursued by asking the athletes to imagine themselves at each of the stages of testing and then respond to the same set of questions. This general section was included to establish the athletes' typical directional interpretations of their anxiety responses as well as to examine whether the responses reported prior to the two matches employed in this study were typical.

Part 3: Athletes were asked to think back to the series of items they had responded to in the period leading up to the meeting in question. They were asked to reflect on the level or amount of their cognitive and somatic anxiety and self-confidence at each of the four stages of testing in the specific example of the West London Institute or AAA match in which they had competed. In other words, questions were directed at the intensity of their anxiety and self-confidence responses. Athletes were provided with information about their actual CSAI-2 subscale scores and questioned as to whether these were normal patterning for them.

Part 4: This section was a replication of Part 3, only on this occasion, questions were aimed at the specific responses to the frequency scale of the modified CSAI-2. Respondents were asked to reflect on how often they experienced these feelings and expressions of anxiety and self-confidence at each of the four stages of testing. Once again, athletes were provided with their frequency responses and questions were aimed at developing discussion from this information. Furthermore, in order to differentiate between the frequency of anxiety-related cognitions and other competition-related cognitions, this section also included a question about the thoughts that were occupying the athlete's mind at each stage.

Part 5: This final section concentrated on the athletes' specific responses to the direction scale in the event in which they had just competed. In other words, the interviewees were asked to reflect on the type of anxiety they felt they had experienced. Specific questions were also posed relating to the actual direction responses that the athletes had reported.

Parts 3 to 5 were incorporated in the interview schedule as they enabled a comparison against the actual responses to the modified CSAI-2. The modified CSAI-2 scale has yet to be psychometrically validated and so the information that could be generated by the interviews was seen as a means of providing potential support for the empirical findings.
RESULTS

Questionnaire Data

In order to examine whether the responses to the three separate subscales (i.e. intensity, frequency and direction) of each of the CSAI-2 components had changed during the pre-competition period and whether any differences emerged between males and females, the questionnaire data were analysed by means of two-way analyses of variance (gender by time-to-competition) with repeated measures on the second factor. Follow-up Scheffe tests were employed to determine between which means significant differences were evident and the means and standard deviations for the nine variables are presented in Table 4.6. The findings are presented by discussing the patterning of the three dimensions for each subscale separately. The next stage of the quantitative analysis involved a stepwise regression analysis in order to examine if any of the anxiety and self-confidence variables predicted the subjective rating of performance. Examination of the quantitative data was completed by performing a correlation analysis. As in the previous study, this was conducted because of the exploratory nature of the investigation. The nature of the various interrelationships are not known and hence, the justification for such an analysis.

It is interesting to note that the cognitive anxiety intensity scores are similar values to those reported for the males in the previous investigation, but that the females in this study reported considerably less and more stable cognitive anxiety than their counterparts in the previous investigation. The findings for self-confidence intensity reflect this finding in that males again experienced levels similar to those for the males in the previous study, but female self-confidence was substantially higher and more stable in this investigation than the previous study. The findings for male somatic anxiety intensity reveal similar levels to those in the previous investigation but females tended to report greater somatic anxiety. The male subjects reported, therefore, similar levels for all three CSAI-2 components to the previous study. This was to be expected because the competitions involved in both studies were of comparable significance to the male competitors. The females, on the other hand, tended to differ in all three responses, reporting greater self-confidence and somatic anxiety and lower cognitive anxiety in this second study. Clearly, these findings appear contradictory but the results for cognitive anxiety and self-confidence can possibly be explained by the fact that in the AAA’s match, women were guest competitors and their events were not as important as both the meetings in the first investigation. A further interesting finding is that females tended to perceive their cognitive anxiety as very slightly negative whereas the male athletes viewed the response as marginally positive. This is despite experiencing moderate levels of the response.
<table>
<thead>
<tr>
<th></th>
<th>2 Days</th>
<th>1 Day</th>
<th>2 Hours</th>
<th>&lt;30min</th>
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</thead>
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<td></td>
<td></td>
<td></td>
</tr>
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<td>Males</td>
<td>15.30 (3.44)</td>
<td>15.85 (3.34)</td>
<td>16.19 (3.65)</td>
<td>16.67 (4.03)</td>
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<tr>
<td>Females</td>
<td>18.05 (6.28)</td>
<td>18.14 (6.21)</td>
<td>18.82 (5.85)</td>
<td>18.86 (6.64)</td>
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<td><strong>Cognitive Anxiety Frequency</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
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<td>Males</td>
<td>23.85 (6.32)</td>
<td>28.15 (7.37)</td>
<td>34.26 (8.76)</td>
<td>39.63 (9.77)</td>
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<tr>
<td>Females</td>
<td>27.14 (6.90)</td>
<td>28.59 (7.33)</td>
<td>35.55 (9.84)</td>
<td>40.64 (9.30)</td>
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<td><strong>Cognitive Anxiety Direction</strong></td>
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</tr>
<tr>
<td>Males</td>
<td>1.77 (6.82)</td>
<td>1.68 (7.13)</td>
<td>1.55 (8.75)</td>
<td>1.41 (10.57)</td>
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<tr>
<td>Females</td>
<td>-0.44 (4.20)</td>
<td>-1.26 (5.47)</td>
<td>-0.89 (6.75)</td>
<td>-0.67 (8.30)</td>
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<td><strong>Somatic Anxiety Intensity</strong></td>
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<td>Males</td>
<td>10.44 (1.22)</td>
<td>11.44 (1.55)</td>
<td>15.33 (3.05)</td>
<td>18.59 (3.38)</td>
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<tr>
<td>Females</td>
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<td>15.09 (4.88)</td>
<td>18.59 (3.94)</td>
<td>20.91 (4.74)</td>
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<td><strong>Somatic Anxiety Frequency</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>15.22 (3.75)</td>
<td>18.70 (3.82)</td>
<td>27.93 (6.34)</td>
<td>38.15 (9.41)</td>
</tr>
<tr>
<td>Females</td>
<td>16.91 (5.45)</td>
<td>23.55 (7.39)</td>
<td>30.50 (6.95)</td>
<td>37.36 (8.49)</td>
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<td><strong>Somatic Anxiety Direction</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>2.55 (5.42)</td>
<td>2.55 (6.29)</td>
<td>2.64 (6.19)</td>
<td>2.27 (7.14)</td>
</tr>
<tr>
<td>Females</td>
<td>0.70 (3.46)</td>
<td>0.33 (4.40)</td>
<td>1.15 (5.56)</td>
<td>1.22 (6.93)</td>
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<td><strong>Self-Confidence Intensity</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>25.78 (3.23)</td>
<td>25.41 (3.72)</td>
<td>25.07 (3.45)</td>
<td>25.07 (3.87)</td>
</tr>
<tr>
<td>Females</td>
<td>24.73 (5.47)</td>
<td>24.77 (4.77)</td>
<td>23.86 (4.54)</td>
<td>24.41 (5.22)</td>
</tr>
<tr>
<td><strong>Self-Confidence Frequency</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>32.44 (7.18)</td>
<td>32.37 (7.44)</td>
<td>32.37 (7.42)</td>
<td>32.67 (7.28)</td>
</tr>
<tr>
<td>Females</td>
<td>36.32 (8.94)</td>
<td>35.46 (8.71)</td>
<td>34.23 (8.94)</td>
<td>35.91 (10.67)</td>
</tr>
<tr>
<td><strong>Self-Confidence Direction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>5.33 (5.13)</td>
<td>6.82 (5.61)</td>
<td>8.07 (4.97)</td>
<td>8.07 (5.17)</td>
</tr>
<tr>
<td>Females</td>
<td>7.23 (6.69)</td>
<td>7.46 (6.32)</td>
<td>7.82 (5.92)</td>
<td>9.73 (6.82)</td>
</tr>
</tbody>
</table>
In comparison, both males and females viewed their somatic anxiety as slightly positive. As expected, self-confidence direction responses were more positive, with male and female responses at the within 30 minute stage indicating mean item responses of +1.

Analyses of Variance

Cognitive Anxiety

Intensity

The gender by time-to-competition interaction for cognitive anxiety intensity (in other words, the traditional CSAI-2 subscale) was not significant (F(3,141)=0.28; p=.84) and neither was there a main effect for gender (F(1,47)=3.29; p=.09). However, a significant time-to-event main effect (F(3,141)=4.00; p<.01) did emerge. Follow-up Scheffe tests are shown in Appendix 12 and revealed that the only significant difference for the group as a whole was greater cognitive anxiety intensity at the final stage than at 2 days before. Apart from this one difference, the intensity of the response remained constant. See Table 4.7 for analysis of variance summary.

Table 4.7: Analysis of Variance Table for Cognitive Anxiety Intensity

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F-test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENDER (A)</td>
<td>1</td>
<td>294.85</td>
<td>294.854</td>
<td>3.29</td>
<td>.092</td>
</tr>
<tr>
<td>Subjects w. groups</td>
<td>47</td>
<td>4214.65</td>
<td>89.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time-to-competition (B)</td>
<td>3</td>
<td>36.79</td>
<td>12.26</td>
<td>4.00</td>
<td>.009</td>
</tr>
<tr>
<td>AB</td>
<td>3</td>
<td>2.59</td>
<td>0.86</td>
<td>0.28</td>
<td>.839</td>
</tr>
<tr>
<td>B x subjects w. groups</td>
<td>141</td>
<td>431.87</td>
<td>3.06</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Frequency

Similarly, the gender by time-to-competition interaction for cognitive anxiety frequency was not significant (F(3,141)=0.57; p=.63) and neither was there a main effect for gender (F(1,47)=0.62; p=.44). However, a significant time-to-event main effect (F(3,141)=66.26; p<.01) did appear, revealing a progressive increase for the frequency of the cognitive anxiety symptoms. Specifically, Scheffe tests revealed significant differences at every stage of testing apart from two days to one day before competing and are shown in Appendix 12. See Table 4.8 for analysis of variance summary.
Table 4.8: Analysis of Variance Table for Cognitive Anxiety Frequency

<table>
<thead>
<tr>
<th>Source</th>
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<th>P value</th>
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<td>109.84</td>
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<td>Subjects w. groups</td>
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<td>8348.12</td>
<td>177.62</td>
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<tr>
<td>Time-to-competition (B)</td>
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<td>6426.46</td>
<td>2142.16</td>
<td>66.26</td>
<td>.001</td>
</tr>
<tr>
<td>AB</td>
<td>3</td>
<td>55.66</td>
<td>18.55</td>
<td>.57</td>
<td>.633</td>
</tr>
<tr>
<td>B x subjects w. groups</td>
<td>141</td>
<td>4558.63</td>
<td>32.33</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Direction

The findings for cognitive anxiety direction, (i.e. whether the cognitive anxiety was perceived as positive or negative), on the other hand, revealed no significant interaction (F(3,141)=0.26; p=.85), nor main effect for gender (F(1,47)=1.44; p=.24), nor time-to-competition (F(3,141)=.31; p=.82). In other words, the perception of the cognitive anxiety did not significantly differ between males and females and did not alter as a function of the proximity of competition.

The temporal patterning of the three dimensions for cognitive anxiety is shown in Figure 4.6. Since there were no interactions or gender main effects for any of the three dimensions, the male and female data have been combined in this Figure, for the sake of convenience. See Table 4.9 for analysis of variance summary.

Table 4.9: Analysis of Variance Table for Cognitive Anxiety Direction

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F-test</th>
<th>P value</th>
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</thead>
<tbody>
<tr>
<td>GENDER (A)</td>
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<td>283.29</td>
<td>283.29</td>
<td>1.44</td>
<td>.237</td>
</tr>
<tr>
<td>Subjects w. groups</td>
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<td>9266.13</td>
<td>197.15</td>
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</tr>
<tr>
<td>Time-to-competition (B)</td>
<td>3</td>
<td>6.22</td>
<td>2.07</td>
<td>.31</td>
<td>.818</td>
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<tr>
<td>AB</td>
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<td>5.23</td>
<td>1.74</td>
<td>.26</td>
<td>.854</td>
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<tr>
<td>B x subjects w. groups</td>
<td>141</td>
<td>943.80</td>
<td>6.69</td>
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</tbody>
</table>

Somatic Anxiety

Intensity

The gender by time-to-competition interaction for somatic anxiety intensity was not significant (F(3,141)=1.09; p=.35) but significant main effects for both time-to-event (F(3,141)=119.25; p<.01) and gender (F(1,47)=12.55; p<.01) did emerge. The follow-up Scheffe tests, as shown in Appendix 12, indicated a progressive increase for males and females throughout the pre-competition period in that somatic anxiety increased at every stage of
Figure 4.6: TEMPORAL PATTERNING OF COGNITIVE ANXIETY DIMENSIONS

Cognitive Anxiety Dimensions

- Intensity
- Frequency
- Direction

Time-to-Competition

2 Days 1 Day 2 Hours 30 Mins
testing. However, the gender main effect revealed that females (mean=16.81) reported significantly higher overall somatic anxiety intensity than the male subjects (mean=13.95). See Table 4.10 for analysis of variance summary.

Table 4.10: Analysis of Variance Table for Somatic Anxiety Intensity

<table>
<thead>
<tr>
<th>Source</th>
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<tbody>
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<td>394.72</td>
<td>12.55</td>
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<td>Time-to-competition (B)</td>
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<td>668.06</td>
<td>119.25</td>
<td>.001</td>
</tr>
<tr>
<td>AB</td>
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<td>18.40</td>
<td>6.13</td>
<td>1.10</td>
<td>.353</td>
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<td>B x subjects w. groups</td>
<td>141</td>
<td>789.91</td>
<td>5.60</td>
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</table>

Frequency

The gender by time-to-competition interaction for somatic anxiety frequency was not significant (F(3.141)=2.54; p=.08), and neither was there a main effect for gender (F(1,47)=2.07 p=.16). However, a significant time-to-event main effect (F(3,141)=174.46; p<.01) did emerge, revealing a progressive increase in the frequency of the somatic anxiety cognitions. Scheffe tests indicated significant differences at every stage of testing and are shown in Appendix 12. See Table 4.11 for analysis of variance summary.

Table 4.11: Analysis of Variance Table for Somatic Anxiety Frequency

<table>
<thead>
<tr>
<th>Source</th>
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<th>Mean Square</th>
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Direction

The findings for somatic anxiety direction, on the other hand, revealed no significant interaction (F(3,141)=0.43; p=.73), nor main effects for gender (F(1,47)=1.19; p=.28) or time-to-competition (F(3,141)=.32; p=.81). In other words, the perception of the somatic anxiety did not significantly differ between males and females and did not change as the competition approached.

The temporal patterning of the three dimensions for somatic anxiety is shown in Figure 4.7. Although a gender main effect did appear for the intensity of the somatic anxiety response,
Figure 4.7: TEMPORAL PATTERNING OF SOMATIC ANXIETY DIMENSIONS

![Diagram of Temporal Patterning of Somatic Anxiety Dimensions](image-url)
no interactions on any of the three dimensions emerged. Therefore, it was again decided to combine the male and female data for the purposes of graphic representation. See Table 4.12 for analysis of variance summary.

Table 4.12: Analysis of Variance Table for Somatic Anxiety Direction

<table>
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<tr>
<th>Source</th>
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<td>131.72</td>
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<td>.32</td>
<td>.811</td>
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<td>2.98</td>
<td>.43</td>
<td>.729</td>
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<td>969.44</td>
<td>6.88</td>
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</table>

**Self-Confidence Intensity**

The findings for self-confidence intensity revealed no significant interaction (F(3.141)=0.40; p=.75), nor main effects for gender (F(1,47)=0.58; p=.45) or time-to-competition (F(3.141)=2.38; p=.08). See Table 4.13 for analysis of variance summary.

Table 4.13: Analysis of Variance Table for Self-Confidence Intensity

<table>
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<td>38.42</td>
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</tr>
<tr>
<td>Time-to-competition (B)</td>
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<td>17.73</td>
<td>5.91</td>
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<td>2.96</td>
<td>.99</td>
<td>.40</td>
<td>.755</td>
</tr>
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<td>349.56</td>
<td>2.48</td>
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</tbody>
</table>

**Frequency**

The same was found for the frequency of self-confidence, with no significant interaction (F(3,141)=1.42; p=.24) nor main effects for gender (F(1,47)=0.58; p=.45) or time-to-competition (F(3,141)=1.72; p=.20) emerging. In other words, levels and frequency of self-confidence did not significantly differ between males and females and did not change as the competition neared. See Table 4.14 for analysis of variance summary.
Table 4.14: Analysis of Variance Table for Self-Confidence Frequency

<table>
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<tr>
<th>Source</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F-test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENDER (A)</td>
<td>1</td>
<td>440.58</td>
<td>440.58</td>
<td>1.72</td>
<td>.197</td>
</tr>
<tr>
<td>Subjects w. groups</td>
<td>47</td>
<td>12074.31</td>
<td>256.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time-to-competition (B)</td>
<td>3</td>
<td>29.76</td>
<td>9.92</td>
<td>1.64</td>
<td>.184</td>
</tr>
<tr>
<td>AB</td>
<td>3</td>
<td>25.88</td>
<td>8.63</td>
<td>1.42</td>
<td>.239</td>
</tr>
<tr>
<td>B x subjects w. groups</td>
<td>141</td>
<td>854.86</td>
<td>6.06</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Direction

As far as the direction of self-confidence responses were concerned the gender by time-to-competition interaction was not significant (F(3,141)=1.75; p=.16) and neither was there a main effect for gender (F(1,47)=0.41 p=.53). However, a significant time-to-event main effect (F(3,141)=9.24; p<.01) did emerge, indicating an increasingly positive perception of the response as the event approached. More precisely, follow-up Scheffe tests as shown in Appendix 12 revealed that self-confidence was perceived as significantly more positive at both periods of testing on the day of competition than it was two days before competition and also more positively at the within 30 minute stage than it was at the one day before stage. The temporal patterning of the three self-confidence dimensions is shown in Figure 4.8, and represents the data for the males and females combined, due to the fact that no interactions or gender main effects materialised. See Table 4.15 for analysis of variance summary.

Table 4.15: Analysis of Variance Table for Self-Confidence Direction

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F-test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENDER (A)</td>
<td>1</td>
<td>46.83</td>
<td>46.83</td>
<td>.41</td>
<td>.525</td>
</tr>
<tr>
<td>Subjects w. groups</td>
<td>47</td>
<td>5371.37</td>
<td>114.29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time-to-competition (B)</td>
<td>3</td>
<td>187.85</td>
<td>62.62</td>
<td>9.24</td>
<td>.001</td>
</tr>
<tr>
<td>AB</td>
<td>3</td>
<td>35.54</td>
<td>11.85</td>
<td>1.75</td>
<td>.160</td>
</tr>
<tr>
<td>B x subjects w. groups</td>
<td>141</td>
<td>955.36</td>
<td>6.78</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Regression Analyses

The second stage of the data analysis was to examine whether any of the anxiety and self-confidence variables emerged as significant predictors of the subjective rating of performance. The nine variables entered into the regression equation, therefore, were each of the CSAI-2 subscales and their three dimensions; intensity, frequency and direction. The findings, shown in Table 4.16, revealed that cognitive anxiety direction 2 days before
Figure 4.8: TEMPORAL PATTERNING OF SELF-CONFIDENCE DIMENSIONS

SELF-CONFIDENCE DIMENSIONS

TIME-TO-COMPETITION

Intensity
Frequency
Direction
competing was the only predictor of how well they felt they had performed. However, this was
the only occasion that this variable emerged as a predictor. At the remaining three stages,
somatic anxiety direction emerged as the dominant predictor of subjective performance. At 1
day before and at the within 30 minutes stage, the intensity of the self-confidence response also
emerged as a significant predictor, combining with the somatic anxiety direction dimension on
both occasions. In particular, at the final stage of testing, these two factors accounted together
for 35% of the total variance. Significantly, none of the three frequency dimensions emerged as
a predictor and the results from the correlation analyses that are reported shortly indicate weak
relationships with subjective performance at all stages. It is also interesting to note that
progressively more of the variance in the rating of performance was accounted for as the time
to compete neared.

Table 4.16: Stepwise Regression Analyses: Predictors of Subjective Rating of Performance

<table>
<thead>
<tr>
<th>Anxiety Variable</th>
<th>r²</th>
<th>F-to-enter</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive Anxiety Direction</td>
<td>0.12</td>
<td>6.17</td>
</tr>
<tr>
<td>1 Day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Somatic Anxiety Direction</td>
<td>0.18</td>
<td>10.00</td>
</tr>
<tr>
<td>Self-Confidence Intensity</td>
<td>0.25</td>
<td>7.56</td>
</tr>
<tr>
<td>2 Hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Somatic Anxiety Direction</td>
<td>0.28</td>
<td>18.05</td>
</tr>
<tr>
<td>&lt; 30 Mins</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Somatic Anxiety Direction</td>
<td>0.27</td>
<td>16.96</td>
</tr>
<tr>
<td>Self-Confidence Intensity</td>
<td>0.35</td>
<td>12.49</td>
</tr>
</tbody>
</table>

In all cases, these relationships were positive. In other words, the more positive the perception of
one's anxiety, and the higher one's level of self-confidence, the better the rating of one's
performance.

4.8 The interrelationships between the three subjective ratings of performance were all high (0.83 to 0.89).
"Performance" ("How pleased were you with your performance?") was chosen as the dependent variable since it
correlated strongest with the other two variables and also because it incorporates the elements of position and
time/distance.

4.9 Correlations between performance and the three CSAI-2 frequency dimensions at all four stages of testing
ranged from 0.05 to 0.28
Correlations

In view of the exploratory nature of this investigation and the fact that predicted relationships between variables have not been established, it was decided to perform a correlational analysis of all the variables in this study. Therefore, the responses for the three dimensions of each subscale at each of the four stages of testing as well as subjective performance were correlated against one other to see if any interesting interrelationships emerged. Due to the large number of correlations, not all relationships are reported here (see Appendix 13 for correlation matrix) but rather a selected number are chosen that appear to be of interest. An interesting finding concerns the relationships between self-confidence intensity and somatic anxiety intensity and direction and cognitive anxiety intensity and direction. Although Parfitt et al. (1990) have questioned Martens et al.’s (1990) proposal that cognitive anxiety and self-confidence are at opposite ends of the same cognitive evaluation continuum (see Chapter 2), moderate correlations do tend to be reported between these two variables (e.g. Jones et al., 1990). However, as close inspection of the correlations at the final stage of testing in this investigation revealed, low to moderate correlations for self-confidence intensity and cognitive anxiety intensity (-0.34) and self-confidence intensity and somatic anxiety (-0.28) emerged. These findings are interesting when compared with the relationships between self-confidence intensity and cognitive and somatic anxiety direction as substantially stronger positive relationships emerge (0.54 and 0.68 respectively). These results are discussed at greater length in the final section of this chapter. A further interesting finding from the correlation analyses is the relationship that emerged between cognitive anxiety frequency and intensity, as this changed dramatically during the pre-competition period. The magnitude of the relationship decreased as the competition approached, reducing from 0.70 2 days before competition, to 0.19 30 minutes before. In other words, whilst a strong connection existed between the amount of cognitive anxiety experienced and how often it was experienced 2 days before the competition, no such association emerged at the final stage. This suggests evidence of the relative independence of these dimensions at this latter stage, and justification, therefore, for their separate measurement. The intensity-frequency correlations for the other two CSAI-2 components, on the other hand, showed no comparative reduction in the strength of the relationship. In both instances, the relationships were moderate and remained relatively stable over the four stages of testing (see Appendix 13).

As far as the interrelationships between the intensity and direction dimensions are concerned, the correlations provide further support for considering these variables separately. For example, the interrelationships between cognitive anxiety intensity and direction ranged between 0.16 and 0.21 over the four stages of testing. Similarly, the corresponding correlations for somatic anxiety intensity and direction ranged from -0.06 to 0.32. The nature
of these associations suggests that a substantial degree of independence exists between these dimensions. Interestingly, the interrelationships between intensity and direction of self-confidence became progressively stronger as the event approached, increasing from 0.24 to 0.65.

Interview Data

The material presented in this section is based on qualitative analysis of the interviews conducted with the 8 selected athletes. As in Study 3.1, representative interview quotes are presented throughout to illustrate the basis upon which statements are formulated.

The data is presented in three separate sections. The first section discusses the findings for cognitive anxiety from a general perspective, and then in relation to the specific event in which the interviewee competed. This discussion incorporates the findings for the intensity, frequency and direction of the response at the four stages of testing. Emphasis is placed on the data concerning the direction and frequency dimensions, as the findings for intensity tended to support the results of the previous study. The second section reports the findings for somatic anxiety in the same way and the third and final section discusses the findings for self-confidence. Brief biographies of all eight athletes and full interview transcripts of three of these athletes are presented in Appendix 9b and 11b respectively.

Although the interviewees were chosen to represent a cross-section of the sample in terms of the events in which they competed, they also represented the group in terms of questionnaire responses. As can be seen from Table 4.17, the mean values for the interviewees were similar to those of the sample a whole.

Table 4.17: Comparison between group means and interview sample means for the modified CSAI-2 variables

<table>
<thead>
<tr>
<th>Modified CSAI-2 Variable</th>
<th>Group</th>
<th>Interview Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Anxiety Intensity</td>
<td>17.1</td>
<td>18.2</td>
</tr>
<tr>
<td>Cognitive Anxiety Frequency</td>
<td>32.1</td>
<td>34.4</td>
</tr>
<tr>
<td>Cognitive Anxiety Direction</td>
<td>0.27</td>
<td>0.98</td>
</tr>
<tr>
<td>Somatic Anxiety Intensity</td>
<td>15.2</td>
<td>16.6</td>
</tr>
<tr>
<td>Somatic Anxiety Frequency</td>
<td>25.9</td>
<td>26.0</td>
</tr>
<tr>
<td>Somatic Anxiety Direction</td>
<td>1.62</td>
<td>0.80</td>
</tr>
<tr>
<td>Self-Confidence Intensity</td>
<td>24.9</td>
<td>26.4</td>
</tr>
<tr>
<td>Self-Confidence Frequency</td>
<td>33.8</td>
<td>35.2</td>
</tr>
<tr>
<td>Self-Confidence Direction</td>
<td>7.53</td>
<td>9.00</td>
</tr>
</tbody>
</table>
Cognitive Anxiety

The respondents were largely in agreement that their cognitive anxiety intensity levels generally tended to increase during the pre-competition period, although one athlete commented that he was least cognitively anxious at the within 30 minutes stage because 'warming up' and 'some hard strides' usually helped get rid of any worries that existed. However, the remainder of the athletes generally reported elevations in their cognitive anxiety as the event approached, and crucially, in the context of this study, it appears that these elevations were linked to a certain extent with increases in the frequency of cognitive anxiety intrusions. Athlete 2's comments are symptomatic of the interviewees as a whole: "I am more worried on the day, in that I can't settle to anything else. My whole day is geared to the meet so it's difficult to get away from worrying about it. Two days before, you're busy with other things so your mind is occupied with them - but on the day, I just can't settle or concentrate". Further support is provided by Athlete 3: "Everything happens more often. Two days before, a negative thought might creep in and then be gone - but on the day, or just before I run they're (negative thoughts) harder to get away from".

This lends some support to Jones' (1991) notion that an athlete who is thinking considerably about an event is unlikely to be experiencing the same cognitive state as an athlete whose mind is only occupied minimally by such thoughts. Additional evidence for this is provided by two further athletes: "I am certainly thinking or aware of some negative thoughts more often. Two days before I might think to myself 'I need to run well here' and then it's gone. Now, (two hours before) I'm just conscious of thoughts like that quite a lot" (Athlete 4) and "Things about the race come into my mind more often. If I think about the race when it's a long way off then there's no pressure, but as you get closer to it, it's more difficult to dismiss any negative thoughts I might have" (Athlete 1). Clearly, there is strong evidence here to question the assumptions concerning cognitive anxiety that are generated from use of the time-to-event paradigm. Multidimensional Anxiety Theory predicts that cognitive anxiety will remain constant in the period leading up to a competition with the implication that the state that the athlete is in remains unchanged, and yet extracts such as these suggest that the athlete may in fact experience cognitive anxiety that differs considerably in nature in the period prior to competing.

The interview data also cast doubt on the assertion that elevated cognitive 'anxiety' intensity is detrimental to performance, since the general consensus was that some cognitive anxiety was necessary and beneficial, although the performers also seemed to agree that too much cognitive anxiety debilitated performance. The important factor, however, is that this optimal 'amount' appears to be substantially mediated by individual differences in that some athletes reported different preference levels for the amount of cognitive anxiety they deemed to be facilitative. For example, "I definitely need some - I need some kind of spur. I've run badly
before in low key meets. because I just didn't get up for it. If I'm worried then that's a good
sign - unless I start panicking and then that's no good" (Athlete 3), and "I have to be worried to
a certain extent because without it I don't get psyched-up properly. It helps me get focused on
the things I need to do" (Athlete 2). These generally facilitative notions of cognitive anxiety
were not universal, however. Some athletes expressed less favourable perceptions: "I generally
don't do well under real pressure. It definitely gets to me. I seem to be at my best when I'm not
thinking about it and nobody expects anything of me" (Athlete 8), and "I think for me it's
probably negative, because I think too much - about silly things. It causes me to get uptight and
analyze too much. I'm thinking while I'm on the runway and I shouldn't. I should just let go.
I'm sure I'd do better without any" (Athlete 8).

These general findings were supported by the comments relating specifically to the two
events used in this study, as they were meetings seen as important and typically stressful. The
following extracts are specific remarks from four athletes whose questionnaire responses
indicated significant increases in the frequency of their cognitive anxiety with a slightly positive
interpretation of that response - which is reflective of the group as a whole. Athlete 2
commented: "I got fairly nervous actually. I was definitely a bit worried about running badly. I
didn't want to let myself down in front of that crowd. Occasionally, I'd get a 'you're not up to
it' thought but then I'd get rid of that and convince myself I was. So by the end it was probably
just about positive"; Athlete 3 endorsed this slightly positive interpretation of his cognitive
anxiety symptoms: "It was annoying because it should have been very positive. In front of that
crowd was very exciting, but I haven't been very well lately and so I was too bothered about
that to say I was really right for it. But on balance it was definitely helpful"; as did Athlete 5: "It
was probably a little positive because it made me concentrate hard - because I wanted to give
myself a chance. In warm-up Shane had lobbed it over 60 metres and I wanted to get near that.
That was a target so I suppose it was good", and finally, Athlete 7: "By then (30 minutes
before) I was worried, yes. Hoping that I wouldn't get blown away but that makes me
determined. Determined to hang on and squeeze out every bit I've got. In that way it was good
for me".

Somatic Anxiety

The comments concerning the general tendency to experience somatic anxiety, both in
terms of intensity and frequency, conformed virtually identically to the specific remarks that
were made, supporting the empirical data and essentially endorsing the prediction that both
intensity and frequency responses increase rapidly close to the start of the event. Athlete 3, for
example, provided clear evidence of this: "The AAA's was no more important than other events
for me. In fact, there are others that are more important, but I still got nervous about it. The fact
that a big crowd were there got me excited and I got a nice buzz warming-up. It's definitely
very exciting running in front of a large crowd". Athlete 4 provided similar support: "I think I was a bit more nervous than most home matches because of the coverage the AAA's match gets. It got a mention on the news on Friday night which gets you going because you know you're in it", as did Athlete 7: "There was a lot of chat about the AAA's match but I'm used to that. It means I got that feeling of being nicely on edge as I was getting ready". Athletes generally remarked about the positive nature of their somatic anxiety or physiological arousal. "All my best races have been when I'm really pumped up - in a positive way. There's a difference between being pumped up and on edge. When you're on edge - you're tight - and that's negative. When I'm pumped up it's a good feeling" (Athlete 4). Athlete 3 also commented on the importance of elevations of physiological arousal: "Very positive. The 800 metres is an aggressive event. You make a mistake because you're not ready and it's all over. When the pace is cranked up you need to react and be ready for it". This feeling was equally endorsed by Athlete 1: "Butterflies can help - they make you feel gee-ed up, which is good. Adrenalin is good for you. I quite like that feeling. There's a certain type of feeling that I know is good for me and usually lots of butterflies is like that". Athlete 1 similarly commented: "I know when I'm ready. It's a certain feeling I get. Very loose and lots of energy and it really gets me going. It makes me think I'm going to run well. In fact, I know I'm going to run well".

The comments relating to the West London and AAA's matches support this generally positive labelling of somatic anxiety symptoms but also indicate inter-individual variability in appreciation of the response: "I felt quite good for the AAA's match. My psyche was good. They had a couple of guys I wanted to beat and so I needed to get aggressive. So the nerves I got helped" (Athlete 3); "I'm looking to explode. and I was right there on Sunday. You can get over-psyched and just lose it - no control, all over the place, but on Sunday it was great. The crowd made a difference, but I kept my form. It was really good" (Athlete 4). However, this contrasts starkly with Athlete 5: "No, I was too uptight. It made me rush everything. I couldn't get right. I can't put my finger on it, but it affected me...in the wrong way".

These latter two quotes are of particular significance because both these athletes reported very similar somatic anxiety intensity levels. The former athlete, a hammer thrower, reported a somatic anxiety intensity score of 22 at the within 30 minutes stage. The other was a male javelin thrower who scored 21 at the same stage of testing.

Another athlete commented on not being appropriately aroused for his 800 metre race. "I wasn't up enough. It made me listless. I wasn't concentrating at all. So, yes, I would have said it was negative. I need some nerves to make me get into it" (Athlete 6). This particular athlete scored 13 on the somatic anxiety intensity scale (which is relatively low at this stage) and yet responded with -9 on the direction scale, revealing distinct dissatisfaction with his pre-competition physiological state.
These extracts tend to substantiate the findings that emerged from the cognitive anxiety data that individuals differ considerably in interpretations of their pre-competitive state and that these differing interpretations can occur at similar levels of intensity. What also appears to have emerged from the interviews is the apparent strong interrelationship between cognitive and somatic symptoms in that athletes tended to imply that their pre-competitive physiological state was related to the cognitions they were experiencing about the event. An extract from Athlete 2 provides a good example: "If I'm worried about losing then it just follows that I'm tense. I get tight in my shoulders in particular. I try to relax, but it doesn't help. If I think I'm going to lose, everything seems to get affected". This is interesting in the context of Catastrophe Theory (Fazey and Hardy, 1988; Hardy, 1990; Hardy and Parfitt, 1991). These authors have argued that a weakness of Multidimensional Anxiety Theory is that it attempts to explain the three-dimensional relationship between cognitive anxiety, somatic anxiety and performance in terms of a series of two-dimensional relationships. In other words, it examines the separate relationships between cognitive anxiety and performance and somatic anxiety and performance whereas catastrophe theory takes account of their interaction (see Chapter 5).

Self-Confidence

The interview data that was related to the specific events for self-confidence endorse the empirical finding that self confidence intensity and frequency remained stable. Athlete 8, for example, stated: "My confidence was pretty good, I'd say. I'm going fairly well at the moment - so it was the same throughout. I don't think that I'm conscious of being confident more or less of the time. It will only suddenly change if suddenly someone stuffs me in training or if I feel a niggle or something". This largely supported the general findings, although some athletes commented on a tendency for slight reductions in self confidence that was also found in the previous investigation. "My confidence will probably fluctuate as late as when I'm doing my warm-up. If I don't feel sharp warming-up, then that might affect me. Well, it does for sure. It affects how I run. If I feel good then I'll hit the front early and drive it, if not then I probably sit back and hope I'll have a kick left" (Athlete 3).

The fact that self-confidence direction increased in this study tended not to be supported in that the interviewees reported no alterations in their self confidence direction response, in line with intensity and frequency. However, one athlete did provide information that may explain this finding for the group as a whole: "I think the reason for that (more positive perceptions of self confidence direction on the day of competition) may have been that it's no big deal being confident two days before. You need to feel good at the time, and if I'm still feeling confident when I get to the track then that means more to me than it would if I was thinking about it a couple of days ago" (Athlete 6). This comment is interesting in light of the fact that the strength of the relationship between self-confidence intensity and self-confidence
direction for the group as a whole, increased from 0.24 two days before to 0.65 30 minutes before competing.

Some of the athletes alluded to a potential relationship between the intensity of self-confidence and the directional perception of their anxiety responses. The following two extracts suggest that an interesting interrelationship may exist between these variables: "If I'm feeling confident then everything feels good. I feel comfy about everything about me and I feel relaxed but in a confident way" (Athlete 2), and "When I'm feeling confident it's easy to see everything as positive. If I'm confident and I'm drawn in an outside lane then it doesn't bother me - but if I'm not (confident) then a bad lane draw would bug me. I try to turn the thing round, but I can't if I'm not confident because I figure I'm kidding myself. It's all a bit silly but negative thoughts come in. So, when I'm confident I like having butterflies because my whole attitude is very different, but if I'm not happy because I know I might struggle, then butterflies would bug me. I'd say to myself 'relax' but that's because I start to see everything negatively" (Athlete 7). The implications of these particular comments with regards the relationship between self-confidence intensity and interpretations of anxiety symptoms may prove to be illuminating and are discussed in the following section.

The material presented in this section appears to have largely supported the questionnaire data, in that the interviewees agreed that their empirical responses were a reflection of how they had felt and the interviewees responses were similar to those of the group as a whole. The interviews also again elicited detailed accounts of the precise nature of the athletes' thoughts and feelings and in so doing provided an explanation of certain phenomena that could not be gained from a purely quantitative approach. For example, a potential explanation was forthcoming for the fact that self-confidence was perceived as increasingly positive as the competition approached, despite intensity remaining stable. Athlete 6 explained that because his level of self-confidence had been 'retained' right up to the start of the event, the value or significance of that self-confidence was far greater than it had been earlier in the week and, therefore, the same level of intensity was perceived as more positive on the day of competition. Similarly, the qualitative support for the fact that frequency of anxiety symptoms does increase further endorses Jones' (1991) notion that cognitive states close to the start of the event are considerably different to those a week before.

DISCUSSION

The primary purpose of this study was to examine the additional competitive state anxiety dimensions of frequency and direction. This was conducted within the context of the time-to-event paradigm and, consequently, the temporal patterning of these dimensions, as well the existing intensity dimension, were considered. The first interesting finding was that, contrary to previous studies (e.g. Jones and Cale, 1989a: Study 2; Study 3.1), males and
females did not differ in the temporal patterning of their intensity responses. A possible explanation for this was proffered earlier in that the females who competed in the AAA’s match may have perceived the event as relatively unimportant due to the relatively low-key nature of the women’s events at this particular match, therefore, the match was not likely to be as anxiety-provoking as competitions examined in previous investigations.

Relating the findings to the experimental hypotheses, partial support was found for the first prediction in that females did increase in their cognitive anxiety (although very slightly and not to the same degree as in previous studies). However, the males did not remain completely unchanged as the event approached as predicted, in that cognitive anxiety increased at the final stage of testing. No support was found for the second hypothesis in that females did not report earlier elevations in somatic anxiety than males. This was due to the fact that the males reported earlier elevations in their somatic anxiety than expected with somatic anxiety increasing from 2 days to 1 day before competing. Therefore, both genders reported progressive elevations throughout the pre-competition period. This runs counter to previous findings for males which has tended to indicate an increase only on the day of competition. The interviews suggested that male somatic anxiety was elevated earlier than usual because of the exposure in the media and the local community of the AAA’s match and the large crowd that was predicted. Athletes reported earlier experiences of competition-related ‘physiological arousal’ than usual due to the high profile the event received both on campus and in the town. The findings did reveal, however, that overall somatic anxiety was greater in the females which supports a number of previous studies (e.g. Jones and Cale, 1989a; Study 2; Study 3.1). Partial support was found for the third hypothesis in that male self-confidence intensity scores remained stable in the pre-competition period but females did not report a decrease on the day of competition as their response remained stable like the males. The reason why female self-confidence did not decrease may also be related to the fact that some of the female subjects were competing in the AAA’s match. Although this finding is difficult to explain, the same explanation may be suggested as to the less substantial increase in cognitive anxiety that has been reported in other studies; that is, the relatively unimportant nature of this match for the women. This may have precluded any reduction in female self-confidence.

The temporal patterning for the frequency of the cognitive and somatic anxiety responses supported hypotheses four and five, with progressive increases throughout the pre-competition period. These findings are interesting in light of the assumptions of multidimensional anxiety theory concerning cognitive anxiety which proposes that this response remains unchanged as the event approaches. Whilst this ‘assumption’ regarding cognitive anxiety may be correct if adopting an intensity-alone perspective to the measurement of the construct, it appears from this study that measuring anxiety in this traditional way may not be providing the complete picture. The nature of the cognitive anxiety response may change during the pre-competition period, as evidenced by the increase in the frequency of anxiety-
related cognitions. However, the ability to detect any potential change in the response is being obscured by the existing psychometric approach to competitive state anxiety.

The interview data provided some interesting insights into individual variability in interpretations of anxiety responses. An excellent example of this is provided by the comments from the two throwers who were interviewed in this study. The hammer thrower and the javelin thrower reported virtually identical levels of somatic anxiety intensity and yet recorded completely differing interpretations as to the suitability of this 'anxiety'. The hammer thrower reported a somatic anxiety intensity score of 22 and perceived his somatic anxiety as very positive. The javelin thrower, on the other hand, perceived his somatic anxiety as very negative, having reported an intensity value of 21. This is interesting as both events are explosive throwing events and suggests that individual arousal level preferences may be more important than the nature of the task in determining optimal arousal levels. This is a finding that challenges the efficacy of adopting an intensity-alone approach.

Some individuals clearly felt that their cognitive and somatic anxiety symptoms (as measured by the CSAI-2) were extremely positive while others felt they were detrimental and yet, crucially, these comments are not intensity-related (i.e. negative perceptions did not necessarily correspond to high intensity levels and low intensity levels were not necessarily perceived as positive). This casts further doubt on the applicability of intensity as the sole form of anxiety assessment and is interesting in the context of the predicted relationship between cognitive anxiety intensity and performance which proposes a negative linear relationship between the two variables (see Chapter 5). In other words, the more cognitive anxiety, the worse it is presumed to be in terms of its impact on performance. However, the interview and empirical data from athletes in this study suggests that moderate levels of cognitive anxiety were perceived as positive and potentially enhancing to performance. This proposition is supported by the finding that direction scores of the anxiety components (which are generated regardless of intensity) formed stronger relationships with the subjective rating of performance used in this investigation than did the intensity of responses.

The results from the regression analyses indicates that athletes' directional perceptions of their cognitive and somatic anxiety symptoms may be better predictors of subjective ratings of performance than both the intensity and frequency of the response. The apparent importance of the somatic anxiety direction variable as compared to the directional perception of the cognitive anxiety response can perhaps be explained as a function of the subject population. The relative 'physical' nature of the sport, as opposed to an activity that may require more detailed decision-making, suggests that such athletes are particularly cued into their somatic

\[^{4.10}\] Direction scores will clearly be influenced by the intensity of the response but that influence is dependent on the intensity preference of the individual.
responses. Past experiences may have served to provide an accurate indication of how appropriate their current feelings in fact were. This was supported by evidence from the interviews which suggests that athletes know 'when they feel right'. The finding that somatic anxiety direction and self-confidence intensity combined as predictors is also interesting and suggests that a better indication of what is happening may come from an interaction between the dimensions that have been considered in this study. Certainly, the nature of the correlation between somatic anxiety direction and self-confidence intensity (0.68) suggests the strength of the interrelationship between these variables. This finding is noteworthy in the context of Watson and Tellegen's (1985) theory of affect which proposes that individuals low in confidence will report significantly greater negative affect than subjects high in confidence. The primary aspects of negative affect are negative mood and cognitions, which resemble to a certain extent, debilitating perceptions of cognitive and somatic 'anxiety'. It may be that high levels of self-confidence intensity generate positive perceptions of physiological reactivity/somatic anxiety and cognitive anxiety or vice-versa. Indeed, the interview data suggests that a potentially reciprocal relationship between self-confidence intensity and the direction of cognitive and somatic anxiety may exist. The interview data suggests neither self-confidence nor cognitive anxiety or somatic anxiety direction necessarily causes a change in the other but that there may be an interaction between the two. These comments are clearly interesting in view of the on-going debate concerning the relationship between self-confidence and anxiety between self-efficacy theorists (e.g. Bandura, 1977) and anxiety reduction theorists (e.g. Borkovec, 1976). These protagonists argue that a decrease in one component (i.e. self-confidence or anxiety) will lead to an increase in the other and vice-versa. However, in keeping with the importance attached to directional perceptions of anxiety levels made in this chapter, it may be that high self-confidence is associated with favourable perceptions of cognitive anxiety. Indeed, the interview data from this investigation supports this view by suggesting that self-confidence intensity does not necessarily alter or affect anxiety levels, but serves to increase positive perceptions about that anxiety. Whilst there is insufficient evidence to claim that self-confidence intensity causes a change in anxiety direction it is clear that an interaction between the two may operate close to the start of the event. Interestingly, previous research has shown correlations among cognitive anxiety, somatic anxiety and self-confidence intensity to be moderate (e.g., Gould et al., 1984; Martens et al., 1990), and in this investigation, self-confidence intensity correlations with cognitive anxiety and somatic anxiety were -.34 and -.28 respectively. However, the interrelationships between self-confidence intensity and somatic anxiety direction and cognitive anxiety direction that were reported earlier were more substantial (0.68 and 0.54 respectively), and served to emphasise the interesting nature of the interaction between these variables. Swain and Jones (1991b) reported similar findings in that the relationships between self-confidence intensity and cognitive and somatic
anxiety direction were stronger than the relationships between self-confidence intensity and cognitive and somatic anxiety intensity.

The progressive increase in the percentage of performance variance accounted for by the modified CSAI-2 variables, promotes the argument that researchers need to make their anxiety assessments as near to the start of the event as possible, in their attempts to establish the relationship between pre-competition anxiety levels and performance. Although levels of anxiety two days before competition are important to consider in terms of their potential influence on preparation, intuitively, they are not as important as anxiety levels at 30 minutes or even closer to the start of the event. The interview data that was gathered from both of the throwers, for example, mentions fluctuations within the competition. Chapter 3 referred to the paucity of research in this specific area and identified the benefits of attempting to assess anxiety levels within competition and the data from this investigation supports those comments. To date, McAuley (1985) and Martens et al. (1990, study 3) are the only studies that have attempted to examine anxiety during performance and researchers must explore ways of rectifying the current imbalance in the literature.

The results in general may have important implications for mental preparation. The fact that interpretations of the suitability of one's cognitive and physical state may exert an influence on performance suggests that it may be beneficial for some athletes to utilise a cognitive restructuring technique, such as a relabelling of their anxiety symptoms as positive and facilitating, as opposed to attempting to reduce anxiety levels through various relaxation techniques. Evidence shows that some individuals find it difficult to relax (Bunker and Williams, 1986) and that such performers could clearly benefit from an alternative approach to facilitating an optimal performance state.

However, it is important to acknowledge that the performance 'measure' used in this study was a subjective assessment of how well the athlete felt he or she had done. Knowledge of Watson and Tellegen's (1985) theory of affect ensures that such findings are treated with caution. Their proposed theory of mood alluded to earlier, includes the bipolar constructs of negative and positive affect, with negative affect centring on the conscious, subjective experience rather than on an objective condition. In other words, it emphasizes how people feel about themselves and their world rather than how effectively they may actually handle themselves in the world. Those individuals high in negative affect will tend to report on incidents more negatively across time and regardless of the situation. An athlete with a negative affective disposition, therefore, will be more inclined to rate, say, a mediocre performance, as disappointing and a failure, than another individual in the same situation who is high in positive affect. This may have served to bias the results in that perceptions of anxiety may have only related to performance due to the influence that positive and negative affect may have had on assessing performance. An improvement on this particular study, therefore, would be to
incorporate an objective measure of performance in order to avoid the potential scope for inaccuracy that subjective measures inevitably provide.

Summary

In view of the fact that two studies have been reported in this chapter, it would seem appropriate to provide a brief summary. Study 3.1 examined the frequency of 'cognitive intrusions' about a forthcoming event (where 'intrusions' referred to the extent to which one's mind was occupied with thoughts about the upcoming event), as well as responses to the CSAI-2. The interesting finding was that cognitive anxiety in males essentially remained stable whilst the frequency of their 'cognitive intrusions' (or 'percentage thinking time' as it was also conceptualized) increased progressively throughout the pre-competition period. This suggested that a further dimension of anxiety (i.e. frequency) may exist that could assist our understanding. However, to make this suggestion with greater conviction, it needed to be demonstrated that an increase in 'cognitive intrusions' actually included an increase in the frequency of the anxiety-related cognitions.

Study 3.2 developed this first investigation in a number of ways. Firstly, the frequency of specific anxiety cognitions were measured; secondly, the further dimension of direction was incorporated; and finally, a subjective measure of performance was included. The findings provided further evidence to demonstrate the limited utility of the current intensity-alone perspective that is adopted by multidimensional anxiety theorists by revealing, in particular, that the frequency of cognitive anxiety symptoms increased whilst the intensity of the same symptoms essentially remained stable. The fact that the frequency of anxiety symptoms increased (and not just frequency of cognitions about the event) substantiates the comments made in study 3.1 regarding the fact that cognitive anxiety remains stable in the period prior to competition. Importantly, the interview data from this study revealed that although the percentage thinking time often involved task-related cognitions, some of these cognitions were anxiety-related as well.

The findings from study 3.2 also revealed that athletes' directional perceptions of their anxiety symptoms may be better predictors of subjective ratings of performance than both the intensity and frequency of the response and, therefore, measurement of directional perceptions appears to be warranted. The fact that two individuals report the same intensity levels of anxiety symptoms but label them in vastly different ways, suggests this approach may be of considerable value. It is important to reiterate that the CSAI-2 only measures symptoms that are purported to assess anxiety. However, some individuals clearly do not perceive some of these symptoms as negative when they experience them.

Related to this issue is the finding that a direction dimension scale may be more predictive of a subjective measure of performance than intensity, which in view of the
inconsistency in documenting the relationship between anxiety-related constructs and performance is clearly significant. It seems clear that valuable information can be gathered from further analysis of this direction dimension especially in terms of the relationship with performance. The investigation reported in the next chapter attempts to address these issues with a more cogent assessment of performance.
CHAPTER 5

RELATIONSHIPS BETWEEN INTENSITY AND DIRECTION DIMENSIONS OF COMPETITIVE ANXIETY AND PERFORMANCE

Study 3.2 provided interesting findings relating to the relationship between dimensions of competitive state anxiety and a subjective rating of performance. Specifically, the intensity of self-confidence and the direction of somatic anxiety responses emerged as the dominant predictors of Track and Field athletes' perceptions of how well they felt they had performed. This suggests the value of examining additional dimensions of competitive state anxiety and, in particular, the direction dimension, in investigations of the anxiety-performance relationship. However, the previous study involved only a subjective measure of performance, the weaknesses of which were discussed earlier. The focus of the investigation reported in this chapter, therefore, is to examine the relationship between anxiety and a validated, objective measure of performance, with particular emphasis on the dimensions of intensity and direction. It was decided to concentrate on these two dimensions of the anxiety response and to omit the frequency dimension that was included in the previous study, for two reasons. Firstly, the frequency variables had formed very weak relationships with subjective performance in that investigation, and secondly, the percentage of performance variance accounted for 30 minutes prior to competition was considerably greater than at earlier times in the pre-competition period. Therefore, in order to examine the specific relationship between anxiety and performance, there appeared a need to concentrate on this final stage of testing as the previous study indicated that anxiety assessments taken at this stage were most likely to form associations with performance. As a result of this decision to focus exclusively on the final stage of testing, it meant that the time-to-event paradigm was not employed as it had been in the two previous studies involving additional dimensions. In the previous studies, frequency was measured in an attempt to indicate that cognitive anxiety did not in fact remain the 'same' during the pre-competition period. In this study, responses during the pre-competition period were not examined since the focus of interest had shifted to anxiety just prior to competition. Clearly, removal of the time-to-event paradigm creates the methodological problem that was alluded to earlier in Chapter 3, of having only one absolute measure of anxiety; that is, 'one-off' measures do not really allow the researcher to determine whether the performer has his or her anxiety levels under control. However, this potential problem was not an issue because of the longitudinal design which the investigation that is reported in this chapter employed. This investigation involved measurement of pre-competition anxiety and performance of the Loughborough University Men's basketball squad from six matches during the first part of the 1990/1991 season. Four of the players were also interviewed after each of the six games. These players, who were the
same throughout the interview process, were selected on the basis of their differing trait anxiety levels. The methodology combined, therefore, both nomothetic and idiographic approaches.

The chapter is presented in the following way. The first section includes a review of the literature that has examined the arousal-performance or anxiety-performance relationship. Since this area is so vast, the review is presented in a number of separate sections. The first section is subdivided into two parts, the first of which briefly reviews a number of theories that have been forwarded to account for this relationship, whereas the second part focuses exclusively on Multidimensional Anxiety Theory and performance. This second part is divided into two further subsections; firstly, work from the general psychology literature is considered and then research specific to sport psychology and the CSAI-2 is described. The next section discusses the importance of the measurement of the direction dimension in light of the recent methodological improvement of intra-individual analyses in anxiety-performance relationship studies. In other words, researchers have already acknowledged the need to control for interperson variance in anxiety responsiveness. Despite this, a justification for measuring direction is provided. The final section of the introduction discusses the means of adequately assessing performance and justifies the change in methodology that this study adopts. This involves a more idiographic, case study approach with four players providing detailed interview data after each of their six games. It has been argued that this aspect of the methodology is particularly well suited to the examination of the anxiety response (Gould & Krane, in press). The introduction concludes with a brief explanation of the decision to include a mood adjective checklist in order to compare mood responses with the direction dimension of the CSAI-2. The chapter will then proceed with a detailed explanation of the longitudinal investigation that was performed with the Loughborough University Mens basketball squad.

ANXIETY AND PERFORMANCE

A number of theories and hypotheses have been generated as a means of explaining the relationship between arousal or anxiety and athletic performance5.1. One of the first theories proposed was Drive Theory which was later superceded by the Inverted-U Hypothesis. These two theories were not formulated as anxiety theories but researchers have wrongly used the Inverted-U, in particular, to describe the relationship between anxiety and performance. While the study reported in this chapter is an investigation of the anxiety-performance relationship, it would be wrong to ignore these early arousal-performance hypotheses since the ensuing anxiety-performance relationship theories have been derived and developed from these original

5.1 As in the previous chapters, anxiety-related terminology is used interchangeably in this section. This is a reflection of the terms that have been adopted by sport psychologists in the context of the theories that are discussed.
explanations. More recent theories include Catastrophe Theory, Reversal Theory and Multidimensional Anxiety Theory. In the following section each of these (with the exception of the latter) is discussed briefly. Due to the emphasis of this thesis on Multidimensional Anxiety Theory, the literature concerning multidimensional anxiety and performance will be reviewed separately and in greater detail.

**Drive Theory**

Drive Theory was originally proposed by Hull (1943) and modified by Spence and Spence (1966) and indicated that performance is a product of drive and habit strength. Drive is considered synonymous with arousal and habit strength as the dominance of the correct or incorrect response. Thus, the arousal-performance relationship is expressed as the linear relationship \( P = H \times D \), with increased arousal causing an increase in the frequency of the concomitant response. Early during learning, the dominant response would be the incorrect one. The theory predicts, therefore, that increased arousal would be detrimental during skill acquisition. However, when a skill is well learned, arousal or drive would increase the probability of the dominant 'correct' response and performance would improve with increased arousal.

In over 25 studies reviewed by Spence and Spence (1966), all but four supported the hypothesis that arousal was positively correlated with performance. Although many studies supported Drive Theory; they tended to employ very simple tasks such as response timing. Furthermore, Martens (1971) conducted an extensive review of the literature testing Drive Theory and found approximately an equal number of studies supporting and rejecting the predicted relationships between arousal and performance. Another criticism of this theory is that it did not seem to be sufficiently applicable to complex motor tasks (Martens, 1971; Weinberg, 1979), and is therefore considered too simplistic to explain complex athletic performance (Fisher, 1976). It is also very difficult to determine the habit hierarchy of correct and incorrect responses in most motor skill tasks so that it is difficult to adequately test the theory. Hence, Martens (1971) and others (Neiss 1988; Weinberg, 1989) have strongly rejected the use of the Drive Theory in motor behaviour contexts.

**Inverted-U Hypothesis**

An alternative approach which has superceded Drive Theory is the Inverted-U Hypothesis. This had its origins in the work of Yerkes & Dodson (1908) on the effects of electric shock upon discrimination learning in mice. In Yerkes & Dodson’s experiments, the mice had to discriminate between the brightest of two boxes, with an electric shock being administered for discrimination failure. The results showed that increases in the strength of the
shock produced faster acquisitions up to a certain shock intensity. After which the speed of learning deteriorated. Furthermore, the more difficult the discrimination, the lower the shock intensity for 'peak' performance. It was not until the 1950s, however, that interest in this research became apparent and began to be referred to as the Yerkes-Dodson law. Broadhurst (1957) stated that decreases in optimum motivation with increases in difficulty of a learning task constituted the principle of the Yerkes-Dodson law (Jones and Cale, 1989b), and obtained some further evidence to support the relationship in an experiment in which rats were required to learn a brightness discrimination task under varying degrees of air deprivation. Based upon the claim that this stimulus to learn the task involved positive reinforcement (air to breathe) rather than negative reinforcement (an electric shock), Broadhurst proposed that the Yerkes-Dodson law was generalisable to situations involving positive drives as well as punishment situations. In other words, he claimed that there was a curvilinear relationship between (negative or positive) drive and performance, with performance improving up to an optimum level and then decreasing with further increases in the drive level. The major assumptions of arousal theorists are that for every type of behaviour there exists an optimal level of arousal, usually of moderate intensity, that produces maximum performance, and this optimal level decreases as performance complexity increases. Levels of arousal above or below this optimum amount are seen to produce inferior performance. Thus, the hypothesis simply states that increases in arousal are accompanied by increases in performance up to a certain point but further increases cause a deterioration in performances.

The Inverted-U Hypothesis has been the primary explanation used in contemporary sport psychology to examine and interpret the anxiety-performance relationship. The hypothesis was supported by Martens and Landers (1970) when examining performance on a tracing task involving arm steadiness. Subjects in a moderately stressful situation performed the task better than those in the low stress and high stress conditions. The stress levels were manipulated by varying the emphasis on performance scores from a relaxed, low stress setting in which no emphasis was placed on scores to an elaborate, high stress condition. In this latter condition, researchers were dressed in white lab coats with the subjects hooked up to a bogus shock machine with threatening labels and instructions indicating that low scores would result in shocks. The three stress conditions yielded three levels of arousal and performance scores formed an Inverted-U pattern, with best performance occurring in the moderately stressful condition. Klavora (1978) also supported the Inverted-U Hypothesis in a study involving male high school basketball players. In this investigation, Klavora asked coaches to evaluate each player in terms of whether he had played below, close to or well above his own ability. Across 8 to 14 games for each player, outstanding performance was associated with moderate levels of pre-competition state anxiety and average performances associated with means either smaller or larger than mean state anxiety scores for the outstanding category. Poor performance contained the smallest and largest state anxiety means. A configuration of means strongly supporting the
Inverted-U was found. Performance of female collegiate basketball players was also shown to follow an Inverted-U pattern (Sonstroem and Bernardo, 1982). Polynomial trend analyses revealed significant quadratic relationships between performance and state anxiety (as measured by the CSAI (Martens et al., 1980)) across three levels (high, medium and low) of trait anxiety. In other words, best performance was associated with moderate state anxiety, whereas any poorer performances occurred at relatively high and low levels of state anxiety. Support for the Inverted-U Hypothesis was also found in a study of hitting performance in Little League baseball players (Lowe, 1973), with best performances occurring when players were under moderate stress. Lowe operationalised stress as the criticality of the situation in the latter stages of the game. In other words, if the game was very close and the outcome very much in the balance then this equated to high stress, whereas if either team held a large lead and the outcome was certain, then this was interpreted as a low stress situation. Moderate stress was operationalized as a relatively close game with a particular outcome likely but not absolutely certain.

Despite having some empirical support in the sport psychology literature, the Inverted-U has received a great deal of criticism. Firstly, Landers (1980) contended that the Inverted-U Hypothesis does not explain the relationship between arousal and performance but that it merely notes that the relationship is curvilinear. Whilst Landers and Boutcher (1986) have offered possible attentional explanations (focusing on Easterbrook’s (1959) cue utilisation theory and Bacon’s (1974) attentional selectivity notions) for why and how arousal influences performance in an Inverted-U fashion, a full test of these predictions has never been made. Hence, the Inverted-U is merely a general prediction and not a theory which explains how, why and precisely when arousal affects performance. The Inverted-U also has “an apparent lack of predictive validity in practical situations” (Hardy and Fazey, 1987; p.4). Specifically, experiential knowledge suggests that after an athlete’s anxiety increases beyond the optimal level, slight decreases in anxiety do not correspond to similar incremental improvements in performance (Hardy and Fazey, 1987). Rather, performance deteriorates in a drastic and catastrophic fashion (see following section).

Other criticisms of the Inverted-U stem from the methodological, interpretive, conceptual and statistical problems in previous studies purporting to support this hypothesis (Jones and Hardy, 1989; Neiss, 1988). Equivocal findings have often been explained by noting individual differences, task characteristics or imprecise measurement of performance (Gould and Krane, in press). Failure to recognise the multidimensional nature of arousal/anxiety is a primary criticism of the Inverted-U Hypothesis (Jones and Hardy, 1989). These authors commented that "arousal as a unitary concept reached a zenith with Moruzzi and Magoun’s (1949) identification of the brain stem reticular formation as the neuropsychological structure which mediated generalized drive" (p.42). The reticular activation system was assumed, therefore, to serve as a generalized arousal mechanism which responded to sensory
input of all kinds, energized behaviour and produced both EEG and sympathetic nervous system activation (Fowles, 1980). Thus, arousal was regarded as a unidimensional activation response which prepared the organism for action. Duffy (1962) defined arousal as "the extent of release of potential energy, stored in the tissues of the organism, as this is shown in activity or response" (p.179). Similarly, Malmo (1959) defined arousal as relying on a continuum of neural excitation ranging from comatose states of deep sleep to extreme excitement. Consequently, arousal or activation conceptualized in this way was viewed as a unitary concept in which increases in arousal were accompanied by increases in behavioural, physiological and cognitive indices. Researchers at this stage did not distinguish between the constructs of arousal and activation, although this in itself is inappropriate. Pribram and McGuiness (1975), for example, distinguished three separate but interacting neural systems: "One regulates arousal resulting from input; a second controls the preparatory activation of response mechanisms and a third operates to coordinate arousal and activation, an operation that demands effort" (p.116).

Tucker and Williamson (1984) suggested that there are two major cortical regulatory systems; arousal is externally orientated, located primarily in the right hemisphere and parietal regions, whereas activation is internally orientated and associated with the left hemisphere and frontal regions.

This notion of unidimensional activation responses was challenged by Lacey (1967) whose discussion of directional fractionation and situational stereotypy provided arguments that Arousal Theory found difficult to refute (Jones and Hardy, 1989). Lacey argued that it is possible to identify three forms of arousal: Electro cortical (i.e. cognitive), referring to the degree of electrical activation taking place in the cortex and measured by EEG; autonomic (i.e. somatic), referring to the degree of physiological activity that is primarily under the control of the automatic nervous system and measured by such indices as skin conductance, respiration, heart rate and blood pressure; and behavioural arousal, referring to the overt activity of the organism. Lacey cited substantial evidence to illustrate that high cognitive or behavioural arousal does not always result in increased physiological activity, and vice-versa. Instead, he argued that arousal is not a unidimensional but a multidimensional concept, where physiological, cognitive and behavioural responses are specific to, as opposed to uniform across, different situations. Neiss (1988) argued that the term arousal, as it is used in Inverted-U explanations of the arousal/anxiety performance relationship, refers to the common variance shared by the physiological components of a number of states, such as anger, excitement and fear. Consequently, arousal as a construct is "artificially severed from its psychological context" (p.354). This clearly has methodological and theoretical implications. As Neiss continued "arousal cannot be created in a pure form for research purposes, nor can cause be legitimately attributed to it" (p.355). Therefore, the Inverted-U Hypothesis, if thought of as stating a cause and effect relationship between arousal and performance, can never be supported. Neiss' criticisms are also largely based on his contention that the hypothesis is
irrefutable. The proposed variability of optimal arousal and the influence of task complexity has allowed researchers, he argued, to fit most data to the Inverted-U curve. Any evidence contrary to the Inverted-U Hypothesis could be explained by suggestions that the subjects were not sufficiently aroused or that the task was too simple or complex (Neiss, 1988). These criticisms lead Neiss to claim that "the Inverted-U Hypothesis reveals only that the motivated outperform the apathetic and the terrified.....and it has not received clear support from a single study" (p.355). When the pressure mounts, what actually accounts for some peoples' loss of coordination while others perform better than expected? Even if an Inverted-U relationship emerges between levels of arousal and these performance consequences, the question remains as to what psychological factors mediate these changes. As Neiss concluded, "the Inverted-U Hypothesis has primarily served to obscure these important individual differences. To average across subjects only disguises the fact that some peoples' performances improve.....A psychology of motor performance must be able to account for these individual differences and is unlikely to do so adequately with physiological constructs such as arousal" (p.355).

Clearly, the Inverted-U Hypothesis has received substantial criticism from a variety of sources and this has lead a number of researchers to look for alternative and more suitable explanations of the anxiety-performance relationship. The more prominent of these approaches are detailed in the next section.

**Catastrophe Theory**

A recently proposed alternative to the Inverted-U Hypothesis is Catastrophe Theory (Hardy and Fazey, 1987). The Inverted-U Hypothesis and Catastrophe Theory are similar in that both predict that increases in stress will facilitate performance up to an optimal level. However, what occurs after this critical threshold differs between the two theories. The Inverted-U Hypothesis suggests that with further increases in stress, performance will decline in a symmetrical, orderly, curvilinear manner. Thus slightly too much anxiety will result in a slightly hindered performance which gets worse as one moves further away from the optimal level. However, according to Catastrophe Theory, when an athlete 'goes over the top' there will be a large and dramatic decline in performance. As Figure 5.1 indicates, the athlete will experience a sudden drop on to the lower performance curve and in order to return to the level of performance prior to the 'catastrophe', there needs to be a substantial reduction in the amount of stress. Hence, it would be very difficult for athletes to recover from this 'catastrophe' even to a mediocre level of performance.

Catastrophe Theory was derived by Rene Thom (1972) as a mathematical model for describing discontinuities that occur in the physical world. While Thom developed the theory, it was Zeeman (1976) who popularised it when he demonstrated that the model could be applied to a wide range of social science phenomena. Several Catastrophe models have been
developed, the most commonly applied model and most easily understood is the cusp-Catastrophe model (Hardy, 1990). The cusp-catastrophe model is three dimensional and consists of a normal factor, a splitting or bifurcation factor and a dependent variable (Zeeman, 1976). The normal factor is the variable in which increases are associated with increases in the dependent variable. The splitting factor at least partially determines the effect of the normal factor on the dependent variable.

When used to explain the anxiety-performance relationship, Catastrophe Theory assumes that there are two subcomponents to anxiety; cognitive anxiety and physiological arousal. Physiological arousal (labelled the normal factor) is characterised by a sympathetic physiological arousal response and may be reflected to some extent by somatic anxiety. Cognitive anxiety (labelled the splitting factor) mediates the effects of physiological arousal and can directly influence performance (the dependent variable). The model proposes that cognitive anxiety acts as the splitting factor which determines whether the effect of physiological arousal (normal factor) will be minimal or catastrophic or somewhere in between these two extremes, (see Figure 5.2). These roles were chosen so that the model would possess four characteristics of the anxiety-performance literature. When cognitive anxiety is low, the model predicts that the relationship between physiological arousal and performance should be the uniform or mildly Inverted-U shaped curve which is given by the back face of Figure 5.1 (Hardy, 1990). When physiological arousal is high, the model predicts a negative correlation between cognitive anxiety and performance, as shown by the right hand face of Figure 5.2. When physiological arousal is low (e.g. during the days prior to a competition), the model predicts that cognitive anxiety should lead to enhanced performance. Finally, when cognitive anxiety is elevated, the model predicts that the effect of physiological arousal upon performance could be either positive or negative, depending upon exactly how high cognitive anxiety is (Hardy, 1990).

Fazey and Hardy (1988) proposed a number of testable hypotheses from the model. Firstly, physiological arousal, and the associated somatic anxiety, are not necessarily detrimental to performance; however, they will be associated with catastrophic effects when cognitive anxiety is high. Secondly, under conditions of high cognitive anxiety, hysteresis will occur. That is, performance will follow a different path when physiological arousal is increasing compared to the path it follows when physiological arousal is decreasing. Under conditions of low cognitive anxiety, hysteresis will not occur. This is essentially congruent with earlier findings in the test anxiety literature (e.g. Morris and Liebert, 1973). Thirdly, intermediate levels of performance are most unlikely in conditions of high cognitive anxiety. Specifically, performance should be bimodal under conditions of high cognitive anxiety and unimodal under conditions of low cognitive anxiety (see Zeeman, 1976).

Since the application of Catastrophe Theory to the anxiety-performance relationship is such a recent development, there is little direct evidence to support it. However, Hardy and Parfitt (1991) found that under conditions of high cognitive anxiety, performance followed
Figure 5.1: TWO-DIMENSIONAL CATASTROPHE MODEL (FROM HARDY, 1990)

Figure 5.2: CATASTROPHE MODEL OF THE RELATIONSHIP BETWEEN ANXIETY AND PERFORMANCE (FROM HARDY AND FAZEY, 1987)
different paths when physiological arousal either increased or decreased, whereas under conditions of low cognitive anxiety this effect on performance did not occur. The experiment made use of the time-to-event paradigm to manipulate cognitive anxiety. Eight experienced female basketball players were tested one day before an important basketball game and one day after it, in order to manipulate cognitive anxiety independently of physiological arousal. These days were chosen because they had been shown to produce high and low cognitive anxiety coupled with low physiological arousal and somatic anxiety in basketball players. On each of these days physiological arousal was manipulated by means of physical exercise and monitored by measuring heart rate. Subjects' physiological arousal levels were increased by requiring them to perform shuttle runs. Subjects were asked to perform a series of basketball set shots at various levels of arousal.

What is innovative about Catastrophe Theory is the three dimensional approach it takes to the relationship between anxiety and performance. It provides an explanation of how cognitive anxiety and somatic anxiety interact to influence performance and in so doing challenges the value of examining the separate relationships of cognitive anxiety and performance and somatic anxiety and performance. Furthermore, it recognizes that phenomena in the real world athletic settings do not always function in perfectly symmetrical ways. In terms of practical implications, it appears clear that when cognitive anxiety is high, the consequence of too much physiological arousal is very damaging (Hardy, 1990). Since performers are already highly cognitively anxious and physiologically aroused on the day of important competitions, the Catastrophe model would suggest the efficacy of a "most conservative and controlled approach to any pre-match 'psyching-up strategies' which a coach might employ" (Hardy, 1990; p.98). Limitations of the theory include its complexity and the need to obtain a large number of assessments on the same athletes over time to test it.

Reversal Theory

Another development applicable to the anxiety-performance literature is Reversal Theory proposed by Smith and Apter (1975) and popularised in the European sport psychology literature by Kerr (1985, 1987). Reversal Theory suggests that an arousal continuum can be divided into four quadrants by combining it with a stress continuum. This results in four quadrants labelled anxiety, excitement, boredom and relaxation. An individual may interpret arousal as pleasant or unpleasant depending on the situation. More specifically, high arousal may be interpreted as excitement or anxiety and low arousal may be interpreted as relaxation or boredom. Apter (1984) explained that these differing interpretations of arousal are mediated by the metamotivational state or mode that the individual is in at the time. The telic state is characterised by its seriousness or preference for low arousal while the paratelic state is characterised by its preference for high levels of arousal. The changes that occur from one
metamotivational state to another are known as reversals. Apter (1984) used the example of risk-taking sports such as rock climbing or parachuting to illustrate his concept of psychological reversals. The danger involved induces a high level of arousal. in the telic state experienced as anxiety, and then when the danger is mastered the anxiety suddenly reverses and becomes experienced as excitement in the paratelic state.

An important implication of Reversal Theory is that high arousal is not necessarily unpleasant. Rather, depending on one's metamotivational state, it can be perceived as positive or negative. Martens (1987b) believed that there is a positive linear relationship between an athlete's paratelic state, or what he labels positive psychic energy, and performance, while telic, or negative psychic energy, states are associated with performance in a negative linear fashion. Unfortunately, Martens' (1987b) interpretation of the Reversal Theory-performance relationship is based on tacit knowledge and the intuitive appeal of this approach rather than any empirical evidence.

In a review of the general anxiety literature, Apter (1984) cited the work of Svebak (1982, 1983) which found that telic dominant subjects tend to elicit increased task-irrelevant muscular tension and greater heart rate in threat conditions compared to paratelic dominant subjects. Martin, Kuiper and Olinger (1988) found that paratelic dominant subjects performed better on a video game under conditions of stress, whereas telic dominant subjects performed better in the non-stressful condition. Kerr (1987), in a laboratory-based squash study, found that players with the paratelic state operative experienced high levels of arousal as pleasant while telic state players found that high levels of arousal provided anxiety.

Reversal Theory offers a potentially exciting alternative explanation of the anxiety-performance relationship. Its strength lies in the importance it places on the athlete's interpretation of arousal states. Current limitations include the lack of a paratelic psychic energy measure and the lack of any investigations designed to test its predictions.

This brief review has clearly shown the breadth of approaches that exist to explain this complex phenomenon and yet current sport psychology thinking is dominated by Multidimensional Anxiety Theory. The following section concentrates on multidimensional anxiety as this investigation examines the relationships between multidimensional anxiety and performance. A weakness of this approach is that it deals with these relationships in a series of two-dimensional relationships (i.e. cognitive anxiety and performance, somatic anxiety and performance and self-confidence and performance) and consequently fails to take into account how the anxiety components interact. This acknowledgement begs the question why an examination of Catastrophe Theory has not been undertaken. However, as previously mentioned, this theory is relatively complex, so to incorporate the additional dimension of direction into the investigation would only serve to exacerbate this complexity.
MULTIDIMENSIONAL ANXIETY THEORY AND PERFORMANCE

This section categorises research that has considered the effects of multidimensional anxiety upon performance into two parts. The first of these discusses research from the general psychology literature, whilst the second concentrates on the sport psychology literature and, in particular, work which has used the CSAI-2.

General Psychology

The research evidence examining the specific relationships between global performance and cognitive-somatic components of state anxiety in the general psychology literature is relatively limited. However, evidence suggests that worry and emotionality\(^5\) have differential effects on intellectual performance. In actual examinations the differences between worry and test performance and emotionality and test performance are not large but they are consistent (Morris et al., 1981a). As evidenced in a number of studies, worry is the anxiety component most consistently and strongly related (inversely) to academic performance (e.g. Deffenbacher, 1980; Doctor and Altman, 1969; Morris and Liebert, 1969). Doctor and Altman (1969), for example, administered the TAQ immediately preceding the final examination of an undergraduate psychology course. Results showed that worry was more highly associated with the examination score than emotionality with high worry subjects performing significantly worse than low worry subjects. Data from studies using laboratory-based intellectual tasks also show differential effects of worry and emotionality on performance. Morris and Perez (1972), for example, found worry, but not emotionality, to be negatively correlated with reading test performance and that worry was correlated stronger with performance than emotionality. Holroyd, Westbrook, Wolf and Badhorn (1978) found that worry correlated \(-0.80\) with anagram performance whereas emotionality was unrelated to performance. Finally, Deffenbacher (1978) found that scores on both a task-generated interference scale and a worry scale were highly and negatively correlated to anagram performance, unlike the emotionality scale that was used.

Morris, Smith, Andrews and Morris (1975) suggested that whilst worry might be the dominant influence upon cognitive performance in test situations, emotionality might well interfere with motor performance. This was based on Morris and Liebert's (1969) speculations that emotionality may be the component which interferes most with motor performance due to shaking hands and decreased muscular coordination. Students (N=49) who were enrolled in a

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\(^5\) In keeping with the terminology used by test anxiety researchers, a brief return to ‘worry’ and ‘emotionality’ is made here.
type-writing class completed three 5 minute timed writings. A 'net words per minute' score, taking into account typing speed and accuracy, constituted the performance score. Correlational analyses revealed, contrary to Morris et al.'s (1975) expectations, that emotionality did not interfere with performance, whereas worry did. In other words, the findings were similar to those involving cognitive tasks.

Deffenbacher (1977) found a complex interaction between cognitive and somatic anxiety, suggesting that anxiety may become debilitating only when both components of anxiety are elevated to high levels. He found that both worry and emotionality were negatively correlated with performance on the Miller Analogues Test. However, in a detailed re-analysis of his and Morris and Perez's (1972) data, Deffenbacher (1980) later concluded that:

"Partial correlations demonstrated that when the effects of emotionality were partialled out, worry continued to form a significant negative correlation with performance. However, when worry was partialled out, emotionality was not significantly correlated with performance" (Deffenbacher, 1980; p.115).

Doctor and Altman (1969) also found interesting interrelationships between worry and emotionality that support Deffenbacher's initial analyses. They found that high anxious subjects (i.e. high worry and high emotionality) performed more poorly than moderate anxiety subjects (i.e. high worry and low emotionality and low worry and high emotionality) who in turn performed better than low anxious subjects (i.e. low worry and low emotionality). In keeping with Deffenbacher's earlier arguments, therefore, those subjects who performed worst were those who experienced high levels of both anxiety components. Doctor and Altman's findings support the Catastrophe Theory notion that performance will deteriorate most markedly when both cognitive anxiety and physiological arousal levels are high at the same time.

However, due to the correlational nature of the majority of these investigations, it is not possible to establish a cause and effect relationship between worry and performance. One argument is that worry prior to and during tests may interfere with performance by distracting attention from preparation for the test and from the task itself. Wine (1971) and Hamilton (1975) suggested that interference occurs as a result of anxious subjects being preoccupied with their own personal thoughts and concerns at the expense of the task in hand. The fact that cognitive anxiety is argued to be more strongly and consistently related to performance is in essence based on the notion that somatic anxiety is hypothesized to dissipate once performance begins, whilst the subjective probability of success is free to vary throughout performance. It is proposed, therefore, that cognitive anxiety should be the principal influence upon performance and that this influence should be a negative one. Morris et al. (1981a) have argued that somatic
anxiety should only affect performance if it is so extreme that the performer becomes preoccupied with his or her physiological state.

Alternatively, worry may reflect concern about accurately perceived past and present performance difficulties, rather than acting as a cause of poor performance. In other words, if an individual is experiencing high levels of anxiety and then performs poorly, that poor performance may not necessarily be attributed to his or her anxiety levels. A better explanation may be that anxiety is the consequence of a realistic assessment of how the performer will do in the test. That is, the performer knows that he or she will do badly and, therefore, experiences anxiety as a result. For example, O'Neil, Judd and Hedl (1977) obtained higher correlations between worry and performance when worry was assessed after feedback was received than when it was assessed prior to giving feedback. Obviously, the two explanations are not mutually exclusive and both factors may operate simultaneously. Either way, as Morris, Brown and Halbert (1977) concluded:

"Worry, the cognitive component of anxiety involving conscious concern about one's performance, emerges consistently as the most important element of the anxiety experience when considering effects on performance." (p.155).

In the context of this chapter, it is important to mention that Morris and Liebert (1973) noted that emotionality only interfered with performance at extremely high levels, whereas both very high and very low worry was associated with poor performance. They referred to debilitating low levels of worry reflecting lack of motivation which clearly runs counter to the general consensus that cognitive anxiety should form a negative linear relationship with performance and argued that such subjects perform better optimally under conditions of high incentive or ego threat. Morris and Liebert (1969) found that low trait anxious subjects performed much better in stressful condition whereas high trait anxious did better in non-stressful conditions. This supports the notion of cognitive anxiety not necessarily having a negative blanket effect on performance alluded to in the bidirectional conceptualisation discussed in Chapter 4

**Sport Psychology: Multidimensional Competitive Anxiety and Performance**

Examinations of the relationships between multidimensional competitive state anxiety and performance can generally be categorised into two different approaches. One which has examined global performance and the other, subcomponents of performance. Consequently, this section is divided into two parts; the first part considers the literature that has distinguished between components of anxiety and investigated their differential effects on global performance, while the second describes research which considers both components of anxiety and their effects on subcomponents of performance.
Effects of the Anxiety Components Upon Global Performance Measures

Research examining the anxiety-performance relationship using the CSAI-2 has largely been equivocal. Naturally, the earliest work in this area was conducted by Martens and his colleagues in the validation research of the CSAI-2. Martens et al. (1982) predicted that cognitive anxiety and self-confidence would be stronger predictors of performance than would somatic anxiety because somatic anxiety manifestations are hypothesized to dissipate at the onset of competition. On the other hand, cognitive anxiety and self-confidence are linked to social evaluation and expectancy, both of which continue throughout the contest. In the first study examining the anxiety-performance relationship in the original CSAI-2 validation research, CSAI-2 components were unable to predict immediate performance as measured by nine hole golf scores. However, Martens and his colleagues felt that the performance measures used in this study lacked the precision necessary to demonstrate accurately the subtle influence of anxiety on performance (see later discussion). The general theoretical assumption is that performance will decrease linearly with increases in cognitive anxiety and will increase linearly with increases in self-confidence. Also, somatic anxiety is predicted to demonstrate an inverted-U relationship with performance (Martens et al., 1990).

However, further studies examining these relationships, either directly or indirectly, have also tended to provide inconclusive findings. Gould, Petlichkoff and Weinberg (1984) compared levels of anxiety with match outcome and points scored in the first period of two separate intercollegiate wrestling matches. In the first match, none of the three CSAI-2 subcomponents had significant relationships with either measure of performance. However, in the second match standard beta coefficients showed that cognitive anxiety (0.53) was a significant predictor of match outcome but somatic anxiety (-0.12) and self-confidence (0.03) were not.

Barnes, Sime, Dienstbier and Plake (1986) computed a performance formula based on individual accomplishment compared to previous performance in a sample of male college swimmers. Although somatic anxiety and self-confidence were not related to performance, cognitive anxiety emerged as a significant predictor, accounting for 15% of the total performance variance. Similarly, Rodrigo, Lusiardo and Pereira (1990) reported a significant negative relationship between cognitive anxiety and performance in a study involving 51 male soccer players, but no significant relationships were found for somatic anxiety or self-confidence and performance. Performance was measured in two ways. Firstly, each player subjectively rated his own level of performance on a five point scale and an independent observer also recorded the "number of good passes and ability to play the position" (p.114). These measures were averaged to form a performance index score.
Gould et al. (1987) used intra-individual performance measures and also computed intra-individual CSAI-2 component scores on the basis of procedures designed by Sonstroem and Bernardo (1982). These procedures involve making repeated state anxiety measurements on the same people and then performing an analysis of within subject variance that is devoid of inter-personal differences in levels of anxiety responsiveness. Trainee Police Officers participated in a competition that included five separate shooting occasions. Polynomial trend analyses indicated that somatic anxiety was related to performance in an Inverted-U fashion, self-confidence was negatively related to performance and cognitive anxiety was not related to performance. The authors suggested that the lack of interpretable findings for cognitive anxiety and self-confidence may have resulted from a lack of ego threat in the contrived competition but the findings provided support for only one of the three predicted anxiety-performance relationships. However, these findings are important since it was the first time that somatic anxiety had accounted for more of the performance variance than cognitive anxiety which, as mentioned previously, is contrary to the the general consensus in the anxiety literature. This finding may largely be due to the type of task used by Gould and his colleagues in that pistol shooting requires very fine neuromuscular control that is particularly sensitive to changes in physiological arousal. Furthermore, as Parfitt et al. (1990) pointed out, the lack of effects due to somatic anxiety or emotionality in the previous literature may have been due to the type of linear analysis used. Gould et al. themselves stressed the critical importance that researchers studying these relationships design investigations that allow them to identify both linear and curvilinear relationships between these variables. To date, investigators have over-emphasized examining linear relationships between these variables and have virtually ignored the possibility of Inverted-U relationships. Hence, the need exists for polynomial trend analyses to be performed.

Other studies examining the anxiety-performance relationship using the CSAI-2 have failed to find significant relationships (Caruso, Dzewaltowski, Gill and McElroy, 1990; Karteroliotis and Gill, 1987; Krane and Williams, 1987; Martin and Gill, 1991; Maynard and Howe, 1987; McAuley, 1985). In all of these six studies none of the three CSAI-2 subscales emerged as predictors of performance. However, as previously suggested, a number of these studies compared absolute performance scores, which have been shown to confound the sensitive relationship between anxiety and performance because of the lack of precision with which anxiety was assessed.

A provocative, but understandably natural, conclusion from this catalogue of insubstantiation could be that the relationship between anxiety and performance may be non-existent or at best dismal (Bird and Horn, 1990). However, there are still grounds for optimism. Burton's (1988) recent findings on swimmers' anxiety, using an intra-individual rather than an inter-individual approach, indicates a sound basis for such hope. The research of Sonstroem and Bernardo (1982) suggests that intra-individual relationships between CSAI-2
levels and performance may be more appropriate than considering absolute measures of state anxiety measured across subjects because of individual differences in response intensity. Using such a technique, Burton found support for all three anxiety-performance hypotheses. CSAI-2 and performance assessments were taken from 28 collegiate swimmers during three separate meets. Polynomial trend analyses revealed that cognitive anxiety formed a negative linear relationship with performance, with self-confidence exhibiting a positive linear relationship. As was also predicted, somatic anxiety exhibited an Inverted-U relationship with the swimmers' performance.

Krane (1990) used a similar design and made assessments of anxiety on ten separate occasions. She found support for the negative linear relationship between cognitive anxiety and performance among female college soccer players. However, support was not found for the predicted Inverted-U relationship between somatic anxiety and performance as a negative linear relationship was reported. Krane did not report the relationship between self-confidence and performance.

Clearly, a number of studies that have examined the anxiety-global performance relationship using the CSAI-2 have been unable to indicate any significant relationship. However, more recently, some studies, possibly as a result of methodological improvements (i.e. intra-individual analysis and more precise performance measures), have demonstrated some support for the Multidimensional Anxiety Theory predictions. However, more evidence needs to be provided as these studies are relatively few.

Although the investigation that is reported in this chapter employs a global performance measure, studies that have examined subcomponents of performance are also worthy of consideration.

**Differential Effects of the Components of Anxiety Upon the Subcomponents of Performance**

The first research which considered the effects of different components of performance (e.g. perception, decision-making, working memory) was conducted by Ussher and Hardy (1986). They investigated whether or not the cognitive and somatic components of anxiety had differential effects upon some of the cognitive and motor processes involved in competitive rowing. The findings provided weak evidence in support of specific interference patterns for cognitive and somatic anxiety regarding different aspects of performance in that increases in somatic anxiety impaired learned hand grip, whilst a cognitive task, logical reasoning, was negatively affected by increased cognitive anxiety. Jones et al. (1988) examined the relationships between cognitive anxiety, somatic anxiety and self-confidence and performance upon simple reaction time (SRT) and discrimination reaction time (DRT) tasks in a sample of 12 cricket players. The subjects performed the SRT and DRT tasks one day and one hour prior to a cricket match and again immediately prior to each individual's batting performance as well
as completing the CSAI-2 on each occasion. The results identified the significance of the somatic anxiety component by showing that somatic anxiety in conjunction with reduced self-confidence in cricket players immediately prior to batting was associated with an increase in errors in a discrimination reaction time task. This finding, coupled with the fact that cognitive anxiety was not related to such errors, led the authors to highlight that cognitive anxiety is not the only factor related to performance. However, none of the three CSAI-2 components formed a significant relationship with simple reaction time and actual discrimination reaction time tasks.

Parfitt (1988) suggested that it is possible to explain many of the anxiety-performance relationship findings in terms of motivational epiphenomena. If subjects do not perceive the experimental task to be relevant to the stressful situation in which they find themselves then it is perhaps inevitable that they will adopt a cognitive strategy of refusing to invest any attentional resources in that task with subsequently meaningless findings resulting. Thus, while subjects might be prepared to expend considerable effort on apparently worthless tasks under control conditions, they might opt not to do so under highly stressful experimental conditions. Therefore, any performance decrements will represent a coping strategy rather than any reduction in the availability of resources (Parfitt et al., 1990). It is possible, therefore, that the mode-specific negative effects of both somatic and cognitive anxiety reported by Ussher and Hardy (1986) were due to the absence of an instructional set which emphasised the relevance of performance on the two tasks to subsequent rowing performance. This notion of situational relevance was initially forwarded by Spiegler et al. (1968). They suggested that the inconsistencies which had occurred in the anxiety literature might have been due to factors such as experimental setting, type of task and instructions employed. The importance of employing situationally-relevant criterion tasks is emphasised by Goolkasian (1982), who argued that it might be possible to identify stress effects only by considering such tasks. This was supported by Idzikowski and Baddeley's (1983) findings with public speakers.

Parfitt and Hardy (1987) performed a series of studies examining the effect that different anxiety components had upon subcomponents of hockey and basketball performance. The design was similar to Ussher and Hardy (1986) but differed in that the authors deliberately emphasised the situational relevance to their subjects of each of the tasks which they asked them to perform. The tasks were critical flicker fusion (CFF) and pattern search for the hockey subjects, and letter span, Sargent jump and rebound shooting for the basketball subjects. The CFF test required subjects to indicate when a visual stimulus changed and measured the flicker speed at which this was achieved. The inclusion of this task was justified to subjects on the grounds that such discriminative ability is a fundamental aspect of any sport where decisions have to be made if and when something in the environment changes. The pattern search task was a sustained information transfer task which required subjects to identify when a specific pattern occurred. Its inclusion was justified on the grounds that team sports are structured around identifying patterns of play and reacting to them. The letter span task was included as a
measure of working memory. Performance in games such as basketball requires an ability to hold and recall salient, strategic information for short periods of time. Sargent jump was included as a basic measure of leg power, as jumping height is clearly crucial to basketball performance. Finally, rebound shooting was included as a fundamental ability in basketball, which could be regarded as a long term motor recall task. Results revealed that cognitive anxiety was shown to be associated with positive effects upon some subcomponents of performance, namely, CFF, pattern search, and rebounding. Somatic anxiety, on the other hand, had positive effects on Sargent jump but negative effects on letter span. Cognitive anxiety was, therefore, shown to be associated with positive effects upon some subcomponents of performance, while physiological arousal was associated with both positive and negative effects. Furthermore, these differential effects, recorded for physiological arousal/somatic anxiety, clearly support the argument that cognitive anxiety is not the only influence on performance.

Bird and Horn (1990) investigated the relationship between subcomponents of anxiety and degree of mental errors amongst 161 varsity softball players. Mental errors were operationalised via the development of a mental error questionnaire which allowed coaches to quantify the relative amount of mental errors committed by each player. Coaches were told that mental errors could be defined as the degree to which each player's performance was adversely affected as compared with her usual performance in practice. It was a ten-point scale ranging from very much affected (many mental errors) to very little affected (few mental errors). The CSAI-2 was administered 45 minutes prior to a scheduled game at the competition site. Results revealed that elevations in cognitive anxiety were directly related, in a negative linear fashion, to mental errors that occur in softball performance. However, no relationship was found between mental errors and somatic anxiety.

Jones and Cale (1989b) examined the effects of competitive anxiety upon perceptuo-motor speed and digit span in 20 male student hockey players. The sample was divided into two groups, an experimental group and a control group, with ten subjects in each. The CSAI-2 and the two performance tasks were administered at three stages during the pre-competition period: 2 days, 2 hours and 20 minutes prior to the start of the event. The relevance of these tasks to hockey performance was made clear to the subjects. Hypothetical situations in hockey matches were described and the importance of working memory and perceptuo-motor speed to successful performance in those situations was emphasised. The results confirmed that somatic anxiety can have a positive effect upon performance by demonstrating that perceptuo-motor speed was enhanced by somatic anxiety. Specifically, a significant interaction between group (experimental and control) emerged for somatic anxiety and the perceptuo-motor speed task. Follow-up Tukey tests revealed that the experimental group reported significantly greater somatic anxiety 20 minutes prior to the match as well as significantly better performance on the perceptuo-motor speed task at the same stage. However, it should be pointed out that no
significant relationships were found between the anxiety components and the digit span task. An interesting aspect of this study is that the authors used two types of analysis: analysis of variance and stepwise multiple linear regression analysis. Their results support the argument proposed by Parfitt (1988) that conducting different analyses can lead to different conclusions. Parfitt pointed out that correlational analysis provides information about the person-by-situation interaction, whilst analysis of variance provides information about situational main effects. In the Jones and Cale study (1989b), performance significantly improved 20 minutes before the competition, and was accompanied by an increase in somatic anxiety. However, neither self-confidence or cognitive anxiety could be shown to be related to any aspect of performance using analysis of variance. Conversely, the regression analysis revealed that somatic anxiety and self-confidence predicted perceptuo-motor speed performance in a positive linear fashion, and somatic anxiety predicted digit span performance in a negative linear fashion. This finding is interesting in light of Gould et al.'s (1984) criticism of the linear nature of correlational analysis and further suggests that future research into the differential effects of anxiety components upon performance should consider conducting both curvilinear regression analyses and group mean analyses.

According to Morris and Liebert's (1969) proposals, as well as the premise behind Davidson and Schwartz's (1976) matching hypothesis, one would hypothesise that cognitive anxiety should impair performance on tasks that are primarily cognitive in nature and somatic anxiety should impair performance on motor-based tasks. The matching hypothesis argues that a stress management strategy is most effective at alleviating compatible types of anxiety, and will be less effective in combating other types of anxiety. In other words, a somatic-based technique, such as progressive muscular relaxation will be more successful in alleviating somatic anxiety than cognitive anxiety. However, it is clear from the studies that have been described above, that support for this dichotomy is inconsistent. Interestingly, Burton (1990) has also argued that empirical data suggests that the best intervention programmes should employ multimodal stress management techniques that attack multiple types of anxiety simultaneously. Furthermore, these studies are also important because they serve to illustrate that a number of investigations have failed to document significant relationships between the CSAI-2 subcomponents and performance-related variables and in many ways support the inconsistent findings for the anxiety-global performance relationship.

Additional Anxiety-Performance Issues

Intra-individual Analysis of Anxiety Intensity and Direction

As alluded to already, most of the previous research on the anxiety-performance relationship has focused on between-subject or inter-individual comparisons that are insensitive to
the variation in individuals' customary levels of anxiety. Due to the fact that individual differences play such an important role in the relationship between anxiety and performance, it seems imperative that researchers take this into consideration when investigating this relationship. Fortunately, some sport psychologists are acknowledging the wide variation in how individuals react to anxiety-provoking situations and are adopting an intra-individual approach in their methodologies as a result. As described earlier, intra-individual measures compare deviations in the level of anxiety that is experienced by an individual to changes in performance states. This notion concurs with an early conceptualisation by Duffy (1957), who stated that "depending on the degree of inhibitory ability, a high degree of activation may lead to impulsive, disorganised behaviour or to sensitive, alert, vigorous and coordinated responses to the environment" (p.273) as well as the arguments put forward in the previous chapter.

Does this acknowledgement of individual differences negate the need to consider individual interpretations of the response? Certainly, some studies, most notably Burton (1988), that have used this intra-individual methodology have provided findings in support of theory predictions and have increased our understanding of this relationship. However, a number of investigations using intra-individual analyses have not provided such support (e.g. Bird and Horn, 1990; Caruso et al., 1990), and in Burton's study (sample 2), cognitive anxiety accounted for only 7% of performance variance. Thus, considerable inconsistency remains suggesting that intra-individual analyses do not necessarily clarify the situation. Thus, in response to the question just posed, this awareness of the need to control for interpersonal variations in anxiety responsiveness does not mean that consideration of the direction of the anxiety response is superfluous. In other words, although intra-individual analyses are a methodological improvement, additional valuable information can be provided, that is unrelated to intensity, by measuring direction. It is also important to consider direction on two further grounds. Firstly, Study 3.2 indicated that the greater specificity provided by measurement of direction may account for greater prediction of performance and, as a result, will hopefully add to our understanding of the competitive state anxiety response as a whole. Secondly, an argument for the utility of measuring direction is also based on methodological grounds. It can be inferred from this argument that to measure anxiety by an intensity-alone approach in conjunction with an inter-individual methodology provides virtually meaningless information, and spells the end, therefore, of cross-sectional studies that employ the CSAI-2 in its current form. This within-subjects approach that has been encouraged is clearly important because it acknowledges that athletes differ in the levels of 'anxiety' they require to create their optimal pre-competition state. This whole concept of preferred levels of arousal or 'anxiety' is central to the concept of directional perception. People can report identical levels in terms of the intensity of the response but, because of variations in preferred 'anxiety' levels, differ considerably in their interpretation of that response. As Neiss (1988) argued "performance-degrading dysphoric psychobiological states and performance-enhancing euphoric ones can
occur at equal arousal levels" (p.360). The logical extension of this, therefore, is to consider whether anxiety responses are perceived by the athlete as positive or negative.

**Adequately Measuring Athletic Performance**

Whilst the previous section has argued in favour of the importance of improvements in assessing anxiety, it follows that efforts to accurately and precisely assess athletic performance are also crucial in the examination of the anxiety-performance relationship. Previous studies have been flawed in that they have failed to use standardized performance measures and this has served to cloud predicted relationships. Performance measures used in testing this relationship have varied greatly in terms of precision, process, outcome and objectivity. For example, previous investigations have utilised a range of performance criteria, including objective outcome measures such as basketball playing statistics (Sonstroem and Bernardo, 1982), swimming times (Burton, 1988), pistol shooting scores (Gould et al., 1987) and scores on an eighteen hole round of golf (McAuley, 1985). In addition, subjective scales and measures have been employed, such as judges' ratings (Basler, Fisher and Mumford, 1976), subjective coaches' ratings (Klavora, 1978), as well as ratings of experts (Fenz and Jones, 1972; Swain and Jones, 1991b). Furthermore, some researchers have focused on competitive outcome, i.e. win/loss as the performance measure (Gould et al., 1984). Finally, measures emphasising the process of the movement have been employed using electromygography (Weinberg, 1978) and movement kinematics (Beuter & Duda, 1985).

This diversity of performance measures needs to be considered when studying the relationship between anxiety and performance as illustrated by the study by Ebbeck and Weiss (1988) that was referred to in Chapter 4. Data were collected from high school athletes across four Track and Field meets. State anxiety was obtained prior to each performance and three different performance measures were obtained (event results and the quality of performance as subjectively evaluated by the athlete and the coach). The correlation between the two subjective measures of performance was moderate (r=0.51), whereas the correlations between the objective performance measures for each of five different events and both the athlete's and coach's subjective ratings were generally low (i.e. 8 of the 10 correlations were 0.40 or below). Thus, it appears that the three approaches to assessing performance were sufficiently diverse to generally result in a low relationship among the performance measures across events. Results also indicated that the three performance measures were not equally related to pre-competitive state anxiety and suggest that the relationship between state anxiety and performance might be different depending on what type of performance measure is chosen. As mentioned previously, if one extrapolates from the arguments of affect theorists such as Watson and Tellegen (1985), then subjective assessments of performance may be distorted by the affective disposition of the individual. In other words, those individuals who are high in negative affect tend to report on incidents (such as their performance) more negatively than individuals high in positive affect producing the same relative performance.
Therefore, some individuals may feel good or bad about the performance irrespective of the quality of the performance.

Gould et al. (1984) assessed performance by outcome (win-loss) across wrestling matches. Because different opponents competed in each match of the tournament, performance was not standardized; rather it changed as a function of one's wrestling opponent. Similarly, in golf studies by Martens et al. (1982) and McAuley (1985), performance was compared on front nine versus back nine holes of the golf rounds. In these studies, therefore, changing and non-standardized task demands may have confounded and/or masked relationships between state anxiety and performance. A better test of the anxiety-performance relationship occurs when task demands are held constant from one state anxiety assessment to another. In this context the study conducted by Gould et al. (1987) achieved this aim. Pistol shooters were required to perform on five separate occasions under identical performance conditions (e.g. identical targets, distance from target, used same weapon, fired on the same range). Hence, only when performance environments are standardized will investigators be able to validly test the anxiety-performance relationship. However, it must be noted that the competition used in this investigation was developed for the specific purpose of answering the research question in mind. In a sense, therefore, the competition was not completely valid in that the performers were primarily subjected to scientific evaluation as opposed to genuine competition evaluation and this may have served to confound the results in that performers may have been 'stressed' as a function of being a subject in a scientific investigation and not the competition itself.

Weinberg (1990) has indicated that the use of outcome or win-loss performance measures in anxiety-performance studies is also a major concern because of the lack of sensitivity and precision which is often associated with such measures. Norm-referenced measures that compare performances of competitors (e.g. eighth place finish in a road race) are clearly imprecise. For example, a person could win a contest and not approach a personal best or, conversely, could be labelled as an inferior competitor (e.g. finish last) yet achieve a personal best. Weinberg also indicates that comparing game scores may be inaccurate since losing a basketball game 100 to 65 to a top ranked team might be quite different to losing 100 to 65 to an inferior team. In contrast, it is recommended that field researchers employ performance measures similar to those used by Burton (1988) where swimmers' best times in an event were assessed relative to previous times in that event. Barnes et al. (1986) similarly standardized performers' accomplishments against their own previous performance. However, even in an example such as this, caution needs to be applied. In physical conditioning sports such as swimming and athletics, performers often prepare to peak for relatively few competitions. Because of the periodization process in their training it is important that such measures as advocated by Burton (1988) and Barnes et al. (1986) occur when the performer has tapered and is at a relative peak.
The primary performance measure utilized in the investigation reported in this chapter was an objective measure of basketball performance. This measure incorporates a wide ranging number of elements in the game and was previously used by Sonstroem and Bernardo (1982). Previous objective measures of basketball performance have used points scored only (e.g. Williams and Jenkins, 1986), but this is clearly influenced by position played and by the performance of team mates. Additionally, shooting is only one of many skills that are contained in the game of basketball. Two subjective measures of performance were also used, a coach rating and athlete subjective rating of performance in order to assess the relationship between the three measures. However, for the reasons that were discussed in Chapter 4 with regards potential weaknesses of subjective measures, emphasis in the analyses is placed on the objective performance measure.

The Need for Idiographic Investigations

The traditional competitive anxiety-performance relationship study has employed a nomothetic approach examining hypothesized relationships across large groups of individuals. By its very nature, this approach requires that the investigator take on a reductionistic orientation since it is not logistically possible to study large groups of athletes as a whole (Martens, 1987a). However, as Martens (1987a) has argued, sport psychologists need to utilize idiographic approaches such as case studies, in-depth interviews and participant observations if real gains in knowledge about athletes are to be made. Given the multivariate nature and complexity of the anxiety-performance relationship, employing such in-depth approaches would better allow investigators to understand how anxiety affects the athlete as a whole and which systems influence performance over time. It would provide the detail and in-depth knowledge about anxiety and performance that has not been generated through the exclusive use of nomothetic methods (Gould and Krane, in press). Whilst the utilization of ideographic approaches is advocated here, the weakness of such approaches must be recognized. The gains made in the depth of knowledge are offset by a weakening in the reliability of knowledge gained (Gould and Krane, in press). Hence, it would be foolish for investigators to totally abandon the nomothetic approach for an idiographic orientation. Indeed, Hackfort and Schwenkmezger's (1989) recommendation that anxiety investigators need to utilize both orientations of study appears to be the best approach and is discussed later in this chapter.

Measuring Mood

The use of mood adjective checklists is also becoming increasingly popular as a method of gathering data about an individual's phenomenological awareness of bodily processes and also about the behavioural and cognitive components of his reaction to different situations. Thayer (1967) first developed an instrument along these lines for the measurement of self-reported activation, the Activation-Deactivation Adjective Checklist (AD-ACL). This scale comprises 45
mood-describing adjectives that measure the bipolar dimensions of 'energy' and 'tension'. Mackay et al. (1978) devised an anglicized version of Thayer's scale (described in detail in Chapter 4) and shorter versions (i.e. 20 items) have been designed by both authors, with those adjectives loading highest as a result of factor analysis being chosen. The bipolar dimensions that Mackay et al.'s scale measures are stress (which is seen as negative affect) and arousal (which is seen as positive affect). Consequently, the AD-ACL (shortened anglicized version) was included in this investigation as Thayer conceived his bipolar dimensions in terms of positive and negative reactions to stress. This scale was, therefore, administered in order to see if any relationships emerged between positive and negative interpretations of the CSAI-2 responses and the stress and arousal dimensions of the mood scale. The modified CSAI-2 scale has not undergone the rigours of psychometric validation and, consequently, it was felt there was a need to use a validated scale such as the AD-ACL that measured related constructs. It is important to mention, in this context, the related observations of Martens (1987b). He has suggested that this distinction is fundamental to an understanding of the relationship between arousal and performance. In particular, Martens defined psychic energy as activation or arousal of the mind and body and believes that two forms of psychic energy exist, one that is constructive and positive in relation to performance and the other that is destructive and negative. Positive psychic energy, Martens proposed, is synonymous with emotions of excitement and happiness, whilst negative psychic energy is related to emotions such as tension and anger. This clearly parallels the observations of researchers like Thayer (1978) and Hardy and Whitehead (1984), but is an opinion based on his own tacit knowledge and is a view that has not been empirically examined until now. What is of particular interest is the fact that Martens predicted a positive linear relationship between positive psychic energy and performance and a negative linear relationship between negative psychic energy and performance.

STUDY 4
Purpose of the Study

The purpose of the study reported in this chapter was to examine the relationships between the intensity and direction dimensions of anxiety; mood and objective basketball performance. The methodology employed in the investigation is somewhat different to the previous studies in that it employed a longitudinal approach and is largely idiographic in nature. This longitudinal design was incorporated in order to relate fluctuations in anxiety and mood to performance variation, with a more cogent performance assessment than used in the previous investigation. Therefore, anxiety assessments (as measured by the modified CSAI-2), as well as assessments of mood (incorporated as a check on the direction scale of the modified CSAI-2 and measured by the AD-ACL), were made prior to six basketball games. This was seen as important since it is the effect of changing anxiety levels (and perceptions) upon an individual's actual performance that is crucial, not how scores vary between individuals with different
anxiety responsiveness. All of the subjects provided quantitative data on the mood and anxiety variables and four of these athletes also provided detailed qualitative data as a result of interviews conducted shortly after every game. The procedure for selecting these four athletes was based on responses to the modified SCAT (Jones, in press) and is described in detail in the methodology section of this chapter.

Due to the exploratory nature of this study and the predominantly ideographic approach that was adopted, no specific hypotheses were formulated.

METHOD

Subjects

The subjects in this study were the 12 members of the Loughborough University men's basketball squad (mean age = 21.1 years; S.D. = 3.04) who were competing in the Leicestershire Senior Division One League and Cup competitions during the 1990-1991 season. Eight of the squad of twelve players played in all of the six games that were selected for observation. Two of the players played in four of the games and the remaining two squad members played in just two of the games from which data was collected. All 12 players had been playing competitive basketball for a minimum of six years and, without exception, had played county schoolboy basketball at some stage in their careers. Three of the players were former junior internationals. Two of these three players, as well as two others had represented British Universities during the previous season.

Instrumentation

Competitive State Anxiety Inventory-2 - Modified Version-2

Both the intensity and direction dimensions were measured using a modified version of the CSAI-2. This differed from that used in the previous investigation in that the frequency scale was omitted from this particular modified version. The intensity of symptoms was determined by using the existing CSAI-2 scale and, alongside each of the 27 items, a separate scale was included that related to direction. The direction scale again asked "Do you regard this thought or feeling as negative - i.e. debilitating, or positive - i.e. facilitating, in relation to your upcoming performance?". This was measured on a 7 point likert scale, from -3 (very negatively) to +3 (very positively). The modified scale and accompanying instructions are shown in Appendix 5.

5.3 For practical reasons two of the six games were cup matches. Although the nature of a cup match is slightly different from a league fixture, the opposition did come from those teams in the Leicestershire Senior League.
Activation-Deactivation Adjective Checklist (AD-ACL)

The AD-ACL short form (anglicized version) (Mackay et al., 1978) was administered to assess the mood dimensions of stress (negative affect) and arousal (positive affect). This version of the scale incorporates 20 adjectives; ten that are related to the stress dimension (e.g. 'tense' and 'calm') and ten that are related to the arousal dimension (e.g. 'energetic' and 'tired'). The response scale reads 'definitely feel' (++), 'feel slightly' (+), 'cannot decide' (?), and 'definitely do not feel' (-). Numerical scores range from '4' for 'definitely feel' to '1' for 'definitely do not feel'. Overall response scores are gained by summing the ten items in each dimension (although some of the items are initially scored in reverse). The scale, including all administration and scoring instructions, is shown in Appendix 7.

Sport Competition Anxiety Test (SCAT) - Modified Version

An assessment of competitive trait anxiety was used as a means of identifying which subjects would be most suitable to select as interviewees. Competitive trait anxiety was measured using a modified version of Martens' SCAT (1977). The SCAT itself is a 15-item inventory developed by Martens (1977) and comprises statements covering a variety of symptoms of anxiety associated with competition, such as 'I feel nervous' and 'I get uptight'. Subjects are asked to rate how they generally feel prior to competition. Ten items are scored and five are fillers and responses are measured from '1' (hardly ever) to '3' (often). Scores range, therefore, from 10 (low competitive trait anxiety) to 30 (high competitive trait anxiety). Following the procedure adopted by Jones (in press), in modifying the SCAT, a separate scale that related to 'direction' was included alongside the existing 15 items. This direction scale asked to what extent subjects felt that each symptom was either debilitating or facilitating in relation to their performance. This was measured on a 7 point likert scale, from '1' (very debilitating) to '7' (very facilitative). Total responses ranged, therefore, from 10 to 70. The modified scale complete with instructions is shown in Appendix 6.

Performance Measure

The objective measure of basketball performance that was employed in this study was that developed by Sonstroem and Bernardo (1982). These authors commented that total points in a game is frequently used as the best measure of individual performance in competitive basketball but the points that an individual scores in a game may be influenced by position played and team-mate performance. Additionally, the game of basketball includes a plethora of skills other than just shooting. Consequently, Sonstroem and Bernardo developed a more composite measure of overall playing performance which is shown on the next page.

5.4 Whilst this is not a perfect objective measure for basketball (i.e. it does not include performance components such as screens or blocked shots), both the players and the coach felt that is was a good overall measure of performance.
Performance = SHOT% (TP + REB + AS + ST) - TO - PF +10,

where SHOT% = Field goal and foul shot percentage combined (a decimal in the formula);
TP = Total points in the game;
REB = Rebounds;
AS = Assists;
ST = Steals;
TO = Turnovers;
PF = Personal fouls
(a value of '7' was assigned when fouling out of the game) '10' = constant to ensure positive scores.5.5

In addition, subjective ratings of performance from both the individual player and the coach were also collected. The same question was asked of both the coach and the players and read "How well do you think you/player x played tonight?" and was scored on a 7 point likert scale ranging from 'Played extremely badly' (1) to 'Played extremely well' (7). This question was administered to all respondents within 10 minutes after the end of the game.

Procedure

All of the subjects responded to a questionnaire 20 minutes prior to performance. The questionnaire included the CSAI-2 with the additional direction scale, as well as the shortened anglicized version of the adjective checklist list (Mackay et al., 1978). The shortened version of this scale was used to ensure that completion of the whole questionnaire took no more than five minutes. Completion of the full version of the AD-ACL as well as the modified version of the CSAI-2 may have proved too irksome to the players due to the length of time required to finish.

The modified SCAT was administered prior to a practice session one week before the first match. This provided time for trait anxiety levels to be assessed and for the interviewees selected from that data to be approached and asked if they would participate in the interview process.

Six home games were targeted to ensure as constant an environment as possible. In other words, the players responded to the questionnaires in the same changing rooms, at the same time and on the same day of the week. A major problem in anxiety-performance studies such as this is to also ensure that task demands are held constant from one assessment to another. Whilst this is difficult in a field investigation such as this, a substantial effort was made to ensure that the specific

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5.5 Example: Subject D. Game I. Performance = 7 Successful shots (3x2 pts: 4x1 pt); 4 Failed shots; 10 Points; 6 Rebounds; 1 Assist; 2 Steals; 2 Fouls; 6 Turnovers; Shot % = 63.6: Performance = 0.64 (19) - 8 + 10 = 14.16
games targeted were against opposition of similar ability. Therefore, based on knowledge from previous seasons, matches against certain teams were deliberately not chosen in order to standardize the performance environment as much as possible. This was because a substantial gulf tended to exist between the top teams in the league and those nearer the bottom.

Of the six games reported, Loughborough won four and lost two. Their largest margin of victory was 16 points and their heaviest defeat was by 12 points. The precise results of the games and the opposition involved are detailed in Appendix 14. Each game was videotaped and the experimenter evaluated performance during each match. Unlimited replay of the videotape after each game permitted the experimenter to review any portion of a particular game if necessary. Before analyzing games one and four the captain evaluated the scoring criteria to ensure that correct interpretations had been made.6.5

**Interview Participants**

Interviews were carried out with the same four members of the team after each of the six games. The selection of which players to interview was based on trait anxiety data collected prior to the first game. The modified SCAT scale was administered with the intention of identifying the two players with highest trait anxiety levels and the two players with lowest trait anxiety levels. Each player was, therefore, chosen as a result of having a different trait anxiety profile (all trait anxiety scores are presented in following section). Two of the players reported very high levels of SCAT but differed in the degree to which they perceived the direction of that anxiety. In other words, one player perceived his high trait anxiety as very positive whilst the other perceived it as considerably less facilitative in relation to his performance. The other two players who were chosen as interviewees formed a deliberate contrast as they reported very low levels of SCAT. As was the case with the high trait anxious subjects, these two individuals also differed in the way they perceived their trait response; one player perceived his low trait anxiety as extremely positive whilst the other felt it was less suitable in relation to his performance. The interviews were designed to examine the nature of the thoughts and feelings that the player experienced in the final 20 minutes prior to the start of the match and how they may have influenced their performance. Each interview was conducted within at least 48 hours of the completion of the match.

5.6 Prior to reviewing these two games the captain was asked to verify if accurate evaluations of performance had been made. In other words, precise clarification was made as to what constituted the subcomponents identified in the performance equation.
Design of the Interview Schedule

The standardized interview format that was used in this investigation was divided into six parts and can be seen in Appendix 10c. Part one of the schedule followed the format used in Studies 3.1 and 3.2 by asking general introductory questions in order to orient the participants to the interview process. Since the same interview was conducted with the athletes on six separate occasions, this introductory section became increasingly less substantial as the study progressed.

The remaining sections focused on the nature of the thoughts and feelings the player had experienced in the game they had just competed in. Part two focused on the intensity and direction of the cognitive anxiety response and the interviewees were asked to reflect on the scores they had reported on the questionnaire and assess whether they were a fair reflection of how they had felt just prior to the game. The players were also asked to compare these particular thoughts and feelings to previous games in the season and offer explanations as to why any differences may have occurred. Parts three and four asked the same types of questions but related them specifically to somatic anxiety and self-confidence, respectively. Part five of the interview focused on the type of mood the player was experiencing at this 20 minutes before competing stage. Questions were posed that related to the two dimensions that the AD-ACL purports to measure. In other words, the interviewees were asked to reflect on their feelings of energy or tiredness (as part of the arousal continuum) as well as feelings of tension or calm (as part of the stress continuum). As in the previous three parts, players were asked to identify both the intensity of that type of mood and to what extent they felt it was beneficial to their upcoming performance. Part six concentrated on performance and asked the players to reflect on whether the way they had felt and what they had been thinking prior to the game had influenced any aspect of performance in any way at any stage of the game. Appendix 11c provides two complete interview transcripts from each player.

RESULTS

The results of this investigation are presented in three ways. Firstly, in order to identify the relationships between the key variables in this study, mean intra-subject correlations are reported between the CSAI-2 intensity and direction scores, the AD-ACL dimensions of arousal and stress and the three performance measures. It was decided not to perform polynomial intra-individual trend analyses as recommended by anxiety researchers such as Burton (1988) and Gould et al. (1987) due to the relatively small number of subjects. Previous investigations that have used this form of analysis have invariably had subjects in excess of 30. This is followed by presentation of the group SCAT data as a means of explaining how the four interviewees were selected. The final section, which forms the major emphasis of the results, provides detailed profiles of the four subjects who were interviewed after each of their games. In the absence of experimental control
which precludes the labelling of this study as a single subject design. the data from each of these four individuals are presented in the form of four separate case study reports.

**Correlations**

As with Studies 3.1 and 3.2, the relatively exploratory nature of this investigation and the variables involved means that interrelationships between the variables are not well established. A correlational analysis was used, therefore, to determine the nature of the associations between these variables. Due to the longitudinal design of this investigation, an intra-individual correlation for each possible interrelationship for each subject across the six matches was calculated (cf Hardy and Whitehead, 1984). Table 5.1 shows the mean correlation for each interrelationship for the group as a whole. The data from those players who had played in a minimum of four matches were included in this analysis (N=10). On this basis, therefore, the data from two players (i.e. those who only played two games) were excluded.

The first issue of interest amongst these correlations is the relationships between the mood dimensions of the AD-ACL and the CSAI-2 components. As mentioned previously, the AD-ACL was included in this investigation as a means of providing a check or some form of concurrent validity for the direction scale of the modified CSAI-2. However, no particularly strong associations emerged, with the greatest correlation involving the arousal dimension being 0.39 with cognitive anxiety direction. Although this value is relatively low, it does indicate that the more positive the perception of the cognitive anxiety the greater the arousal (positive affect).

The correlation between somatic anxiety direction and 'arousal' was only 0.23, which is surprisingly low, considering that positive perceptions of physiological symptoms are presumed to correspond to positive affect (i.e. the arousal dimension of the AD-ACL). Equally, the correlations involving the stress dimension (negative affect) are generally small although one relatively strong association emerges with the relationship with somatic anxiety intensity (r=0.52). In other words, the greater the somatic anxiety the higher the negative affect. However, it is interesting to note that negative relationships (albeit small) did appear between 'stress' and the direction dimensions of the CSAI-2. For example, somatic anxiety direction correlated -0.35 with 'stress'; that is, the more positive the perception of the somatic anxiety, the lower the stress dimension response.

The intercorrelations between the three performance measures indicate moderate relationships (r=0.56 to r=0.64) in keeping with previous studies (e.g. Krane, 1990). The unexplained variance in each of these three interrelationships again suggests that different interpretations concerning the anxiety-performance relationship may occur as a result of which performance measure is considered. However, in this particular investigation, the three performance measures do not substantially differ in the nature of their relationships with the independent variables (see Table 5.1).
Table 5.1: Mean intra-subject rank correlation matrix for all variables across matches

<table>
<thead>
<tr>
<th></th>
<th>CA I</th>
<th>CA D</th>
<th>SA I</th>
<th>SA D</th>
<th>SC I</th>
<th>SC D</th>
<th>AR</th>
<th>STR</th>
<th>CR</th>
<th>PR</th>
<th>OP</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA I</td>
<td>-</td>
<td>-0.08</td>
<td>0.67**</td>
<td>-0.49**</td>
<td>-0.58*</td>
<td>-0.52**</td>
<td>-0.23</td>
<td>0.26*</td>
<td>-0.11</td>
<td>-0.21</td>
<td>-0.21</td>
</tr>
<tr>
<td>CA D</td>
<td>0.14</td>
<td>0.23</td>
<td>0.48**</td>
<td>0.16</td>
<td>0.39**</td>
<td>-0.24</td>
<td>0.49**</td>
<td>0.42**</td>
<td>0.46**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SA I</td>
<td></td>
<td>-0.29*</td>
<td>-0.56**</td>
<td>-0.52**</td>
<td>-0.13</td>
<td>0.52**</td>
<td>0.04</td>
<td>-0.37**</td>
<td>-0.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SA D</td>
<td></td>
<td></td>
<td>0.68**</td>
<td>0.31*</td>
<td>0.23</td>
<td>-0.35**</td>
<td>0.20</td>
<td>0.32*</td>
<td>0.37**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC I</td>
<td></td>
<td></td>
<td></td>
<td>0.76**</td>
<td>0.16</td>
<td>0.21</td>
<td>0.21</td>
<td>0.30*</td>
<td>0.30*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.06</td>
<td>-0.21</td>
<td>-0.19</td>
<td>0.35**</td>
<td>0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.14</td>
<td>0.43**</td>
<td>0.43**</td>
<td>0.54**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.13</td>
<td>-0.02</td>
<td>0.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.56**</td>
<td>0.64**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.60**</td>
<td></td>
</tr>
</tbody>
</table>

CAI=Cognitive Anxiety Intensity; CAD=Cognitive Anxiety Direction; SAI=Somatic Anxiety Intensity; SAD=Somatic Anxiety Direction; SCI=Self-Confidence Intensity; SCD=Self-Confidence Direction; AR=Arousal; STR=Stress; CR=Coach Rating of Performance; PR=Player Rating of Performance; OP=Objective Performance.

* p<.05
** p<.01

The correlations for the independent variables and the objective performance are again low to moderate but, importantly, the direction dimension does account for considerably more of the performance variance than the intensity dimension, in the case of both cognitive and somatic anxiety. Specifically, the direction dimensions correlated 0.46 (cognitive anxiety) and 0.37 (somatic anxiety) with objective performance as compared to correlations of -0.21 and -0.08 between performance and the intensity dimensions respectively. Interestingly, the variable that formed the strongest relationship with objective performance ($r=0.54$) was the arousal dimension of the AD-ACL. This appears to emphasise the importance of pre-match positive affect in relation to upcoming performance. In contrast, the negative affect dimension formed a very weak relationship with performance ($r=0.03$), and this value, in conjunction with the low correlation between 'stress' and 'arousal' ($r=0.14$), emphasises the independence of these two dimensions.

A further interesting correlation that emerged is the very weak association between cognitive anxiety intensity and cognitive anxiety direction ($r=-0.08$). The traditional negative conceptualization of cognitive anxiety that assumes the response is detrimental would presumably predict a strong negative correlation between these two variables. In other words, it would be
expected that the greater the intensity the more negative the direction. However, the relationship that emerged in this investigation casts further doubt on the assumption that cognitive anxiety is necessarily negative. It should be emphasized, however, that with only 10 subjects involved in the analyses, the intra-subject correlations of one or two players could exert a substantial effect on the nature of the relationship for the group as a whole. For example, as will be apparent in the presentation of the qualitative data, Subject B experienced very high levels of cognitive anxiety and interpreted these high levels as very facilitative for him. His intra-subject correlation, therefore, was +0.74. A correlation of this magnitude clearly had an impact on the mean value. However, it is important to mention that three other players had intra-individual correlations that were positive, one of which was also in excess of 0.7.

Finally, self-confidence intensity formed a relatively strong relationship (r=0.68) with somatic anxiety direction as well as a moderate relationship with cognitive anxiety direction (r=0.48). This supports the findings of the previous investigation by indicating that high self-confidence appears to relate to positive perceptions of both the cognitive and somatic anxiety response. In view of this finding, however, it is surprising that neither self-confidence intensity nor self-confidence direction formed a stronger association with the 'arousal' dimension of the AD-ACL. Nonetheless, the emerging relationship between self-confidence intensity and somatic anxiety direction in particular adds further weight to the argument that an interaction may exist between these two dimensions just prior to competition.

**Group SCAT Data**

Table 5.2 shows the 12 subjects ranked in descending order of competitive trait anxiety scores. The mean SCAT value that emerged (18.6) indicates that the players in this study reported values that are relatively close to the norm value presented by Martens et al. (1990) for basketball players (19.77). However, it is interesting to note that this level of trait anxiety was not necessarily perceived as negative by the players, in that a score of 40 represents a neutral perception of one's cognitive anxiety so any score in excess of 40 represents a positive perception and below 40 a negative perception.

Subjects 1, 2, 11 and 12 were selected as the four interviewees and for the purposes of the interview will be referred to henceforth as Subjects A, B, C and D respectively. These subjects were chosen as they appeared to differ most in terms of their competitive trait anxiety. As the table indicates, Subjects A and B reported very high levels of the response (the maximum score is 30) whereas Subjects C and D reported very low levels (the minimum score is 10). Although the players' differences in perceptions of their trait anxiety are not at opposite ends of a positive-negative continuum in the same way that the intensity levels are (possible responses range from 10 to 70), considerably different interpretations do exist, with Subjects A and C perceiving their trait anxiety levels as negative, whilst Subjects B and D perceive them as positive,
in terms of their influence on performance. The expectations of these subjects, therefore, was that subjects A and B would report higher levels of state anxiety than Subjects C and D. However, it was also expected that Subjects B and D would report positive perceptions of their state anxiety responses whereas Subjects A and C would report negative perceptions of their state anxiety.

Table 5.2: Individual Competitive Trait Anxiety Data

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>SCAT</th>
<th>Modified SCAT</th>
<th>Interviewee</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29</td>
<td>34 (-6)</td>
<td>A</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
<td>52 (+12)</td>
<td>B</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
<td>36 (-4)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td>45 (+5)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>19</td>
<td>51 (+11)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>18</td>
<td>47 (+7)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>18</td>
<td>40 (0)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>17</td>
<td>40 (0)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>15</td>
<td>48 (+8)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>14</td>
<td>38 (-2)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>14</td>
<td>38 (-2)</td>
<td>C</td>
</tr>
<tr>
<td>12</td>
<td>14</td>
<td>52 (+12)</td>
<td>D</td>
</tr>
<tr>
<td>Mean</td>
<td>18.6</td>
<td>43.4 (+3.4)</td>
<td></td>
</tr>
<tr>
<td>S.D.</td>
<td>4.6</td>
<td>6.5</td>
<td></td>
</tr>
</tbody>
</table>

The material presented in the following section is based on the qualitative analysis of the six interviews that were conducted with each of the four selected players. As in the two previous investigations (i.e. Studies 3.1 and 3.2), representative quotes are provided throughout to support the observations that are made. The data is presented by describing in detail the findings for each interviewee separately. Prior to presentation of the qualitative data, the questionnaire responses for each player from all six games is provided to clarify the basis from which certain remarks are generated. Discussion focuses initially on cognitive anxiety and examination will be made of both specific intensity and direction dimensions of this response. Figures are also provided throughout to indicate the nature of the empirical data that emerged for each particular interviewee. The same procedure will apply to discussion of the findings for somatic anxiety and self-confidence, with the exception that the self-confidence intensity and direction findings are not discussed separately due to the strong relationship that emerged between the two.
Subject A: Age 19; First year undergraduate student
Trait Anxiety Level: Very High (29) (Group mean = 18.6).
Trait Anxiety Perception: Negative (34) (Group mean = 43.4).

Based on this subject's trait anxiety, it was predicted that Subject A would report very high levels of competitive state anxiety and would interpret these levels as slightly negative in relation to his upcoming performance. As expected this subject did report high levels of cognitive anxiety but perceived them more favourably, especially in the latter games, than was anticipated. Somatic anxiety levels were moderate to high and, therefore, similar to those predicted, as was the marginally negative mean perception of his somatic response (-0.16). In view of the predicted high levels of debilitating cognitive anxiety, the low levels of self-confidence that were reported were as expected. Subject A's quantitative responses are presented in Table 5.3

<table>
<thead>
<tr>
<th>Game 1: (L)</th>
<th>CAI</th>
<th>CAD</th>
<th>SAI</th>
<th>SAD</th>
<th>SCI</th>
<th>SCD</th>
<th>AR</th>
<th>STR</th>
<th>SP</th>
<th>CP</th>
<th>OP</th>
</tr>
</thead>
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<tr>
<td></td>
<td>28</td>
<td>2</td>
<td>22</td>
<td>-1</td>
<td>17</td>
<td>6</td>
<td>34</td>
<td>31</td>
<td>3</td>
<td>3</td>
<td>3.00</td>
</tr>
<tr>
<td>Game 2: (L)</td>
<td>27</td>
<td>4</td>
<td>23</td>
<td>1</td>
<td>22</td>
<td>7</td>
<td>35</td>
<td>31</td>
<td>5</td>
<td>4</td>
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<td>Game 3: (C)</td>
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<td>17</td>
<td>-1</td>
<td>18</td>
<td>5</td>
<td>34</td>
<td>25</td>
<td>3</td>
<td>4</td>
<td>8.65</td>
</tr>
<tr>
<td>Game 4: (L)</td>
<td>26</td>
<td>1</td>
<td>17</td>
<td>0</td>
<td>24</td>
<td>8</td>
<td>35</td>
<td>27</td>
<td>3</td>
<td>3</td>
<td>11.25</td>
</tr>
<tr>
<td>Game 5: (L)</td>
<td>27</td>
<td>6</td>
<td>19</td>
<td>-2</td>
<td>21</td>
<td>8</td>
<td>34</td>
<td>29</td>
<td>5</td>
<td>6</td>
<td>13.44</td>
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<td>Game 6: (C)</td>
<td>27</td>
<td>7</td>
<td>20</td>
<td>2</td>
<td>23</td>
<td>9</td>
<td>34</td>
<td>26</td>
<td>5</td>
<td>5</td>
<td>15.60</td>
</tr>
</tbody>
</table>

L = League Game; C = Cup game.

Cognitive Anxiety

Intensity
Subject A's scores ranged from 26 to 28 (mean = 27.2) on the CSAI-2 cognitive anxiety scale. Relating this mean raw score to the CSAI-2 norms, 95% of the respondents in the norm group had lower scores on this subscale. Similarly, in the context of this sample of basketball players, Subject A's intensity levels were high when compared to the group mean of 21.1. Clearly, Subject A reported very high levels of cognitive anxiety, as the interview data also indicated:
"I always worry about whether I'm going to play well or not - it's my own performance. I don't worry about the team, I take that for granted. I worry about whether I'm going to play well and if the shots are going to go in" (Game 1).

and:

"Without worrying about the game or seeing yourself in the game, it takes a while for me to get into it. I definitely need things like butterflies to get me going, but I also need to think 'God, we might lose this'. That's why we nearly lost last Friday. I think everyone thought we'd win just by turning up" (Game 2).

Interestingly, Subject A's levels of cognitive anxiety (and responses in general) did not differ as a function of the type of game. Intuitively, the 'sudden death' nature of a cup match may have been expected to elicit higher levels of the response than a league game, but this was not the case with this subject. His early season insecurity about his position within the squad and his desire to establish himself meant that his approach to games was always the same:

"I treat them exactly the same - well, at the moment anyway. It's because I'm new. Because I don't start, when I get on I have to do well. I have to show what I can do. I've got to take every chance when it comes" (Game 3).

Due to the small range of the intensity of Subject A's responses, it is difficult to establish any relationship with performance. However, as Figure 5.3 indicates a curvilinear trend does appear in that Subject A's two best performances occurred at his moderate levels of cognitive anxiety intensity (i.e. 27) whereas his poorer performances occurred at lower (26) and higher (28) levels of the response. Comments following Game 6, provide an interesting insight into why three different performances occurred at the same intensity level of 27 (Games 2, 5 and 6). Subject A believed that, although his intensity scores were the same, he did feel 'better' prior to Games 5 and 6, and this is reflected in his increasingly positive perceptions of his cognitive anxiety in the latter games:

"In the early games I was worried about performing well - about doing myself justice - and so I was worried about that. That kind of feeling changed as I felt I got to know everybody better and got accepted and they'd say 'S...s playing well' and I started to feel better. But I still wanted us to win so I still scored high because I really want us to do well. So it changes in a way".

This provides a possible explanation for Subject A's better performances in Games 5 and 6, and also suggests that the existing CSAI-2 scale is insensitive to the different types of feelings.
Figure 5.3: Relationship Between Cognitive Anxiety Intensity and Performance - Subject A
that may occur at the same reported level of intensity. It serves to emphasize the potential value of incorporating a direction scale.

Subject A's worst performance (Game 1) which coincided with his highest intensity score of 28 can also be explained by the fact that, as a first year student, he was too eager to establish himself and this affected his play:

"I was too uptight before the game. I wanted more than anything to do well. I was just waiting for my chance and was hoping that when it did come that I'd be up to it. I didn't relax when I got on and in the end tried some stupid things that weren't on at all".

Direction

Direction responses ranged from 1 to 7 (mean = 3.5), indicating that Subject A felt that the level of his cognitive anxiety tended to slightly facilitate his performance, although this score was lower than the group mean value of 6.0. This view of his cognitive 'anxiety' being marginally positive is clearly evidenced during his interviews:

"I think I need a certain level to get me psyched-up. It gets you aware and ready to play. Yeah, I think that having it (worry) helps more than it doesn't. If I wasn't worried then I wouldn't get pumped up like I want to, but there are other times when I think to myself 'yeah, I'm worried here' and I think it's detrimental then" (Game 2).

and

"I would say that on balance that it was slightly beneficial in that it helped me think about what I've got to do. But only just (beneficial), because I also worried about my shooting touch not being there and then things got a bit negative. But I kept concentrating and kept trying to see shots going in and getting the right feel and in the end I was O.K" (Game 3).

When cognitive anxiety direction scores were plotted against performance (see Figure 5.4), the results tended to reveal that the more positive the anxiety was perceived the better the performance. Certainly, the two best performances coincided with the two occasions when cognitive anxiety was perceived most positively. This relationship appears to be endorsed during the interview following Game 5 (Second best performance; direction = +7):

"I was quite anxious because I knew it was an important game and we'd played badly and lost on Friday. But I've been feeling far more part of the team lately and Chris (the coach) has been good and I felt I was mentally ready for a good game. Because I feel happier I'm not so uptight in a negative way. I suppose it's because I'm now seen as important and respected as a player so, although I'm worried about us losing, I feel quite good before
Figure 5.4: Relationship Between Cognitive Anxiety Direction and Performance - Subject A
games. In fact, as soon as I hit that three pointer I was away! It’s usually the same. If I can do something like that early in the game then your confidence grows and I’m alright then”.

These remarks are in sharp contrast to those made following Game 1 which was Subject A’s worst performance (Direction = +2):

"I could definitely have felt happier. Like I said, I was too uptight about doing well. It was good in that I knew it meant that I was going to give it everything and hustle and all that, but I wasn't loose. I was thinking too much about how important it was to show them what I could do instead of thinking about how I could do that. I wasn’t thinking about the right things".

Somatic Anxiety

Intensity

Subject A’s somatic anxiety scores ranged from 17 to 23 (mean = 19.66) and were more moderate than his cognitive anxiety responses. However, when compared to the subscale norm, this mean value indicates a relatively high response as 67% of male college students report lower values. Similarly, Subject A’s mean intensity score was noticeably higher than the group mean of 14.9. Supportive evidence from the interviews for the strong nature of the somatic response is forthcoming:

"I'm always ready to go. I feel full of energy. I start running around. Basically, it's that feeling - get out there and play and get on with it. I don't like standing around. Outwardly, I don't show that I'm pumped up, but inside I know I'm ready to go out and play and give it everything" (Game 1)

and:

"I always get nervous in that way. Heart pounding and butterflies mainly. It's always the same. I can't sit down at all. Some players I know like to sit down and be quiet but as soon as I do that I'm not comfortable. I want to move around. It helps me to concentrate as well - just moving around, taking some deep breaths, just getting ready" (Game 2).

The relationship that emerged between somatic anxiety intensity and performance suggested a curvilinear trend. In other words, performance was relatively low on the occasions that somatic anxiety was measured at its lowest and highest levels, but the better performances occurred when relatively moderate levels of the response were reported (see Figure 5.5). Comments following Game 1 (worst performance and second highest intensity score (22)) again provide some clarification:
Figure 5.5: Relationship Between Somatic Anxiety Intensity and Performance - Subject A
"It was high, yes. And it meant I couldn't settle. I prefer to be up and bouncing around but this wasn't quite right. Something wasn't right. I think I was too (his emphasis) keyed up".

Further insight into the nature and importance of Subject A's somatic anxiety is provided from his observations concerning the interpretations he made of his response.

**Direction**

Subject A's perceptions of his somatic anxiety were essentially neutral with a range from -2 to +2 (mean = -0.16) and indicated less favourable interpretations than the group as a whole (group mean = +7.6). In view of his remarks concerning his preference for high arousal and the relatively high score on the CSAI-2 (intensity) scale reported above, it is perhaps a little surprising that the response was not perceived more positively. The interview process provided an explanation for this. It appears, in Subject A's case, that some of the subscale items reflect feelings that he perceived as considerably negative, and responses on these items serve to nullify the generally positive responses on the remainder. For example, any indication of clammy hands was interpreted as potentially debilitating to performance (usually scored as -3), whereas "I feel jittery" was an indication of readiness as it was the closest item that Subject A felt reflected the experience of 'butterflies' or adrenaline. Therefore, although he generally felt positive about his somatic responding, because of the specific nature of the some of the items, the qualitative response was neutral.

The relationship that emerged with performance suggested, with the exception of the Game 5 where somatic anxiety direction was -2, that more positive perceptions of the response corresponded with better performances. However, this finding needs to be treated with caution due to the small range of direction values, although feelings prior to Game 3 (second worst performance; direction = -1; intensity = 17) suggest that it would be wrong to ignore the trend completely (see Figure 5.6):

"I feel the need to get pumped up. If I'm not then I'm not quite ready and it was like that last night. There have been a couple of times I haven't felt that well, actually. 5 or 10 minutes into the game I started to get into it. But it took me a few minutes because I wasn't feeling right before the game. I suppose when I get on court I have to do well to stay on, so by being slow at the start, yeah, it effected me in a bad way".

Similarly, Subject A's comments following Game 6 (best performance; highest direction response of 2; intensity = 20) are valuable in that they do indicate a difference in pre-match feelings from Game 3:
Figure 5.6: Relationship Between Somatic Anxiety Direction and Performance - Subject A
"It (somatic response) was about right. I was nicely keyed up and looking forward to it. I remember thinking that the changing rooms were a bit warmer than usual. Maybe because it's colder outside they've turned the heating up and that meant that I got a bit too warm and almost a bit sleepy. So it wasn't as positive as it should have been. But by the time that I started warming up in the gym I felt lively again".

Self-Confidence

Intensity and Direction

Subject A's self-confidence scores ranged from 17 to 24 (mean = 20.8). The male collegiate norms indicate that only 21% of similar respondents tend to score less than this subject's mean value on this scale, indicating relatively low state self-confidence. In addition, the basketball squad reported a mean self-confidence value of 26.4. He endorsed this finding during the interviews:

"My confidence has not been that good all term. You have to go out and prove you can play and that sort of thing, and I wasn't that confident.....Being a fresher hasn't helped. Back at home I've played for a team for a couple of years now. I just go out and I'm fine, full of confidence....but here you feel you've got to prove what you can do" (Both extracts following Game 3; second lowest self-confidence score of 18).

The relationship that emerged between self-confidence intensity and performance is shown in Figure 5.7 and suggests that the better performances occurred on the occasions that self-confidence was relatively high. Certainly, the two worst performances coincided with the two lowest self-confidence values reported:

"I've not been playing well at all. I need to feel confident to play well, like everyone I suppose, but I think I need it, especially at the moment. If I go into a game feeling confident and I start well then I'll play well. But I'm afraid to try things and then when I do it's too rushed and I make a mistake" (Game 3: Second worst performance; self-confidence = 18).

The direction of the response was, understandably, relatively low (mean = 7.16) as compared to a group mean of 13.1. As one would probably expect, lower intensity scores corresponded with lower direction scores. Consequently, the relationship between the direction of self-confidence and performance follows the same trend as the intensity-performance relationship. In other words, the greater the self-confidence direction scores, the better the performance (see
Figure 5.7: Relationship Between Self-Confidence Intensity and Performance - Subject A
Figure 5.8). Due to the relatively small range of direction responses it would again be wrong to draw too many conclusions from this finding but support for this association is provided below. This extract comes from the interview data gathered following Game 3 (Lowest direction value of +5):

"It's barely positive because I'm only scoring 2's on the first scale. That's 'somewhat' isn't it? Yes, that's about how I feel. I could definitely feel more confident. It's only 'somewhat' because there are times when I'm not in the slightest bit confident"

This compares with interview data that was collected following Game 6 (Best performance; highest self-confidence direction score of +9):

"I know people could say that I've improved because I've been playing a lot and we're playing well as a team now, but last night was all about my confidence. By the end I didn't think I could miss!... I feel a key member of the team now. I still lack a bit of confidence before the game - because every game is a new one - and you don't know what's going to happen. I would prefer though to feel even more confident before I start, because I know it helps me so much"
Figure 5.8: Relationship Between Self-Confidence Direction and Performance - Subject A
Subject B: Age 21. Final year undergraduate student.
Trait Anxiety Level: High (25) (Group mean = 18.6)
Trait Anxiety Perception: Very Positive (52) (Group mean = 43.4)

Based on his trait anxiety data, it was predicted that Subject B would report high levels of competitive state anxiety but would interpret these levels as positive in relation to his upcoming performance. As anticipated, this subject did report high levels of cognitive anxiety and perceived them as facilitating. However, both his intensity levels and directional perception of his somatic anxiety response were not quite as high or perceived as positively as perhaps would be expected. The moderate self-confidence that materialized was not surprising, despite the expectation of high cognitive anxiety. This was due to the positive perception of his high trait anxiety. Subject B's quantitative responses are shown in Table 5.4

Table 5.4: Modified CSAI-2, AD-ACL Responses and Performance Scores for Subject B

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L = League Game; C = Cup game.

Cognitive Anxiety

Intensity

Subject B's scores ranged from 28 to 32 (mean = 29.6) on the CSAI-2 cognitive anxiety scale over the six games. Relating this mean raw score to the CSAI-2 norms for male college athletes provided by Martens et al. (1990), 98% of the respondents in the norm group had lower scores on that subscale. Similarly, within the context of this sample of basketball players, Subject B consistently reported the highest levels of the response. Although Subject A did report levels of cognitive anxiety that approached those reported by Subject B, the group mean for cognitive anxiety was considerably lower at 21.1. Clearly, Subject B reported very high levels of cognitive anxiety.
anxiety and whilst the interview data did not necessarily provide evidence of an individual experiencing images of failure and other traditional conceptualizations of cognitive anxiety, the data did provide evidence of an individual whose pre-match cognitions were dominated with 'concern' about the upcoming game:

"I'm always thinking about the game a lot. What's going to happen, that kind of thing. I'm concentrating on how to perform better and worrying about it. It'll be things like 'are we going to win?', 'what am I going to say to them before the game?' Telling myself what I need to do" (Game 1) and "I do tend to worry about what people think. Also, being captain, you think about leading by example. I didn't play too well last week so I was concentrating on doing my job instead of trying to do everyone else's for them" (Game 3).

Comments prior to Game 6 are equally illuminating:

"Concern is probably the label I'd put on it. I'm not worried in that I'm fretting. It's more like I'm not going into the game half-hearted. If we lose it's not because I could have tried harder".

This suggests that the substantial pre-match cognitive 'activity' that Subject B experienced was essentially task-oriented and mobilized effort resources and possibly explains why his cognitive anxiety direction scores were so positive.

As was the case with Subject A, Subject B's levels of cognitive anxiety did not differ as a function of the type of game, although for a different reason. His position of leadership within the team caused him to treat each game the same:

"My approach is no different. It could be because I'm captain so I really want us to win every game. I want this to be the most successful season ever so the league is very important to us - but obviously the cup is as well. So I wasn't any more nervous, no" (Game 3).

A curvilinear trend appeared to emerge between cognitive anxiety intensity and performance (see Figure 5.9). In other words, performance was relatively low on the occasions that cognitive anxiety was measured at its lowest (i.e. 28) and highest (i.e. 32) levels, but generally the better performances occurred when relatively moderate levels of the response were reported. However, the fluctuations in cognitive anxiety were not substantial so that attempts to draw any conclusions in terms of their impact on performance would have to be viewed with caution. Equally, although Figure 5.9 indicates three different performance scores at the same level of cognitive anxiety intensity (Games 4, 5 and 6: intensity = 30), the variation in performance is also not large.
Figure 5.9: Relationship Between Cognitive Anxiety Intensity and Performance - Subject B

Performance

Cognitive Anxiety Intensity
Although his worst performance occurred in Game 1 (performance score = 7.50) and this corresponded with a cognitive anxiety score of 32, the actual intensity level does not appear to be the reason behind his poor performance:

"No. I don't think being worried matters much at all. Not thinking about the game in the way I do. The only time that things would affect me are when I'm very nervous - physically - which is not very often ".

This latter comment lends some support to the Catastrophe Theory notion that reductions in performance will occur when elevations of both anxiety components materialise.

**Direction**

Subject B's direction responses ranged from 13 to 19 (mean = 16.2) which indicates that his average direction response to each item was nearly +2. This value was substantially more positive than the figure reported by the group as a whole (mean = 6.0). The interviews provide enlightening evidence that high levels of cognitive anxiety, as measured by the CSAI-2, are not necessarily bad for the athlete:

"I find it (cognitive anxiety) kind of concentrates you, especially the defence - because it's all concentration and peripheral vision. That goes better when I am anxious or worried about it. I find I play better if there is pressure on me. If I feel there is pressure and there are people watching I feel that I want to be in control of the game - because I know I can control it from my position ".

Subject B's perceptions of his cognitive anxiety intensity scores generally indicated that the higher his cognitive anxiety, the more positive he perceived it, in that his response of 32 was perceived as the most positive and his two lowest values of 28 were seen as the least positive. When asked why Game 2 (intensity score of 28) was not as positive (+13) as Game 1 (+19) (intensity score of 32), he responded:

"I didn't think I was on my toes as much as I should have been. The game hadn't been on my mind during the day as much as usual, so I was hoping I'd switch in when I got on court ".

Again, however, the range of direction responses is relatively small and this is reflected by the fact that Subject B's three values of 30 for cognitive anxiety intensity were perceived as +14, +17 and +19. In other words, all very positive scores, and the interviews reveal the subject's opinion of similarity in perceptions:
"I'm looking at that (perception of cognitive anxiety) as being very similar right through. Maybe only one game you did, against O'Shea's lot (Game 2; Direction = +13) - I didn't feel right there for some reason. Otherwise, it's more or less the same".

A further interesting finding emerged when cognitive anxiety direction scores were plotted against performance (see Figure 5.10). The results revealed that, generally, the more positive the anxiety was perceived the better the performance. This is endorsed during the interviews:

"I would say it's usually more positive than that (perception of cognitive anxiety). I didn't feel as anxious as I should have been. It's maybe because I felt we were going to win but it meant that I was sloppy when we got out there" (Game 2: Second worst performance; direction = +13).

as opposed to Game 5 (Direction = +19; intensity = 30):

"Yes, it was definitely very positive. I felt that I was in control, thinking very clearly. There were no distractions and I just felt ready. I had no minor things on my mind or thoughts that shouldn't have been there. I was up for it".

There was, however, one data point (Game 1) that did not conform to the positive linear trend that appeared to emerge. Despite a very positive appraisal of his cognitive anxiety (+19), Subject B's performance was comfortably his worst of the six matches, a result that ran counter to the general findings. He explained:

"No, I felt pretty good before the game, that's why that score is probably so high. I was certainly very anxious because I wanted us to win so much - you see it's different when you're captain, winning almost becomes more important - but I was still happy before the game because I was so looking forward to it and getting the season going and so on. I think I played badly because I threw that air ball early on and I let that get to me as well as their guy hitting everything in sight. That didn't help so I guess I panicked. He was very good. To be honest I couldn't handle him"

This is a good example of pre-competition emotions not necessarily predicting what happens during performance and suggests the need for the pursuit of ways of attaining such assessments during performance.
Figure 5.10: Relationship Between Cognitive Anxiety Direction and Performance - Subject B
Somatic Anxiety

Intensity

Subject B's somatic anxiety levels ranged from 15 to 23 (mean = 18.5) and were more moderate than his cognitive anxiety responses. In relation to the CSAI-2 norms for male college athletes, 57% of the respondents in the norm group had lower scores. Similarly, Subject B's mean intensity score was slightly higher than group mean value of 14.9. Extracts taken from the interviews reflect the 'moderate' nature of Subject B's somatic anxiety response:

"I don't usually get the sweaty palms, the butterflies and feeling tight and tense. Obviously, I'm more pumped up than in a normal situation like now, but I'm just thinking about the game. I rarely notice how my actual body is" (Game 2),

and:

"I think it might be that because I'm thinking about the game so much and what I'm going to say and so on, that I don't think about my body at all. To be honest, when that questionnaire asks if your heart is beating, then I need to stop and think about it! All I know is that I'm more pumped up than usual" (Game 3).

The findings for somatic anxiety for the intensity of the response revealed that no relationship appeared to emerge with performance (see Figure 5.11). In fact, the two occasions in which intensity was relatively high (a score of 23; Games 1 and 5) resulted in Subject B's best and worst performances of the six matches. His comments following Game 1 were remarks that he echoed throughout the interviews:

"It's (somatic anxiety) only important if I get too sweaty, but otherwise I don't think it's important at all. Because once I get going I'm too busy thinking about the game. I call most of the plays so all my thoughts are busy with that, so I'm just not aware of what happens to me in that way (somatic anxiety). In that way, it can't be important".

Similarly, following Game 5:

"As I've said before I rarely take any notice of my - how my body feels as such - unless it's really obvious and it's stopping me or interfering with my thinking about the game and what I'm going to say. Usually, I'm so wrapped up in team-talks and what have you, that I don't notice".

A clearer indication of the influence of his somatic anxiety is revealed with examination of the findings for somatic anxiety direction.
Figure 5.11: Relationship Between Somatic Anxiety Intensity and Performance - Subject B
Direction

Subject B generally perceived his somatic anxiety as less facilitative than his level of cognitive anxiety. Responses ranged from -2 to 10 (mean = 3.5) which indicates a relatively neutral perception of his somatic response and is surprisingly low when compared to the group mean of 7.6. This, however, was not a reflection of a desire for a more beneficial pre-competitive state, rather an indication that Subject B usually felt physiological symptoms were relatively unimportant in comparison to achieving an appropriate mental state:

"I never really think about what my body itself is doing. If I am very nervous and my hands get very sweaty then I would say 'yes, this is bad for me' - especially as I get sweaty anyway. But normally I don't tend to think about it all. I'm too busy thinking about other things!" (Game 1).

However, when the somatic anxiety direction responses are plotted against Subject B's performance scores, a positive linear relationship appears to emerge (see Figure 5.12). In other words, as in the case of cognitive anxiety direction, the more positive the perception of the somatic 'anxiety' the greater the performance. Whilst acknowledging the remark just made, the following two comments provide corroborating evidence for the quantitative findings:

"I was definitely too nervous and I prefer to be calmer. The fact that I knew I had butterflies and so on meant that I was being distracted from what I was going to say to the boys. So that's probably why it was a minus. It was strange because I was in a good frame of mind but I was put off a little because I normally don't like butterflies" (Game 1: -2 scored; worst performance. Somatic anxiety intensity = 23): whereas:

"I was nervous but it was in a good way. I kept telling myself to be positive and the adrenaline would help me. By now, I feel more comfy as 'Skips' and so I think it helped. I certainly felt like I had a lot of energy. I was waiting for the tip to go so I could just go 'bang'" (Game 5; 10 scored; best performance. Somatic anxiety intensity = 23).

This finding may be mood-related. Interestingly, Subject B's 'stress' scores on the two occasions (i.e. negative affect) were 37 (Game 1) and 30 (Game 5) and suggests the benefit of using mood scales such as this in conjunction with the modified version of the CSAI-2. Alternatively, the interview extract following Game 5 implies that this subject utilised some form of cognitive restructuring on this occasion. What is also interesting about these two extracts is that
Figure 5.12: Relationship Between Somatic Anxiety Direction and Performance - Subject B
even the same individual can report identical levels and yet perceive them as very different in relation to upcoming performance. This strengthens the argument for the need to measure direction as an intra-individual intensity-alone approach would not have been sensitive to this fact, whereas inclusion of the direction dimension provided a clearer explanation.

Self-Confidence

Intensity and Direction

Subject B's self-confidence intensity scores ranged from 21 to 26 (mean = 24) which means that 39% of respondents in a norm group of male college athletes would report lower levels. The group mean of 26.4 for self-confidence intensity reinforces the relatively moderate level of his self-confidence and this was reflected by the comments from the qualitative data. Subject B acknowledged that his self-confidence could be higher:

"I'd say I'm fairly confident before games, to be honest. Last night was pretty typical in that I got some negative thoughts now and again, like I could see myself throw up an outside shot and it rimmed out, but that's because I'm not shooting well at the moment. Apart from that, I'm playing well, so my confidence is pretty good, but I still think it could be better" (Game 4).

A specific explanation was forthcoming for the relatively low self-confidence score prior to Game 1:

"I think it was because it was our first proper game and I wasn't sure if we'd win and I really wanted us to get off to a good start. Because I'm captain, I kind of answer those (questions on the CSAI-2) like it was the team - and then you know why things didn't go too well (see interview section of cognitive anxiety direction). Maybe, I was thinking about the team too much" (Game 1: self confidence at its lowest (21)).

Subject B's moderate self-confidence levels were reflected in the nature of his direction responses (mean = 14.66; group mean = 13.1):

"Sure, I'd prefer to be more confident. That's why they're not all plus 3's because I know there's a gap there. Most of them are plus 2's, but that's obvious. If I was shooting better then that would help. If I was feeling better about my shooting then my confidence would go up and then there'd be more +3's" (Game 4).
This clearly endorses the mean intra-subject correlation between self-confidence intensity and self-confidence direction (\( r = 0.76 \)) that emerged from the quantitative data and suggests the strength of the association between these two variables. However, Subject B also made a remark that perhaps explains why the relationship is not a perfect one:

"I think it (confidence) also depends on if you're going to win or not. If I think we're going to win then my confidence definitely tends to be higher. But even then you've got to be careful not to be too confident because then I don't focus in like I should. If I go too far I don't concentrate like I should. We might still win but I'd be sloppy and make mistakes that I shouldn't".

No relationship appeared to emerge between self-confidence direction and performance (see Figure 5.14), but as self-confidence intensity increases, improvements in performance do tend to appear (see Figure 5.13). However, the range of self-confidence intensity differences over the six matches is relatively small, and, therefore, it would be inappropriate to associate any fluctuations in performance with variations in the self-confidence. In addition, the three performance scores that occurred at the same level of intensity (Games 3, 4 and 5: intensity = 24) are not vastly different.
Figure 5.13: Relationship Between Self-Confidence intensity and Performance - Subject B

Figure 5.14: Relationship Between Self-Confidence Direction and Performance - Subject B
Subject C: Age 22: Postgraduate student
Trait Anxiety Level: Low (14) (Group mean = 18.6)
Trait Anxiety Perception: Marginally negative (38) (Group mean = 43.4)

Based on his trait anxiety data, it was predicted that Subject C would report low levels of competitive state anxiety with marginally negative/neural perceptions of the response in terms of its suitability for performance. As predicted, low levels of both cognitive and somatic anxiety were reported but contrary to expectations Subject C tended to interpret these responses as very positive. The high self-confidence levels were largely as predicted, based loosely on the anticipation of low cognitive anxiety. These quantitative values are presented in Table 5.5.

Table 5.5: Modified CSAI-2, AD-ACL Responses and Performance Scores for Subject C

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L = League Game: C = Cup game.

Cognitive Anxiety

Intensity

Subject C's scores ranged from 12 to 23 (mean = 15.6) on the CSAI-2 cognitive anxiety scale. Relating this mean raw score to the CSAI-2 norms, 33% of the respondants in the norm group had lower scores on this subscale and the group mean for the subjects in this sample was 21.1. With the exception of the first match, Subject C's responses were relatively low. For example, Game 2 (Intensity = 15):

"I rarely get too worried before a game. I wasn't yesterday for sure. There's no point because it doesn't help my game. So I just think about other things or concentrate on my warm-up. Of course I want us to do well - but you don't have to be worried to show you're taking it seriously. Mental intensity isn't the same as worry."
A curvilinear type relationship appeared to emerge when intensity scores were plotted against performance (see Figure 5.15). Subject C's worst performance occurred on the one occasion that his intensity score was relatively high (Game 1; intensity = 23) and the interview following the game serves as an explanation:

"It was not as I would have liked it. Basically, I played badly last week and because we've got a few good freshers in this year, for the first time I've been here I'm under pressure for a start spot. I've never not started and I was being stupid and negative about it all. I've been busy and not practised as much as I'd want which is probably why I was so lousy - but I'll sort it out".

Similarly, Subject C's second worst performance occurred when cognitive anxiety intensity was at its lowest (Game 3: intensity = 12). However, it appears that despite a relatively low objective performance score, Subject C was satisfied with his overall performance, as was the coach (who gave him a subjective rating of 5 out of 7). It would appear inappropriate, therefore, to formulate the assumption that very low cognitive anxiety was detrimental to the performance of Subject C. In addition, he perceived his cognitive anxiety on that occasion as very positive (+18). The interview following Game 3 sheds some light on why objective performance was relatively disappointing:

"It was a funny game in that I felt I did a lot of good things but things didn't quite come off. I must have made about six or seven great little inside passes in under the basket and then we'd go and miss them. Andy probably missed three that I'd given him that he'd never normally miss. It was the same with my drives. I couldn't believe they weren't called (for fouling me) on some of them".

Direction
Subject C generally had positive perceptions of his cognitive anxiety levels with responses ranging from 3 to 18 (mean = 9.33; as compared to the sample mean of 6.0) indicating an average response per item of +1. However, prior to Game 3 he reported a score of 18 which was considerably more positive than his other responses:

"Yes, I know I did. There were even some plus 3's in there, I think. I was very relaxed and really looking forward to the game. I couldn't wait to get out on court and I think I felt that that was very good for me. I don't often get that "can't wait" feeling - that's why it was higher"
Figure 5.15: Relationship Between Cognitive Anxiety Intensity and Performance - Subject C
but this value of +18 corresponded with Subject C's second worst performance (as identified above):

"I played O.K. but things just didn't go my way. I must have rimmed out about four times and they (the referees) weren't calling much. I reckon I should have had some fouls. I was being positive and driving for the basket a lot - but they (the opposition) weren't getting called at all".

Nonetheless, with the exception of Game 3, the cognitive anxiety direction relationship with performance suggested that the more positive the perception the better the performance (see Figure 5.16). The background to the worst performance (Game 1; direction = +3) has been described earlier and coincided with the least favourable perception of the response. However, the two best performances (Games 4 and 5) were preceded by considerably more positive interpretations in terms of their suitability for upcoming performance (both +11; intensity = 15 and 14 respectively). Interview data prior to Game 5 endorses the facilitative perception of cognitive anxiety at this stage:

"My attitude was good. I was clued in like I wanted to be. I'm playing well at the moment and I'm keen to keep it going. For me it's all about concentration - not doing crazy things or being lazy for that matter. That's why I need an edge to the game, like last night. We needed to win so let's approach it professionally. I think without a bit of pressure I end up going through the motions - especially at that level."

**Somatic Anxiety**

**Intensity**

Somatic anxiety scores ranged from 9 to 15 (mean = 11.83) which is clearly a very low mean score. CSAI-2 norms show that only 10% of male college athletes report lower values and the group mean value for this sample was 14.9. The interview data corroborates this quantitative finding:

"I don't get pumped up at all before the game. Some of the boys like to get all psyched-up, but I'm not like that. Occasionally, I might get a bit nervous like last week, but usually it's about the same. I prefer to sit quietly and get changed slowly. Rushing about would hassle me".

A curvilinear relationship appeared to emerge between somatic anxiety intensity and performance, in that Subject C's better performances occurred at relatively moderate levels of his
Figure 5.16: Relationship Between Cognitive Anxiety Direction and Performance - Subject C
anxiety response whilst his poorer performances tended to occur at relatively low and high levels (see Figure 5.17). Comments following Game 5, which was his best performance, are interesting in this context:

"Perhaps I'm sometimes too relaxed before the game in that it then takes me time to get going. It occasionally makes me slow to react but I'd still prefer it to be that way round than getting all pumped up. What was good about Tuesday was that I was still relaxed but eager. Eager to play - I've been working hard and it's a good feeling to get out there and get away from it all!"

Direction
Subject C generally perceived his somatic 'anxiety' as facilitative to performance with scores ranging from 3 to 14 (mean = 8.33), which represents an average response per item of virtually +1, and a slightly more positive perception than the group mean value of 7.6. His preference for a physically relaxed pre-match state was referred to above, but he commented on the need for some activation:

"Yes, I don't like to be totally relaxed because it shows you might not be too bothered. That's why I only scored that (+3), (Game 2; Intensity = 9) because you need to feel a little up to get into it. Otherwise, you're not sharp. I don't need much to feel right but no nerves at all tells me my attitude's not there".

Although 'Game 3' did not conform to the general trend, and explanations have already been proffered, the relationship with performance tends to suggest that as the perception of the response becomes more positive, performance improves (see Figure 5.18). Certainly, Subject C's two best performances corresponded with favourable interpretations of somatic response:

"I did feel good beforehand, yes. Not nervous, but I was 'up' enough to know that I was into the game. ... That's usually a good sign and important for me because very often if I do something right early in the game then it kind of sets me up for the rest of it" (Game 4; direction = +13; intensity = 14).

Self-Confidence

Intensity and Direction
Subject C's self-confidence responses were generally high, with responses ranging from 26 to 34 (mean = 31.5; group mean = 26.4 ). In comparison to CSAI-2 norms, 85% of male
Figure 5.17: Relationship Between Somatic Anxiety Intensity and Performance - Subject C

Figure 5.18: Relationship Between Somatic Anxiety Direction and Performance - Subject C
college athletes tend to report lower values. The interviews endorsed this high self-confidence that
Subject C reported:

"You have to be confident. The whole game is about confidence. If you're not confident
you don't do anything. You don't shoot, you pass it off. You don't get aggressive
underneath (the basket). You don't drive at people - all sorts" (Game 1) and "I always tell
myself before a game to relax. I know I can play well in this game - it's just a case of
telling yourself or reminding yourself that you can" (Game 3).

Subject C's directional responses tended to correspond with his self-confidence intensity.
For him, like the other players, the more self-confident he was, the better. His scores ranged from
11 to 21 (mean = 17.16; group mean = 13.1) indicating his belief in the facilitative nature of his
self-confidence. Accordingly, when self-confidence intensity and direction are plotted against
performance, similar relationships appear to emerge. In both cases, greater levels of the response
coincided with greater levels of performance (see Figures 5.19 and 5.20).

Game 5, for example, was this subject's best performance and coincided with both his
highest intensity (34) and most positive perception (+21) of self-confidence. Extracts from the
interview following this game suggest the importance of recent performance accomplishments in
determining confidence levels for this subject:

"The fact that I played well last week was a big factor - but also because in practice I'm
hitting a lot of outside shots. That's important because you can always tell yourself you can
do it but to feel really sure, your form is the real thing you go on".
Figure 5.19: Relationship Between Self-Confidence Intensity and Performance - Subject C

Figure 5.20: Relationship Between Self-Confidence Direction and Performance - Subject C
Subject D: Age 19. First year undergraduate student.
Trait Anxiety Level: Low (14) (Group mean = 18.6)
Trait Anxiety Perception: Very Positive (52) (Group mean = 43.4)

Based on his trait anxiety data, it was predicted that Subject D would report low levels of competitive state anxiety and perceive these levels as positive in relation to his upcoming performance. As anticipated this subject did report low levels of cognitive and somatic anxiety and, indeed, generally interpreted these low levels as facilitative. Similarly, the high levels of self-confidence that materialized met with predictions based on his trait anxiety data. Subject D's quantitative responses are shown in Table 5.6

Table 5.6: Modified CSAI-2, AD-ACL Responses and Performance Scores for Subject D

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<td>21.40</td>
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L = League Game; C = Cup game.

Cognitive Anxiety

Intensity

Subject D's scores ranged from 16 to 23 (mean = 17.5) on the CSAI-2 cognitive anxiety scale. Relating this mean raw score to the CSAI-2 norms for male college athletes, 50% of the respondents in the norm group had lower scores on that subscale. In comparison with the group of basketball players in this study, however, Subjects D's responses were considerably lower than the mean of 21.1. This subject tended to report, therefore, low to moderate levels of cognitive anxiety and the interview data served to support this:

"I rarely get really, really anxious but I'd have to say I do get on edge a little bit. That's only natural for important games. If it wasn't important or you aren't bothered about
winning then you wouldn't get worried. I'm always telling myself to relax but it's natural if you're thinking about the game." (Game 1; highest intensity score of 23) and:

"Without getting concerned a little bit or worrying a bit about winning, my mind's all over the place and I get lazy. I think that's why I play better when Chris (the coach) is there. I prefer him being there because it puts me under a bit of pressure" (Game 2; intensity score of 16)

As with the previous subjects, no differences emerged between the cognitive anxiety responses, as well as all the other responses, for the league and cup games. Subject D explained that as a first year undergraduate he was just enjoying student sport and had yet to distinguish between the various types of competition:

"To be honest it makes no difference. I know some of the older guys are saying 'Hey, this is a cup match, we've got to sort it out' - but it's different if you've only been here a few weeks. I'm just enjoying playing and it doesn't change how hard I play".

The relationship between cognitive anxiety intensity and performance tended to show that as cognitive anxiety increased then performance worsened (see Figure 5.21). Certainly, Subject D's two worst games (Games 1 and 3) occurred on the occasions that his cognitive anxiety levels were at their highest. Support for this finding is again forthcoming from the interview data:

"I did feel under a lot of pressure. As a 'fresher', you know, I came here with a reputation - played for England (under 16's) - and I just felt a lot was expected of me and I let it get to me a bit. Instead of saying O.K. 'let's go!' I just let it get to me. I suppose I tried to be a bit fancy, but that was because I felt under pressure" (Game 1; worst performance; highest intensity score of 23)

and:

"Yes, I was (worried). I wouldn't say anxious, just uptight. For some reason I wasn't starting five on Friday night and yet I'd played the best of all of them against Rawlins. It annoyed me that Chris (coach) did that and it got me uptight during that game when I got on and it got me uptight again thinking about it before this one. I don't know why he's doing it" (Game 3; second worst performance; intensity score of 20)

**Direction**

Subject D's direction responses ranged from -3 to 17 (mean = 6.6), which indicates that his moderate intensity levels were generally perceived as positive to performance and represent a level
Figure 5.21: Relationship Between Cognitive Anxiety Intensity and Performance - Subject D
similar to that of the group mean of 6.0. The interviews again provide evidence which challenges multidimensional anxiety theory predictions concerning the relationship between cognitive anxiety and performance by indicating that even those performers who prefer low levels of the response, feel that some is necessary for optimum performance:

"If I am under-anxious then it's bad. I do need to be worried sometimes because I'm lazy. I get lazy on court unless I start thinking 'God, we might lose this!' You have to get the right sort of balance for the right game. I think you have to be not too anxious but anxious to win" (Game 2; direction score of +8; intensity =16).

Subject D's comments following Game 5 (Direction = +17; intensity = 15) also help to establish the relationship, as he sees it, between intensity and direction of cognitive anxiety:

" Last night was great before the game. I was very clear - all my thoughts were on the game and not on 'God, I've got to play well here'. I was still worried in a way because I knew we had to win but I was in control of it. I was right where I want to be and that's why it was so positive".

When asked why the previous game (Game 4) had only yielded a direction response of +8 at the same level of intensity (+17), Subject D replied:

"I think my overall mood was better. I'd had a good day - I'm pretty happy at the moment and positive about most things. I just felt really good."

This is an illuminating statement when taken in the context of the quantitative mood scale responses. Reference to Subject D's responses to the arousal dimension (i.e. positive affect) of the AD-ACL reveal a moderate score of 23 prior to game 4 and a relatively high score of 32 prior to Game 5. This suggests that in this instance mood may have mediated the nature of the direction response and presents evidence of the potential value of utilising mood scales in examination of pre-competition thoughts and feelings. In addition, this example indicates that intra-individual variation can occur at the same level of intensity, providing further support for the rejection of intensity-alone anxiety scales.

The results for cognitive anxiety direction in terms of its relationship with performance lend further support for the notion that valuable knowledge can be gained from measuring this dimension. When direction values are plotted against performance, we see that the more positive the perception of cognitive anxiety, the better the performance (see Figure 5.22). Comments following Game 2, (his best performance), appear to verify the influence that the perception of his cognitive anxiety may have had:
Figure 5.33: Relationship Between Cognitive Anxiety Direction and Performance - Subject D

Cognitive Anxiety Direction

Performance
"Last week it was very negative (Game 1; worst performance) because I had too many pressurising thoughts going through my mind. This time I just felt under less pressure and everything was better. My warm-up, everything. I could spend more time thinking about the game. It's very important to me that I have time to think about what I'm going to do and if things are on my mind then I can't."

**Somatic Anxiety**

**Intensity**

Subject D's somatic anxiety intensity levels were extremely low, ranging from 9 to 11 (mean = 9.83; group mean = 14.9). A comparison with the relevant CSAI-2 norms reveal that only 3% of the respondents in the norm group had lower scores. This extract taken from one interview (Game 2; intensity = 10) reflects the placid nature of Subject D's pre-competitive somatic anxiety response:

"I do tend to relax as much as I can. If you are relaxed, you relax mentally and you think about the game. Last night was fairly good because I was fairly calm. My past history when I was going for England under-15, everything was too much and I worried about it too much and now I've learnt to relax. It's different when you get on court but I now know if I'm relaxed before the game I play better."

and:

"It was just how I want it. I really like the feeling of being totally calm at that stage. I think it's because I used to fret so much and I used to hate that period before a game but now I can usually slow everything right down" (Game 4; Intensity = 10).

Due to the limited range of the intensity responses, drawing any conclusions from the relationship between somatic anxiety intensity and performance (see Figure 5.23) would be inappropriate. However, Subject D's highest somatic anxiety response of 11 did coincide with his worst performance.

**Direction**

Subject D generally perceived his somatic 'anxiety' as being very facilitative to his performance. Responses ranged from 11 to 21 (mean = +17.5) indicating that on average, the intensity response to each item was perceived as +2 on the direction scale. This value compares to a group mean for the basketballers of 7.6. Interview extracts endorse the positive interpretation that Subject D had of his somatic response:
Figure 5.23: Relationship Between Somatic Anxiety Intensity and Performance - Subject D

![Graph showing the relationship between somatic anxiety intensity and performance for Subject D.](image)
"That time just after we've got changed is when I really want to be relaxed. It gives me time to concentrate on the game.... Yes, the more physically relaxed I am, the better. If I started having all those things that it (the CSAI-2) says, I'd be very worried. But because I've been very calm before the games it's been just how I want it”.

With the exception of one outlying data point, (Game 3), when the direction scores are plotted against performance a trend similar to that for cognitive anxiety direction seems to appear (see Figure 5.22). As the perception of the somatic anxiety becomes more positive so performance improves. Closer inspection of the interview extracts reveals that this finding is directly related to the findings for cognitive anxiety direction in that positive perceptions of somatic state facilitate the achieving of an appropriate cognitive state for Subject D.

"...no, it (somatic state) changes. As soon as I'm on court I don't want to be relaxed anymore. You get the adrenaline in you going. You've got to pass the ball quickly and you can't do that if you're relaxed... I want to be relaxed before the game so it gives me time to think about the game. So if I score high on that (somatic anxiety direction scale) then it's because I know I'm getting into a good frame of mind about what I've got to do”.

Therefore, because of the 'shift' in preferred somatic 'anxiety' towards increased 'arousal' that occurs once Subject D gets on court, perceptions of his pre-competitive somatic state are, perhaps, not directly important to the relationship with performance (see Figure 5.24). Of greater importance, it would seem, is the effect that perceptions of his somatic 'anxiety' appear to have on his cognitive state. This pre-match cognitive state is clearly important to his performance and it is through this 'channel' or route that somatic anxiety direction responses influence performance. Certainly, throughout the interviews this subject stressed the need for physical calm before the game as a means of establishing an appropriate environment in which to mentally prepare himself.

Subject D accounts for the relatively poor performance in Game 3, that tended to run counter to this 'positive linear' relationship, by explaining that his attitude during the game was not as it should have been:

"I was probably too big-headed from the last game. I played really well then and I thought I could just go in and start all over again. But I couldn't because they were a different team ... and I got frustrated and started putting up some poor shots. I got a bit greedy, I guess".
Figure 5.24: Relationship between Somatic Anxiety Direction and Performance - Subject P
Self-Confidence

Intensity and Direction

Subject D's self-confidence scores were also at an extreme end of the range with responses falling between 30 and 36 (mean = 33.33). The norms provided by Martens et al. (1990) indicate that 90% of similar respondents tend to score less than Subject D's mean value on this scale, indicating the extent of his state self-confidence. Similarly, within the group, Subject D was the most self-confident across the six games (Group mean = 26.4). He endorsed this finding during the interviews:

"I feel self-confident before any game. You have to be self-confident. If you're not you become hesitant and you're only half-way through when you make your shots. You have to try and keep that confidence in yourself when you know you're good. Now, if your first few shots don't go in, then you think 'oh Jesus', and then you're confidence might go down a bit. But before a game you've got to be confident and then usually that doesn't happen" (Game 2).

The direction of the response was, understandably, relatively high (mean = 16.66) as compared to the group mean of 13.1. However, considering his extremely high self-confidence scores, it was surprising that these direction scores were not even higher. Subject D commented that although he tended to respond with 'very' to each of the CSAI-2 self-confidence items, it did not mean that his confidence levels were perfect and suggested that 'completely' could be included onto the CSAI-2 response scale for the self-confidence items to indicate a fifth and even stronger level of the response. As one would probably expect, however, slight reductions in self-confidence intensity were matched with lower direction scores:

"Although I felt confident I could play well, it wasn't quite as high as I wanted. I guess my confidence had been hit a bit with Chris not starting me on Friday. So, therefore, yeah, it was positive but could be even better - there was that slight thing in my mind that maybe he thinks I got hot last week and it was a one off" (Game 3; direction = +15)

The relationships between the intensity and direction of self-confidence and performance seemed to suggest that the greater the self-confidence scores, the better the performance, although in both cases an outlying data points fail to conform to the trend (see Figure 5.25 and 5.26). In the case of self-confidence intensity, Subject D's poor performance in Game 1 occurred following a high self-confidence response of 33. However, despite this high score, he explains his poor performance on this occasion as a function of the stage of the season in which the game was played:
Figure 5.25: Relationship Between Self-Confidence intensity and Performance - Subject D

Figure 5.26: Relationship Between Self-Confidence Direction and Performance - Subject D
"I know I was a bit uptight and that affected me, but looking back I think the team needs to settle. Nobody played well really. The other guys don't know my style of play yet and I wasn't getting the screens I wanted - but that'll come as we get to know each other better".

Similarly, the relationship that emerged between direction and performance had one game that ran counter to the general trend that suggested that the more positive the direction the better the performance. Subjects D's best performance came in Game 2 despite coinciding with his least favourable perception of his self-confidence. Once again the interview data provided an explanation:

"I think my confidence was a bit vulnerable and so it wasn't that positive. Because I'd played badly in the last game I think I was a bit worried about what might happen. So I really wanted to be very (his emphasis) confident. That's why there was some +1's on that bit (direction scale). But once I got out there and hit a couple of good ones I was on a roll".

The 24 separate interviews that were conducted have provided valuable additional information to that gleaned from the quantitative data and endorse Gould and Krane's (in press) belief that interviews are especially useful in obtaining in-depth assessments of athlete's emotions and cognitions. The qualitative aspect of this investigation has provided a detail and a depth that cannot necessarily be gained from quantitative data as the subjects have described in their own words the events and how they are affected by them. However, it would appear wrong to wholeheartedly recommend the use of interviews in isolation. The findings from this study seem to suggest that a combination of qualitative and quantitative methodologies will particularly enhance the researcher's attempts to examine questions pertaining to competitive state anxiety.

The state anxiety findings for these four subjects seem to reflect to a certain extent the trait anxiety responses on which they were selected for interview. As expected, for example, Subjects A and B, selected on the basis of their high trait anxiety, reported substantially higher cognitive and somatic state anxiety than the other two subjects, who had been selected on the basis of their low trait levels. However, the subjects did not differ quite as expected in terms of direction. Subjects A and C, for example, who were selected because they perceived their SCAT responses as marginally negative, tended to perceive their state responses as positive. The overall similarity in direction responses between the subjects may have been due to the fact that they did not differ that greatly in perceptions of their trait levels in the first place. Nonetheless, the differing insights provided by the four individuals in terms of their cognitive, physiological and behavioural preferences prior to performance and the degree to which these variables can subsequently effect performance has provided valuable additional information which is considered in the discussion section of this chapter.
DISCUSSION

The purpose of this investigation was to examine the relationships between the competitive anxiety dimensions of intensity and direction, mood and an objective measure of basketball performance. The investigation utilised a longitudinal approach in that quantitative data was collected over six separate matches. Additionally, qualitative data was gathered from four of the twelve players following each of the six games.

The results from the various approaches used in this study provide a range of interesting findings. Although the players reported experiencing varying levels of cognitive anxiety, this cognitive anxiety intensity was largely perceived as positive. This immediately questions the assumption that the cognitive anxiety response will have a negative linear relationship with performance if performers are interpreting their cognitive 'anxiety' as facilitative to that performance. This descriptive finding was subsequently endorsed by closer inspection of the actual responses to some of the items of the CSAI-2. This 'inspection' serves as an explanation for the mean findings and suggests a possible reason for the inability of the majority of studies to provide empirical support for the predicted negative linear relationship between cognitive anxiety and performance. Particular cognitive anxiety items of the CSAI-2 (e.g. 'I am concerned about this competition'; 'I am concerned that others will be disappointed with my performance'; and 'I am concerned about losing') tended to have responses of 3 or 4 (i.e. 'moderately' or 'very much so') but these were perceived as +2 and +3 on the debilitative-facilitative scale (i.e. 'very positive') in a number of cases. Previous studies which have failed to relate cognitive anxiety to performance would have assumed that a score of '4' (i.e. 'very much so') would have a negative impact on performance. However, some players appear to consider such a response as facilitatory to performance. Furthermore, the follow-up interviews revealed the motivational and attentional focusing contribution that such thoughts make. In particular, two of the four interviewees consistently reported the benefits they perceived in experiencing high levels of cognitive 'anxiety' as measured by the CSAI-2. The findings for Subjects A and B provide further convincing evidence of the need to challenge the view that cognitive anxiety is necessarily debilitating. In this particular study we can see the value of adopting different methodologies, as both the approaches in this investigation independently challenge the traditional way of thinking and hence strengthen the counter argument. The problem may relate, of course, to the fact that the CSAI-2 items are only those which are purported to signal the presence of anxiety. However, to certain individuals some items clearly do not represent cognitive anxiety as it is defined in the competitive anxiety literature (i.e. images of failure, self-doubting verbalisations). This clearly corroborates the notion that cognitive anxiety need not necessarily be detrimental (Parfitt and Hardy, 1987; Parfitt et al., 1990). A competitive anxiety scale may need to choose more carefully its cognitive anxiety symptoms if its assumption is that those symptoms are detrimental to performance.
Not only did this investigation provide evidence that challenged existing thinking about cognitive anxiety, but the findings also suggest that measuring the direction of the response increases the researcher's ability to predict performance. Inspection of the mean intra-subject correlations indicates that the direction dimensions of cognitive and somatic anxiety were more predictive of performance than were the respective intensity dimensions (although it must be acknowledged that these correlations were low to moderate). Researchers analysing just the intensity-performance correlations would be correct in assuming that little relationship existed between anxiety and performance but, by incorporating direction, it was possible to make a stronger connection. This finding is supported by the evidence provided by the in-depth analyses of the four interviewees. Examination of the direction-performance relationships for these four subjects revealed a tendency for a more positive perception of the anxiety response to relate to a higher level of performance. This contrasts with examination of the intensity-performance relationships which failed to suggest any noticeable or consistent trend except for self-confidence. However, it must be noted that these statements need to be substantiated with larger numbers of subjects.

The reason why the various correlations with performance do not indicate a particularly strong relationship may be a reflection of the type of sport from which this data was collected, in that basketball performance is dependent on so many interacting factors. Not only is it related to the performance of one's team-mates, but also the opposition. Furthermore, the patterns of play to which the player must respond are constantly changing. Pre-competition states, therefore, may exert relatively little impact on overall performance as compared to sports such as track and field athletics or gymnastics, for example, where there may be far fewer intervening variables; that is to say, individual sports where outcome rarely relies on the performance of, and interaction with, colleagues. Indeed, the interviews supported this with the players referring to fluctuations in self-confidence, in particular, depending on their performance early in the game. This clearly adds further weight to the suggestions in the previous chapter of the need to gain measurements of thoughts and feelings during competition. For example, a starting point in basketball may be to gather responses at half-time. Certainly, the indoor environment and length of the half-time break in basketball would lend itself to such an approach. In other sports that have natural but less suitable breaks (e.g. the time allowed is shorter), it may be necessary to develop and validate shortened versions of existing psychometric measures in order to make this feasible. However, the interviews also provided important information that has further relevance to this issue. All four players commented on the benefit of doing something correct or effective in the early stages that they are on court and that this opening 2 to 3 minute period of the game was crucial as it tended to 'set them up' for the rest of the encounter. Therefore, the importance of pre-competition states remains important in this context and this was alluded to in the interviews. One player talked of the importance of getting in the right frame of mind so "I start well and then I'm off and rolling".
Clearly, a methodology that can incorporate both pre-competition and during competition anxiety and mood assessments has enormous potential for providing valuable information.

The interviews supported the findings from the quantitative data that somatic anxiety was generally perceived as positive. Significantly, not only did they provide actual explanations for why responses occurred, the interviews also provided valuable additional information by indicating that interpretations of some of the items on the somatic anxiety subscale may vary across sports. Interestingly, responses to the 'clammy hands' item were very negative across all the subjects and this was supported by the interview data. Clearly, in a sport like basketball that is so dependent on 'safe hands' then the perception will tend to be negative if the symptom is experienced. However, in other sports (e.g. soccer, running) the response may not be so negative and suggests that questionnaires that wish to assess the symptoms of anxiety that are crucial to that sport may need to be sport-specific. It was also noted that some athletes scored very positively on some somatic items but negatively on others. The case of Subject A provides a good example. He responded '+3' for 'I feel jittery' (as he associated this with the feeling of butterflies which he perceived as beneficial to his preparation) but '-3' to the clammy hands that he experienced. Clearly, this athlete is in a different state to someone who 'scores' two zeros in the same situation and consequently, reports the same mean value. Whereas subject A is very much aware of his physiological responses and they convey important information to him, the other athlete may have been fairly ambivalent about his responses and rarely attributes much significance to such symptoms. Clearly, this is a methodological issue for future developers of direction-based anxiety scales.

Evidence such as this supports the findings from Study 3.2 and further indicates the importance that should be attached to an individual's appraisal of his or her anxiety levels and the inter-individual variability in anxiety levels and preferences. Equally, findings from the group as a whole indicated that similar reported levels of somatic anxiety intensity were often interpreted as very different in their potential to influence performance. For example, Subject A's mean somatic anxiety level was 19 (range 17 to 23) and his mean perception of those levels was -0.16 (range from -2 to +2). Another subject who was not interviewed, on the other hand, scored a similar mean intensity level of 19.2 (range from 17 to 22) but his mean perception value was 10.4 (range from 7 to 13). Previous investigations would not distinguish between the two but by incorporating direction it allows us to see these two athletes in a different and more accurate light.

In addition, the longitudinal nature of this investigation revealed that the same individual may even perceive the same level of intensity very differently on two separate occasions. Subject B, for example, twice reported somatic anxiety levels of 23. On the first occasion this was interpreted as -2 (Game 1) on the direction scale whereas on the second occasion the direction response was +10 (Game 5). This further emphasises the importance of measuring 'direction'. Again, not only would an intensity-alone approach not have distinguished between the two values, but more importantly, neither would an intra-individual (intensity-alone) approach. An intra-individual analysis would have assumed similar states and hence, similar performance outcomes.
whereas by measuring direction it can be demonstrated that the individual was in a substantially more suitable frame of mind prior to Game 5. Furthermore, this was endorsed by the interviews and a possible explanation for the difference in interpretation was provided, in that the subject may have performed some cognitive restructuring as a means of coping with his elevated somatic response.

The other correlations showed that the relationship between the mood dimensions and direction scales of the CSAI-2 did not emerge as strongly as expected, but did appear in the appropriate direction in that the arousal dimension (viewed as positive affect) did correlate moderately and positively with cognitive anxiety direction. However, it is surprising that arousal formed such a weak relationship ($r = 0.23$) with somatic anxiety direction. This may be a function of the fact that the modified CSAI-2 is not a validated scale and this may confound any potential relationship with a questionnaire that measures a similar construct. A validated measure of anxiety direction would be expected to demonstrate some degree of concurrent validity by formulating a relatively strong relationship with mood scales such as the AD-ACL, and this is clearly an area for future research. The fact that the AD-ACL is not sport-specific may have contributed to this weak relationship in that previous concurrent validation research has demonstrated stronger associations between sport-specific scales (e.g. Martens et al., 1990). However, the finding that 'arousal' correlated strongest with performance does suggest the need to further examine the potential use of such mood scales in examinations of the anxiety-performance relationship.

The findings concerning the relationships between the CSAI-2 components and performance for the four interviewees are also revealing. The results for cognitive and somatic anxiety appear to demonstrate that performance generally improved as the perception of the response became more positive. In other words, all the interviewees had a tendency to play better on the occasions that they perceived their anxiety levels most favourably. Although each of these subjects tended to produce one performance that ran counter to this trend, the direction dimension for both cognitive and somatic anxiety formed far more consistent patterns with performance than did the two intensity dimension variables. No such discernable trend was forthcoming for the relationships between cognitive anxiety intensity and performance or somatic anxiety intensity and performance. The finding regarding the anxiety direction-performance relationships appeared to be corroborated by the interview data, as the subjects intimated that feeling happy about their attitude and physical state prior to the game was important in terms of how well they started. This was, in turn, significant as far as overall performance was concerned because subjects commented that if they began well then they were usually 'on a roll' and performed well for the remainder of the game. The findings for the relationships between self-confidence intensity and direction and performance were similar in nature to those found for cognitive and somatic anxiety direction, in that the greater the response, the better the performances tended to be. This evidence for the association between self-confidence intensity and performance is consistent with multidimensional anxiety predictions and was also endorsed by interviews. Subjects consistently reiterated the
importance of high self-confidence. Clearly, subject numbers restrict any statistical analyses beyond the descriptive ones presented, but some interesting relationships appear to have emerged.

Evidently, these findings need to be substantiated with larger samples and the problem concerning the validity of the modified scale remains. However, considerable evidence, presented in the context of a longitudinal design, and both qualitative and quantitative in nature, has been provided to lend considerable support to the belief that the measurement of the direction dimension of anxiety will benefit sport psychology researchers. The measurement of competitive state anxiety may clearly benefit from this more detailed approach as opposed to the rather limited intensity-alone perspective currently being employed, especially in terms of examining the anxiety-performance relationship. Clearly, use of the methodology that was employed in this study is to be encouraged but it is hoped that at some stage a validated questionnaire can be developed that measures the direction dimension as this would allow a nomothetic investigation to be performed from which larger generalisations could be made. In this particular case it would be interesting to see if positive linear relationships appear between direction and performance.

For example, once the concepts are better understood in individual athletes, reliable and valid debilitating-facilitative competitive state anxiety measures could then be developed and large group studies could be conducted to determine the generalizability and reliability of any noted relationships. The nomothetic portion of the investigation would determine if reliable and stable relationships existed in key variables, while the ideographic portion would generate important information relative to such issues as what cognitions and emotions occur when an athlete perceives his or her pre-competition state as positive as opposed to negative. In summary, it is strongly recommended that future anxiety-performance relationship investigators use ideographic as well as nomothetic research methodologies in their investigations. Only by combining the two approaches will our understanding of this complex relationship be maximized.
CHAPTER 6

SUMMARY, DISCUSSION AND CONCLUSIONS

This chapter comprises three sections. The first section provides a brief summary of the issues addressed and studies reported in this thesis. The second section comprises a detailed discussion of the findings, and the final section provides brief conclusions. The discussion section is divided into three sub-sections: 'theoretical issues and implications', including a number of conceptual points that appear to arise from this research; 'practical implications' that highlight a number of recommendations to coaches and sport psychologists alike; and, 'implications for future research' that outlines a number of suggestions based on the lessons learned from each study.

SUMMARY

This doctoral thesis attempted to examine specific aspects of the competitive state anxiety response that are considered to be important areas of interest. The underlying purpose, therefore, was to facilitate a greater overall understanding of the construct and some of the variables that influence it. The issues that were addressed include: Examination of which situational factors predict the CSAI-2 subcomponents; investigation of the influence of a selected individual difference variable (i.e. gender) on the temporal patterning of the CSAI-2 components in the period leading up to competition, as well as the antecedents of the anxiety response as a function of gender; exploration of additional dimensions of the competitive state anxiety, and whether current psychometric measures fail to assess aspects of anxiety that may facilitate a greater understanding of the response and its relationship with performance, in particular.

The examination of such issues is important since, although the study of competitive state anxiety has enjoyed a substantial conceptual leap with the adoption of a multidimensional approach, numerous questions remain unanswered as a result of the relative infancy of the area of inquiry. Although this conceptual development has generated considerable empirical research using the CSAI-2, a number of researchers have expressed their misgivings about this psychometric tool and the assumptions generated from its use. The broad perspective that this thesis adopts, therefore, is a reflection of the need to gain a greater overall understanding. Certainly, there has been limited research in the area of the precursors of competitive state anxiety. Considerable literature exists in the related 'sources of stress' research, but the preoccupation with attempts to establish relationships between the anxiety components and performance, for example, has tended to mean that researchers have neglected to pursue the precise precursors of the anxiety in the first place. To this author's knowledge, only two studies have previously examined this particular aspect of multidimensional anxiety. In view of the wide reaching implications for stress

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management that such information could provide. This was considered an important area to address.

Martens and his colleagues (1990) appear to have established a theoretical argument concerning the temporal patterning of the anxiety components in the period leading up to a competition based on their own CSAI-2 validation research and extrapolations from the test anxiety literature. However, some research has emerged which suggests that certain individual differences may, in fact, mediate this proposed temporal patterning, including gender (e.g., Jones and Cale, 1989a), and type of sport (Krane and Williams, 1987). It was, therefore, seen as important to consider this issue and re-examine the influence of the interpersonal difference variable of gender, but also to attempt to understand why such gender differences appear to exist.

Whilst the CSAI-2 has been of considerable value in furthering our initial understanding of competitive state anxiety, there has been some increasing discontent expressed with regards the intensity-alone dimension of the scale and the subsequent intensity-alone perspective that researchers adopt. Therefore, exploration of additional dimensions of competitive state anxiety was undertaken to provide a more complete picture. This was considered crucial because of the distinct lack of empirical support, despite considerable efforts, for the predicted relationships between anxiety components and performance. It was felt that a more detailed approach to the psychometric measurement of the response would assist understanding of the anxiety-performance relationship.

The issues identified above were addressed in the form of five separate studies. The first study (Chapter 2) examined the situational antecedents of competitive state anxiety and self-confidence in a sample of elite student middle-distance runners following the development of a pre-race questionnaire (the PRQ) that identified the factors that middle-distance runners felt contributed most to how they felt during the period immediately preceding a race. A cross-sectional methodology was employed for this study in which subjects responded to the CSAI-2 and the PRQ 1 hour prior to competing. Factor analysis of the 19-item PRQ revealed five factors: 'Perceived Readiness', 'Attitude Towards Previous Performance', 'Position Goal', 'Coach Influence' and 'External Environment'. Stepwise multiple regression analyses demonstrated that cognitive anxiety was predicted by the first three of these factors. However, none of the factors were found to significantly predict somatic anxiety. Self-confidence was also predicted by two factors, 'Perceived Readiness' and 'External Environment'. The findings revealed, therefore, that cognitive anxiety and self-confidence share some common antecedents but that there are factors that are peculiar to each.

The second study (Chapter 3) investigated the influence of gender on the temporal patterning of the CSAI-2 components in a sample of student sport performers in the period leading up to an important varsity competition. In addition, antecedent variables were incorporated in an attempt to explain why any differences might arise. This study employed a time-to-event paradigm whereby subjects responded to the CSAI-2 and six separate situational antecedent items on five occasions during the week preceding an important competition. The CSAI-2 subscale and
situational variable scores were compared between the five conditions and between gender by two-way ANOVAs (gender by time-to-competition). In the case of cognitive anxiety, males showed no increase across time whilst females showed a progressive increase as the competition neared. Males and females showed the same patterning in somatic anxiety, with increases occurring on the day of competition. Self-confidence scores revealed a reduction in self-confidence as the competition neared in both genders, but there was a greater decrease in females than in males. Specifically, significant predictors in the females were associated with personal goals and standards (i.e. how important it was for them to do well personally and how well prepared they felt), whereas significant predictors in the males were associated with interpersonal comparison and winning (i.e. how important it was for the team to do well and the extent to which they thought they would win).

The third study (Chapter 4; Study 3.1) investigated the intensity of competitive state anxiety but also the frequency of cognitions about the event in the period leading up to an important competition in a sample of student Track and Field athletes. This was designed primarily to examine the efficacy of the Multidimensional Anxiety Theory notion that cognitive anxiety remains stable in the period leading up to competition. Using the time-to-event paradigm, the CSAI-2 and a single additional 'Percentage Thinking Time' item, with a response scale from 0 - 100% with gradations at every five percent, were administered to the subjects at five stages during the pre-competition period. The CSAI-2 subscale and 'Percentage Thinking Time' item scores were compared between the five conditions and between gender by means of two-way ANOVAs (gender by time-to-competition). In the case of cognitive anxiety, a significant interaction emerged with the males' response remaining more stable than the females who tended to report a progressive increase. There was no significant interaction for somatic anxiety, nor a significant effect of gender. The significant time-to-competition effect that emerged revealed increases in both genders on the day of competition. The findings for self-confidence revealed that, although both males and females did report reductions in the response, a significant interaction did materialize, with the females reporting a more progressive decrease in their self-confidence as the competition approached. The findings for the 'Percentage Thinking Time' item showed a progressive increase at every stage of testing for both males and females. The percentage of the time that the mind was occupied with cognitions about the event increased from 6% to 16% to 27% to 57% to 83% at the respective stages of testing. A number of the athletes were selected to represent a cross-section of the sample and were interviewed as a means of corroborating the evidence supplied from the questionnaire data. The interviews examined the nature of the thoughts and feelings experienced by the athletes in the period leading up to competition. The qualitative data did provide supporting evidence for the quantitative data with the exception of the patterning for male cognitive anxiety. The questionnaire data essentially revealed that cognitive anxiety remained stable in males, whereas the male interviewees consistently reported elevations of the response. Correlational analysis also revealed that progressively stronger relationships emerged between cognitive and somatic anxiety.
and 'Percentage Thinking Time' and somatic anxiety for both males and females, as the event approached.

The fourth study (Chapter 4; Study 3.2) not only examined the intensity dimension of the anxiety response, but also the frequency and directional aspects of the response as well. This was also conducted within the framework of the time-to-event paradigm and involved student Track and Field athletes. Subjects responded to a modified version of the CSAI-2 on four occasions during the pre-competition period as well as rating how pleased they were with their performance following completion of their event. This subjective measure of performance was included as a means of examining relationships with the independent variables. The intensity, frequency and direction dimensions of each of the CSAI-2 subscales were compared between the four conditions by means of one-way ANOVAs. In the case of cognitive anxiety, time-to-competition effects emerged for intensity and frequency, but not direction. The intensity of the response was significantly greater at the final stage of testing than it was 2 days before the athletes' events, and the frequency of the response increased progressively throughout the experimental period. For somatic anxiety, the time-to-competition effects that also emerged for intensity and frequency revealed that both dimensions increased progressively as the time to compete neared. The directional perception of the somatic response remained unchanged. The results for self-confidence revealed no effects for intensity and frequency but the direction of the response became increasingly positive as the competition approached. Stepwise regression analyses were then performed in order to determine whether any of these anxiety variables were significant predictors of the subjective rating of performance. The results revealed that how the athletes perceived their cognitive anxiety in terms of direction 2 days before competing predicted how well they thought they had performed. In other words, the more positive they felt about their cognitive anxiety the more satisfied they were with their eventual performance. At the remaining three stages, directional perception of somatic anxiety was the predominant predictor of performance. At 1 day before and at the 'within 30 minute' stage, the intensity of the self-confidence response also emerged as a significant predictor, combining with the somatic direction dimension on both occasions. A representative cross-section of the athletes again provided qualitative data to supplement that gathered from the quantitative approach. The interview data provided support for the empirical data in that interviewees agreed that their questionnaire responses were a reflection of how they had felt, and the interviewees' questionnaire responses were a reflection of those of the group as a whole. Correlational analyses revealed that substantially stronger relationships materialised between self-confidence intensity and cognitive anxiety direction and somatic anxiety direction than the relationships between self-confidence intensity and cognitive and somatic anxiety intensity, implying an interesting connection between perceptions of one's anxiety response and one's level of self-confidence.

The fifth and final study (Chapter 5; Study 4) employed a longitudinal methodology and focused on the dimensions of intensity and direction and their relationship with an objective
measure of performance in a sample of basketball players. Players also responded to a mood scale (the AD-ACL) within 20 minutes of the start of six home games. In addition, in-depth interviews were carried out with four of the team following each game, in order to provide further information regarding their pre-match thoughts and feelings and their impact on performance. The findings from this study endorse the view that directional perceptions of the anxiety response appear to serve as a better predictor of performance than the intensity of the response. Mean intra-subject correlations for all the subjects revealed stronger relationships between direction dimension scores and performance than intensity and performance, although the variable that formed the strongest relationship with performance was the arousal dimension of the AD-ACL. Equally, the follow-up interviews that were conducted revealed that it can be dangerously misleading to assume that high levels of cognitive anxiety, as it is currently measured, are detrimental to performance. The case study approach adopted with these four players tended to indicate that the more positive the perception of cognitive and somatic anxiety, the better the basketball performance. The findings also indicated the value of incorporating a mood scale into investigations involving state anxiety as the data gathered from the mood scale used in this investigation provided valuable additional information and served to increase understanding of the relationship which emerged between pre-competition state and performance.

**DISCUSSION**

**Theoretical Issues and Implications**

The theoretical implications to emerge from the first study concern the view that cognitive anxiety and self-confidence exist at opposite ends of the same cognitive evaluation continuum. Borkovec (1978), for example, described self-confidence as simply an epi-phenomenon resulting from a lack of anxiety. Conversely, Bandura (1977) proposed that anxiety was an epi-phenomenon resulting from a lack of self-confidence. However, the fact that factor analysis of the CSAI-2 revealed separate cognitive anxiety and self-confidence factors suggests that they should be regarded as independent rather than bipolar in nature. Hardy and Jones (1990) have argued that self-confidence may in fact be orthogonal to cognitive anxiety and the evidence from Study 1 challenges the notion that they are bipolar constructs. The discovery that the factor ‘Perceived Readiness’ was a predictor of both cognitive anxiety and self-confidence lends support to the traditional bipolar view, but the finding that there were also factors that were unique to these two constructs suggests the need to consider them as independent.

The second study provided some evidence to support the theoretical implications that emerged from Study 1. Whilst the same factors emerged as predictors of cognitive anxiety and self-confidence in females, the results for the male subjects endorsed the previous findings. That is to say, an antecedent of cognitive anxiety (i.e. 'Think Win') also appeared as a predictor of self-confidence. However, certain antecedents emerged that were *unique* to both these constructs. The
finding that different antecedent factors materialized for males and females is a further issue of theoretical significance. The fact that antecedents of competitive state anxiety and self-confidence may differ as a function of gender is one that clearly requires substantiating and suggests that other interpersonal variables may mediate the precise precursors of these constructs.

The differential temporal patterning that was reported in this second study also has theoretical implications for the predicted patterning of the CSAI-2 subcomponents. Multidimensional Anxiety Theory hypothesizes that cognitive anxiety and self-confidence should essentially remain stable in the period prior to competition whereas somatic anxiety should increase both close and rapidly to the onset of the event. Importantly, the theory implies that this patterning is common to all individuals. However, the findings from Study 2 (and Study 3.1), provide evidence that questions this assumption. It appears that the interpersonal difference variable of gender may mediate this predicted patterning and indicates that it may be wrong to assume that all individuals conform to the theoretical predictions. These findings have important implications not only for sport psychology, but also the educational psychology literature from which these assumptions were largely generated.

The theoretical implications to emerge from the final three studies are primarily associated with the apparent value of measuring directional perceptions of the anxiety subcomponents. A number of cognitive psychologists have previously identified the importance of the individual's interpretation of their emotional state in attempting to understand the impact of physiological arousal upon performance or related variables (e.g. Bandura, 1977; Schachter, 1964). Hardy and Jones (1990), whilst advocating the merits of Catastrophe Theory as a means of explaining the anxiety-performance relationship, suggested that it is the negative attribution of perceived physiological arousal by cognitively anxious performers that leads to decrements in performance, rather than simply their perception of it. They argued, "if proven, such a position would imply that the interpretation of somatic symptoms is much more important than somatic anxiety per se" (p.282). The key element of this statement is "if proven", since, to this author's knowledge, very little research has examined the directional interpretation of somatic anxiety, especially within the sporting context. Moormann and Van der Knoop (1987) did investigate the effects of facilitative and debilitative anxiety on ice dancing performance but were restricted by their use of a non-sport-specific anxiety measure, the PMT (Hermans, 1967). Furthermore, the global nature of this anxiety questionnaire prevented examination of the interpretation of somatic symptoms, specifically. This particular limitation of the Moormann and Van der Knoop study (1987), has also afflicted the studies in this area that have been conducted within educational psychology. This is directly as a result of researchers using the AAT (Alpert and Haber, 1960) as their psychometric device. Although Alpert and Haber's work is of considerable conceptual importance, their scale was developed prior to the worry-emotionality distinction made in the test anxiety literature by Liebert and Morris (1967). Therefore, whilst a number of investigations (e.g. Carrier et al., 1984; Couch et al., 1983) have provided evidence of the benefit of acknowledging facilitative as well as
debilitative interpretations of anxiety, they have done so purely from an undifferentiated conceptualization of the construct.

As identified in Chapter 4, Schachter argued that the same state of arousal could underlie all emotions and that the occurrence of the same form of arousal gives rise to a cognitive search for an explanation of the arousal. In essence, Schachter argued that it is the cognitive perception of the physiological state which determines how an individual reacts in a given situation. In other words, if an individual perceives his or her physiological response to a certain stimulus as appropriate or beneficial, then that individual will approach that situation positively. Schachter argued that the reverse will occur should the individual perceive his or her physiological state as debilitating. However, even attempts to test Schachter’s theory directly have provided it with little support (e.g. Manstead, 1979; Schachter and Singer 1962). Despite this, Schachter’s view of the roles of arousal and cognitive factors in the experience of emotion have been widely accepted. Equally, Bandura (1977) argued that how an individual interprets his or her physiological arousal provides information to that person regarding his or her ability to cope. That is, different personal interpretations of internal arousal will have differential effects on self-efficacy. However, little research evidence exists to support Bandura’s contention because the other three sources of efficacy information that he identified have attracted the primary research attention in sport psychology. Based on theoretical suppositions such as these and further arguments proposed in Chapters 4 and 5, the urgency of the need to measure the direction of physiological arousal appears irrefutable.

In view of the paucity of empirical and qualitative research actually providing evidence in support of the value of considering interpretations of the physiological response, the findings from this thesis appear to be of considerable conceptual importance. Evidence has been provided to support the notion that measuring directional perceptions of the physiological response can be of major benefit to our overall understanding of the concept. The quantitative findings from Study 3.2 indicated that somatic anxiety direction formed a much stronger relationship with a subjective rating of performance than the intensity of the response. The interview data from the same study revealed that individuals reporting the same somatic anxiety intensity levels expressed substantial variation in their preference for that level. In other words, vastly differing interpretations in terms of perceived suitability of that level of physiological arousal were reported. Study 4 also provided convincing evidence in support of these findings of the value of asking people what their physiological responses actually mean to them. The mean intra-subject correlations again revealed stronger relationships between somatic anxiety direction and performance than somatic anxiety intensity and performance. The interviews supported the previous qualitative findings by revealing major differences in arousal preference levels. The relationship with performance for the four subjects who were selected as interviewees appeared to indicate that measuring somatic anxiety direction provided a clearer understanding of the relationship between somatic anxiety and
performance. The totality of the evidence strongly suggests the importance of assessing this dimension in the future.

As far as the measurement of the interpretation of cognitive responding is concerned no theoretical models such as Schachter's appear to have been proposed. The underlying reason for this appears to be a result of the commonly expressed view in the general psychology literature that cognitive anxiety is negative and its influence on performance is always negative (e.g. Morris et al., 1981a). Extrapolating from this notion, perceptions of cognitive anxiety have never been considered necessary or relevant to measure. This consensus view has also generally been adopted in the competitive anxiety literature in that Multidimensional Anxiety Theory predicts a negative linear relationship between cognitive anxiety (as measured by the CSAI-2) and performance, implying that any experience of cognitive anxiety is detrimental to upcoming performance.

Experientially, the debilitating effect of anxiety on sport performance is well documented. However, scientific verification of this relationship is more difficult to document. Certainly, there is evidence from some authors that this blanket negative effect attributed to cognitive anxiety may not be the case, and with certain tasks (e.g. those with low memory demands) and certain individuals, elevations in cognitive anxiety may not be negative. Indeed, the competitive anxiety literature is marked with a distinct lack of investigations that endorse the view that cognitive anxiety has a negative influence on performance. Experimental evidence reviewed earlier suggests that cognitive anxiety can influence performance in either a positive or negative way (e.g. Burton, 1988; Hardy and Parfitt, 1991; Parfitt and Hardy, 1987). A number of researchers (e.g. Eysenck, 1982; Kahneman, 1973; Revelle and Michaels, 1976) have argued that moderate levels of cognitive anxiety can lead to an increase in on-task effort provided that the task is seen as achievable. As identified in Chapter 4, an increase in cognitive anxiety that is intrinsic to the task may lead, therefore, to enhanced performance which is important but not too difficult. Increasingly, in the sport psychology literature, researchers are challenging this unimodal conceptualisation of cognitive anxiety (Burton, 1990; Jones, 1991; Parfitt et al., 1990). Clearly, these proposals suggest the need to measure directional perceptions of cognitive responding as well as physiological states.

As was the case with the view concerning the importance of interpretations of somatic anxiety, there remains the issue of empirical evidence to support these contentions. The arguments of these psychologists are very plausible and 'intuitively appealing', but remain educated supposition. To date, it appears that only Parfitt and Hardy (1987) have reported positive effects for cognitive anxiety on performance. As Hardy and Jones (1990) pointed out, "direct empirical evidence for these predictions is still awaited" (p. 286). Therefore, the findings of this thesis may again provide some important conceptual implications in that evidence has been provided to indicate that cognitive anxiety need not necessarily have a negative influence upon performance. Evidence from Studies 3.2 and 4 suggest that it is wrong to assume that elevated levels of cognitive anxiety (intensity) will automatically debilitate performance. Consequently, the assumptions
concerning the cognitive anxiety subscale of the CSAI-2 may be rather limited. It cannot be
oversimplified that the items in this scale are merely cognitive and physical symptoms that are
purported to measure anxiety. In fact, it has become apparent that they are merely symptoms of
cognitive and somatic activity that only take on meaning based on the individual's interpretations of
those symptoms. Certain items in the subscale (e.g. 'I am concerned about performing poorly')
typically generate positive responses in terms of their potential influence on performance. The
interviews revealed that elevations in cognitive 'anxiety' (as measured by the CSAI-2) can serve to
enhance motivation and facilitate appropriate attention focus for a number of athletes. This is
perhaps the primary reason for researchers' inability to find support for the proposed negative
linear relationship between cognitive anxiety and performance, whereas previous researchers have
cited flawed methodology or insensitive performance measures as explanations for the lack of
verification. As was the case with evidence provided regarding somatic anxiety, two individuals
reported the same levels of cognitive anxiety intensity but very different interpretations as to
whether that level was facilitative in relation to their upcoming performance. These findings have
major implications for the suitability of the intensity-alone approach that currently prevails. This
naturally leads on to the issue that current psychometric measurement of competitive state anxiety
(the CSAI-2) is inadequate and whilst it is a valid measure of intensity, it fails to facilitate a
complete understanding of the anxiety construct. In this context, this research is important in two
ways. Firstly, it suggests that cognitive anxiety is not necessarily negative and, secondly, it
indicates the related need to measure direction of both cognitive and somatic anxiety. As Hardy and
Jones (1990) commented, "it may prove necessary to radically re-think the measurement of state
(and trait) anxiety if suggestions regarding the importance of considering the frequency, intensity
and direction of cognitive intrusions are empirically substantiated" (p.283). Hopefully, it has
become clear that this research has provided the very empirical evidence that these researchers were
requesting - and does imply that a new approach in terms of psychometric measurement of anxiety
is required.

As far as this very issue of measurement is concerned, and the implicit criticisms made of
the CSAI-2 therein, a counter-argument could be proposed which would wish to clarify the
relationship between cognitive anxiety direction and self-confidence. Martens would probably
argue that the self-confidence subscale of the CSAI-2 is the equivalent of a direction scale for
cognitive anxiety, based on his belief that they operate at opposite ends of the same cognitive
evaluation continuum (Gould, 1990; personal communication). Correlations between self-
confidence intensity and cognitive anxiety direction indicate some shared variance, but the extent of
the unshared variance suggests that they do warrant separate measurement. Furthermore, the
interview data seems to suggest that positive perceptions of cognitive anxiety are not necessarily
the same as self-confidence intensity. For example, cognitive anxiety appears to be related to
'readiness'. Interview extracts associated with reference to cognitive anxiety direction reveal
statements such as 'the best that I can do', 'up for it', 'give it my best shot' and 'good attitude' all
carry implications of effort with them. Self-confidence, on the other hand, appears more outcome orientated, (e.g. 'confident that I can meet the challenge' and 'going to do well').

Therefore, although an interesting interrelationship exists between these two constructs, it seems prudent to conceive them separately because the performers do appear to distinguish them along the lines just identified. However, there seems little doubt that a strong association does exist between self-confidence and arousal as intimated in the discussion section in Chapters 4 and 5.

At various stages throughout this thesis the importance of avoiding semantic confusion has been stressed and, therefore, it was argued that in reality anxiety is negative because by definition it is a harmful, degenerative state. It was suggested that cognitive 'activity' may be a more appropriate term for this cognitive state in which performance was not harmed by elevations in 'concern' for the competition. This ties in with the fact that the CSAI-2 includes items that only purport to measure cognitive anxiety when in fact they assess elements or symptoms of cognitive (and somatic) activity that only assume connotations of anxiety if this cognitive activity is perceived as negative. Whilst it is appreciated that it is potentially dangerous to challenge those researchers who have argued that cognitive anxiety can be positive, use of the term in this context may only serve to maintain the semantic confusion.

Another conceptual issue of interest that appears to have emerged from this research is the possible existence of what Jones (1991) terms a 'cognitive intrusion threshold'. As identified in Chapter 4, Jones speculated that increases in somatic anxiety that tend to occur on the day of competition may be a function of the athlete reaching a 'cognitive intrusion threshold' which is associated with arrival at the competition site. Jones argued that the athlete's 'Percentage Thinking Time' about the event may increase to a certain point or threshold that results in or contributes to substantial increases in somatic anxiety. However, this proposal is pure conjecture and awaits empirical support. The findings from Study 3.1 appear to provide some partial support in that the correlational analyses revealed that the relationship between somatic anxiety and 'Percentage Thinking Time' became progressively stronger as the event approached for both males and females. As was argued in the discussion of that study, however, the correlational design did not permit any attribution of cause. Nevertheless, 'Percentage Thinking Time' displayed a progressive increase in temporal patterning as the competition neared which indicated that 'Percentage Thinking Time' had started to increase before any elevations in somatic anxiety occurred and hence provides tentative support for Jones' notion. This concept is interesting in the context of interactionism as it favours cognition as a prime-mover and stands against the existence of conditioned somatic responses occurring without cognition. Equally, an argument could be presented, and this is perhaps where Jones' notion is of conceptual significance, that in fact an interaction may occur between a conditioned physiological response and the reaching of a cognitive intrusion threshold to cause the sharp increase in somatic anxiety close to the onset of competition. This may be what Jones is intimating when he states that reaching a 'cognitive intrusion threshold' may contribute to elevations in somatic anxiety.
In the context of this issue, it is worth noting that whilst emotional experiences include cognitive components such as appraisal, the fact that appraisal can affect subsequent emotion (Lazarus, 1982) is not necessarily a reason to assign primacy to cognition, because emotion can affect cognition as well (Zajonc, 1980). As Boucher (1991) argued "only by viewing the human organism from the integrated perspective will phenomena germane to sport psychology, such as emotion, the stress response, competitive anxiety be fully understood" (p.2). He advocates that an interactionary model interpretation is the most appropriate for examining competitive anxiety; that is, a change in one system will affect the other to a certain extent. The important point as far as this issue is concerned is that interaction and interdependence suggest the need to investigate them conjointly as psychobiological states. There is clearly merit in the view that cognitive and emotional components of anxiety are highly interactive and not profitably separated by research methodologies that take no account of their interaction (Neiss, 1988). This statement immediately highlights the efficacy of Catastrophe Theory as an explanatory model of the relationship between cognitive and somatic anxiety and performance. One of the problems with the Multidimensional Anxiety Theory is that it attempts to explain the three-dimensional relationship between cognitive anxiety, somatic anxiety and performance in terms of a series of two-dimensional relationships (Hardy and Parfitt, 1991). More precisely, it only makes predictions about the separate relationships between cognitive anxiety and performance and somatic anxiety and performance, when what is really required is an explanation of how cognitive and somatic anxiety interact to influence performance. This conclusion seems to imply that any satisfactory model of anxiety and performance must be at least three-dimensional and these authors advocate the catastrophe model as an explanation of the relationship. The evidence from this research supports the need to view the interaction and, therefore, suggests the need for more studies to examine the precise predictions of Catastrophe Theory. One of the major strengths of this model is the fact that it does account for the interaction between the anxiety subcomponents to which Neiss refers. The implications of this from a statistical perspective and for the approach adopted in this thesis are elaborated on in the 'Implications for Future Research' section of this final chapter.

Practical Implications

This subsection deals with the practical implications arising from the research conducted in this thesis. For the purposes of clarity, this subsection is divided into the implications concerning 'antecedents', 'temporal patterning' and 'additional dimensions' of the anxiety response. Underpinning the information that is discussed in each of these areas are means and ways of coping with debilitating levels of anxiety and, as a consequence, means and ways of facilitating mental preparation.
Antecedents

Knowledge of the antecedents of anxiety have enormous implications from a stress management perspective in that if the cause of the anxiety can be identified at source then sport psychologists can provide a range of techniques that may pre-empt the experience of that anxiety. The proverb that was used as an analogy, "to be forewarned is to be forearmed", indicates a more positive, proactive approach to the potential experience of anxiety rather than the reactive, 'damage-limitation' approach of teaching relaxation techniques to cope with the anxiety when it arises. The practical implications of identifying the precursors are considerable in terms of pre-competition approaches that can be introduced to combat the onset of anxiety.

This approach of identifying antecedents has clear implications for desensitization training. If specific precursors of anxiety are identified then coaches can introduce into their sessions opportunities for the performer to cope with those distractions or stressors in training so that they are more able to cope with them should they arise in the competitive situation. If we consider the example of 'External Environment' (i.e. track and weather) that emerged as a predictor of self-confidence in Study 1, the athlete could easily be desensitized to unfavourable weather and facility conditions. Track sessions could deliberately be run into the wind or in heavy rain instead of being avoided for reasons of comfort. Equally, training on poor, worn out surfaces which may lack the cushioning that the athlete is used to, or on a track with particularly tight bends, would decrease the likelihood of negative thoughts materializing or self-confidence being damaged if such conditions were encountered on competition day. Other possible stressors for middle-distance runners might include running at the front into a strong head wind, being consistently barged, getting boxed, being tripped in the early stages, being kept waiting at the start. However, all these stressors should be introduced gradually so that athletes learn to cope with each additional stressor and can maintain their level of performance before new ones are introduced. In this way the athletes will gain more and more self-confidence regarding their ability to cope with such stress (Bandura, 1977). It should also be noted that gender differences may mediate the precise nature of the antecedents of anxiety and that coaches may benefit from an awareness that these precursors may alter as a function of individual difference variables.

Temporal Patterning

The differential temporal patterning that emerged for cognitive anxiety and self-confidence in males and females also has important practical implications. For example, the increase in female cognitive anxiety on the day of competition, as well as their earlier reductions in self-confidence, suggests that the implementation of mental preparation strategies during the pre-competition period may need to be structured to meet the specific needs of male and female athletes. In other words, on the day of competition the females may benefit from a coach being very reassuring and very
reinforcing of their individual and team ability, and players could be encouraged to initiate a number of self-affirmation statements. If the coach or sport psychologist could identify the actual statements that players make to themselves that are associated with their cognitive anxiety then discussion of these thoughts and statements would assist the implementation of an effective thought stopping/cognitive restructuring program.

**Additional Dimensions**

The practical implications to emerge from Study 3.1 are based on the finding that increases in somatic anxiety may not just occur as a result of a conditioned somatic response. Findings suggested that this increase in somatic anxiety may be a function of reaching a 'cognitive intrusion threshold' (i.e. frequency of competition-related cognitions) or perhaps, as is more likely, there may be an interaction between the two (i.e. some cognitive influence on somatic responding and vice-versa). This has practical implications as far as stress management is concerned and, in particular, implies the value of multimodal stress management. Burton (1990) stated "conceptual arguments and empirical data argue convincingly that the best intervention program should employ multimodal stress management techniques that would attack multiple types of anxiety simultaneously" (p.180). The traditional way of dealing with high somatic anxiety, based on Davidson and Schwartz's (1976) notion of the 'matching hypothesis', would have been to recommend a somatic-based technique (e.g. progressive muscular relaxation) under the assumption that a cognitively-based technique would be less effective at combating this somatic anxiety. However, findings from this study suggest that a multimodal approach would be more effective because of the cognitive element involved in eliciting the increase in somatic anxiety. Meichenbaum's (1975) stress inoculation training, which incorporates elements of self-talk, cognitive restructuring and physical relaxation, would be an advisable approach.

The findings from Study 3.2 concerning the temporal patterning of the frequency dimension of anxiety (as well as the patterning of 'Percentage Thinking Time' from Study 3.1) have implications for the timing of cognitively-based intervention strategies. Traditional thinking, based on an intensity-alone perspective, assumes that cognitive anxiety becomes elevated and then remains constant during the pre-competition period. The underlying implication of this is that appropriate intervention strategies should be administered as soon as the response becomes elevated, say, for example, a week before competition. However, evidence has been provided that is contrary to this view and suggests that the nature of the cognitive anxiety response changes as the event becomes closer. Although intensity may remain the same during this period, the fact that 'Percentage Thinking Time' increased so dramatically as the event approached suggests that the actual cognitive state almost certainly differs. It may, therefore, be unnecessary to implement an intervention strategy 1 week before competition but instead be more suitable to initiate techniques designed to reduce cognitive anxiety much closer to the start of the competition.
The results of Studies 3.2 and 4 also appear to have important implications for mental preparation. The fact that interpretations of the suitability of one's cognitive and physical state may exert an influence on performance suggests that it may be beneficial for some athletes to utilize a cognitive restructuring technique, such as a relabelling of their anxiety symptoms as positive and facilitating, as opposed to attempting to reduce anxiety levels through various relaxation techniques. Bunker and Williams (1986) suggested that some individuals find it difficult to relax and that such performers could clearly benefit from an alternative approach to facilitating an optimal performance state. Reversal Theory (Apter, 1981), Martens' (1987b) notion of psychic energy, and empirical research on activation (e.g. Thayer, 1985) all suggest that relatively high levels of arousal are not necessarily detrimental to performance. Reversal theorists (e.g. Kerr, 1989) suggest that an alternative approach for anxious athletes, rather than decreasing arousal levels to achieve relaxation, would be to change their interpretation of either the situation or the arousal itself so that the arousal is experienced as positive. This change in interpretation should not only allow the athlete to feel better, but it should also maintain the high arousal level that can contribute to optimal performance. One approach of potential value in recognizing that negative interpretations of both cognitive and physiological pre-match state can have a profound effect on performance is Rational Emotive Therapy (RET) which was first presented by Albert Ellis in 1955. The initial stage involves an educational phase whereby once an individual accepts that there is a very close relationship between what he thinks and the way he feels, he can appreciably make his emotions subject to his will. This may involve emphasizing that increased arousal is essential for peak performance and that the experience of adrenalin is a pre-requisite for successful performance. An athlete could be educated to interpret that increased heart rate and respiration are indicators of important energy stores being activated and that energy supplies are being 'sent' to where they are needed (i.e. the muscles). If the athlete is worried, it can also be demonstrated how this can be positive in that it gives an indication that the performer wants to do well and is, therefore, prepared to invest some effort to achieve success in that task. Therefore, if individuals are anxious and perceive this as negative, then it may be a more appropriate technique to initiate a cognitive restructuring programme along the lines just identified. With some athletes who are experiencing debilitatingly high levels of anxiety, this restructuring of cognitions may be enhanced if used in conjunction with the setting of 'do your best' or process-oriented goals (Burton, 1989). This may serve to de-emphasize the importance of the outcome that could be the source of the anxiety in the first place. In essence, the individual acquires a new effect or philosophy which helps him to think more rationally and constructively about himself and the sporting context in which he performs.

The stress inoculation approach developed by Meichenbaum (1975) aims to develop the individual's competence to respond to stressful events in such a way that disturbing emotions are reduced and adaptive behaviour occurs. Applied to the management of anxiety, the stress inoculation approach does not aim to suppress anxiety which can on occasions have positive functions, as mentioned earlier. However, anxiety may become maladaptive when it occurs at
undesirable frequency and intensity. The term inoculation refers to a process of exposing the individual to manageable amounts of stress; he is then taught the skills to manage the experience. This process involves two stages: firstly, cognitive preparation which has been shown to be important in the amelioration of stress for some time. This involves instruction about the anxiety and its determinants, discriminating the situations which evoke the anxiety, identifying the adaptive and maladaptive aspects of anxiety, and using the anxiety management techniques; and, secondly, skill acquisition. This initially involves the individual modifying his evaluations and expectations concerning the anxiety-provoking event.

Clearly, the major mode of action of the cognitive approaches identified is to modify the faulty patterns of thinking and the premises, attitudes and assumptions underlying these cognitions. Thus, the individual, by identifying his thought content, idiosyncratic styles of thinking, emotional reactions and behaviour, can begin to understand their interaction and by adopting the skills-oriented approach advocated will be in a better position to cope with debilitatingly high levels of anxiety.

Folkman and Lazarus (1980) identified two coping stratagems or styles that may be employed by a person in the face of a given stressful event. Knowledge of these coping styles may be of value to the coach. With the first of these stratagems (problem-focused coping; PFC) an attempt is made to change the troubled person-environment relationship. PFC strategies are employed when the individual perceives he can do something to remove the threat and include a number of active problem-solving skills. In competitive sport, for example, an athlete may analyse his or her performance so as to come up with a different game play or approach to the game and thus offset a stressful situation. So, in the case of basketball, a stressful situation may be an opponent 'getting the better' of you. The player decides on a different approach, for example, mentioning to another team-mate that he needs help or suggesting a 'double-teaming' ploy. In other words, he still confronts the problem but seeks a change in approach to do so. Emotion-focused coping (EFC), on the other hand, involves either a direct or defensive reappraisal of the stressful event. These strategies are utilized in situations when it is perceived that little can be done about the threat. The emotional reaction provoked by the stressful event is altered by way of the person reinterpreting the event or attending away from it. Lazarus and De Longis (1983) identified cognitive behaviour such as attentional avoidance, intellectualised detachment, denial, reinterpretation of the past, humour, wishful thinking, and religious faith are held to be emotion-focused coping mechanisms. Whilst many of these may be appropriate in clinical settings or even to a certain extent in pre-match sport situations, during the match such suggestions are not necessarily feasible. Such a situation that may require EFC could be that an opponent is simply too good. An EFC approach may involve pulling that player out of the game or giving him an alternative opposition player to mark. Therefore, the individual who has become stressed by his inability to cope is given the opportunity to attend away from it.
Implications for Future Research

In view of the recency of the adoption of a multidimensional approach to the measurement of competitive state anxiety and the exploratory nature of some of the studies in this thesis, the implications for future research that have been generated are numerous.

(1) Chapter 2 alerted the reader to the dearth of research that currently exists regarding the antecedents of competitive state anxiety. Antecedents of anxiety and self-confidence were identified within the very specific context of middle-distance running, but other sport-specific scales need to be developed. For example, Scanlan et al. (1991) identified that the stigma of being thought of as a homosexual was a source of stress that may be unique to male ice-skaters. Similarly, the potential existence of developmental differences in antecedents of anxiety in sports such as swimming and gymnastics needs to be examined. These two sports involve substantial numbers of very young performers who compete in very structured competitive and intimidating environments. Intuitively, maturational or chronological age may influence the precursors of anxiety. Alternatively, researchers may wish to develop a general antecedents questionnaire which could be employed to examine similarities and differences across various sports, using, for example, Martens et al.'s (1990) distinction between objective versus subjective, team versus individual and contact versus non-contact as a starting point. In view of the implications for stress management, this is a particularly valuable approach to take.

(2) Although the studies reported in this thesis indicate the value of measuring the direction dimension of the competitive state anxiety response, this needs to be established through further detailed investigations. Does direction emerge as a better predictor of performance than intensity? If so, does a positive linear relationship appear between direction and performance? A number of additional questions could also be addressed. For example, is there a personality disposition that relates to positive perceptions? As Parfitt et al. (1990) suggested, perhaps achievement motivation and state anxiety should interact in Humphreys and Revelle's (1984) model in such a way that subjects who perceive the task to be relevant to the source of the stress are motivated by anxiety to invest extra effort in it. Therefore, is the 'need to achieve' an important mediating personality variable. A crucial area of future research is to examine the situational by personality variables that mediate positive and negative perceptions. In other words, the next step forward is to examine the major determinants of the directional nature of the response.

(3) The precise importance of the frequency dimension also needs to be established. Is there a better way of assessing frequency? Can it be determined if Jones' notion of a cognitive intrusion
threshold exists? Basically, this research has provided some initial evidence that is potentially illuminating, but needs to be corroborated.

(4) The influence of individual differences on the temporal patterning of anxiety responses may also be a future research area in that further examinations may reveal additional individual difference variables that mediate the predicted patterning. This may be a particularly fruitful line of investigation if individual differences are examined not only in terms of intensity, but also frequency and direction. In the context of previous findings, the evidence from this thesis suggests that the gender differences reported for temporal patterning (Jones and Cale, 1989a) may not be consistent. The findings of Swain and Jones (1991a) suggest, in fact, that gender role is the personality variable that we need to be considering when inspecting gender-based differences. Furthermore, the whole area of gender differences in antecedents of anxiety needs confirmation and extension.

(5) The finding in Study 3.2 that self-confidence intensity emerged as a predictor of performance emphasises the importance of this key construct. Future research may wish to examine more closely the precise relationship between self-confidence and directional perceptions of the anxiety response. Indeed, affect theorists believe that self-confidence mediates positive and negative affect and this issue needs to be explored further. More specifically, in the context of anxiety, self-efficacy theorists argue that increases in self-confidence causes a reduction in anxiety. However, in keeping with the importance attached to interpretations of anxiety levels that has been stressed throughout this paper, it may be that increases in self-confidence lead to more favourable perceptions of 'anxiety', not anxiety per se.

(6) Valuable information was gleaned in Study 4 as a result of utilizing Mackay et al.'s (1978) anglicized version of Thayer's AD-ACL, and this clearly indicated the value of using mood scales. The fact that the same player reported the same intensity scores on two separate occasions but differed in his interpretation of the suitability of that intensity is interesting in itself. However, when that player reveals that this difference was a function of his mood prior to those two games, it emphasizes the importance of using mood scales in conjunction with anxiety scales to provide a clearer overall understanding.

(7) The lack of validity of the modified CSAI-2 scale clearly poses problems and restricts acceptance of the potentially widespread ramifications of this research. The findings have seriously questioned the utility of the CSAI-2 in its current form and consequently, there is a need to develop a scale similar to the AAT (Alpert and Haber, 1960) that is sport-specific.

Not only is actual measurement important to consider, but researchers who wish to conduct further preliminary research using the existing modified CSAI-2 may benefit from also considering
how to score the scale or assess the data it provides. This issue could also be addressed in the process of any validation research that is conducted. Should there be a multiplicative analysis of the scale responses? (e.g. Direction X Intensity or Frequency X Intensity). In its existing form, this is probably not feasible because of the existing lack of validity, but is noteworthy as a future research issue.

Evidence from Study 4 suggests that research needs to address the issue of examining cognitions as well as physiological responding during competition. A performer may report facilitative pre-match thoughts and feelings, but these states are not necessarily stable for the duration of the performance. A change in the situation or an opponent's attempt to manipulate one's state (a common practice in sport known as "psyching out") might lead to a predominance of other emotional elements (that bear little resemblance to the pre-match state) that could well have detrimental effects upon performance. Inattentiveness to the task (i.e. being distracted by the 'psyching out'), catastrophising because of mistakes, and other task-irrelevant cognitions may arise. This clearly draws into question the efficacy of pre-game anxiety measures.

Future research needs to consider the potential benefit of assessing anxiety during performance to a greater degree. One way of addressing this issue is through measurement of psychophysiological responses instead of using only questionnaires to measure anxiety states. Physiological assessments should be utilised to not only help provide checks concerning the manipulation of anxiety and arousal states, but also to specify the exact relationship between anxiety and performance. More investigations in sport psychophysiology are required to explore attentional states before and during competition. Boucher (1990) reviewed a number of such studies, but there is much more to learn about the interaction of psychological and physiological processes and the resultant effect on athletic performance. As Hardy and Jones (1990) asked, "can psychophysiological techniques be devised to predict different metacognitive states during performance?" (p.284). However, can these metacognitive states also be measured during performance? Caruso et al.'s (1990) study is a step in the right direction. Subjects responded to the CSAI-2 before, during and after a bicycle competition performed on cycle ergometers. The questionnaire was completed between two 45 second bursts of exercises during a 2 minute recovery period. What needs to be considered are the nature of the cognitions during performance in a realistic field-type situation. Shorter versions of the CSAI-2, or a related anxiety scale, need to be developed and validated to permit their implementation at half-time in various team-sport contests, for example.

One such related concept is the notion of automatic thoughts as revealed by Mace (1990). This approach recommends a single subject approach with individuals who have developed a maladaptive approach to training and competing, and Mace urges that future studies in sport psychology investigate the role of automatic thoughts. These are defined by Rathjen, Rathjen and Hiniker (1978) as self-statements or images that precede a negative affective state. Rathjen et al.
referred to the work of Beck (1976) who devised a number of methods of collection such as have clients record thoughts that accompany increased negative affect, collect thoughts in association with negative affect and precipitating environmental events. Although these were devised for clinical patients, they could be used with sport performers who experience debilitatingly high levels of anxiety.

(9) Research implications of a methodological nature are particularly forthcoming from the work undertaken in this thesis. The various studies incorporated a number of differing methodological designs. These included a nomothetic approach from both a cross-sectional and time-to-event paradigm perspective, as well as an idiographic approach that included case studies and the collection of both quantitative and qualitative data within a longitudinal design. This clearly indicates the plethora of ways to examine the anxiety response from a cognitive perspective and three specific methodological approaches are recommended from the work of this thesis: (a) longitudinal studies; (b) looking at individuals via case studies or single subject designs; (c) using a combination of qualitative and quantitative data collection methods.

(a) Longitudinal studies: the longitudinal approach employed in the final study was particularly valuable as it provided different sources of evidence in support of the notion that researchers need to examine the direction dimension of the anxiety response. Consequently, this approach appears to be an important means of advancing our understanding of the anxiety-performance relationship. Making assessments at only one point in time may not reveal an accurate picture for some individuals due to fluctuations in factors such as mood, health and fitness. The personal experiences of this author in the data collection of the studies in this thesis support this view wholeheartedly. Three of the four interviewees involved in the longitudinal study (Study 4), reported 'off-days' that were not a reflection of their normal pre-match state. An awareness of these atypical instances and their consequences, in themselves provided a better understanding of which variables appear important to consider when investigating the anxiety-performance relationship. Furthermore, the cross-sectional studies allowed very little opportunity to integrate with the subjects or gain any of the experiential knowledge that can enhance a researcher's understanding of the questions that he or she is examining. Study 4, on the other hand, provided numerous such opportunities, that included travelling with the team in the early stages to create a rapport, occasionally attending training, and mixing with them after the game in order to gain their confidence and trust. This interaction enhanced the research process in two ways; firstly, the subjects became increasingly open and forthcoming in their responses, and secondly, the researcher himself was able to ask more informed and searching questions.

(b) Looking at individuals: the suggested efficacy of this methodological approach should not be overlooked, since despite the fact that some researchers believe that they have little place in the confirmatory aspects of science which looks for laws applying to persons generally. However, a weakness of group designs is that while overall results may show no difference between subjects it
is possible that for some individuals, substantial changes did occur. The fact that individuals display idiosyncratic modes of responding to stress suggests that case studies have an important role to play and, as scientists, it can prove beneficial to view the subject as a unique entity. Equally, although not used as part of the methodology in this thesis, single-subject designs (see Bryan, 1987; Smith, 1988) can also be highly recommended because of the detail and improved understanding of information that can be gathered as a result of such an approach.

(c) Combining qualitative and quantitative data collection methods: of particular interest was the depth of knowledge gained from the qualitative approach utilised as part of the design in Studies 3.1, 3.2 and 4. The interviews provided an insight into the nature of the individuals' thoughts and feelings that could not possibly have been as accurately gained from the psychometric evidence alone. As Maslow (1966) observed, "by far the best way we have to learn what people are like is to get them, one way or another, to tell us about themselves" (p.12). The personal experiences of this author in conducting this research strongly suggests that the use of structured interviews is to be advocated in further competitive anxiety research. However, what is particularly significant as far as methodological implications from this thesis are concerned, is the recommendation that a combination of qualitative and quantitative methodologies be used. Whilst valuable information was gleaned as a result of the interview process, the observations and conclusions drawn from those interviews were endorsed and strengthened when taken in conjunction with the questionnaire data. The fact that comments corresponded with quantitative evidence from validated psychometric measures served to increase the conviction with which any conclusions could be made. Conversely, the quantitative data becomes considerably enlivened, placed in context, and understood to a far greater extent as a result of the individual's own articulate explanations of his or her thoughts and feelings at the time of questionnaire completion. This reciprocal support-type 'mechanism' that the two approaches provide each other would seem to suggest that researchers may benefit from combining their respective strengths to answer a research question.

Clearly, what appears to be needed is a combination of different types of methodology, but it is important to point out that the three methodological considerations that have been made are not mutually exclusive. For example, case studies and single-subject designs lend themselves to longitudinal designs and the collection of both qualitative and quantitative data in combination, which in itself is reason to advocate 'looking at the individual'. It is certainly to be recommended that greater emphasis is placed on the ideographic approach of studying humans. Therefore, as well as case studies and in-depth interviews, extended participant observation studies and comprehensive content analyses of a person's oral or written records need to be considered. However, quantitative measurement within this approach remains extremely valuable.

(10) Implications for future research from a statistical perspective are primarily that evidence has been provided for looking at the interaction between cognitive and somatic anxiety as opposed to their separate effects. For example, the interviews indicate that the performers themselves tend to
have difficulty in distinguishing between their separate effects so that they are to a large extent dependent on one another - especially close to the onset of competition. Whilst the analyses used in the investigations in this thesis did not take into account their interaction, explanations were provided in Chapter 5. That is, by including the additional dimensions of frequency and direction it was felt that the nature of the variables created sufficient complexity and to view the anxiety variables conjointly would have increased this complexity further. This may have masked any interesting findings in terms of the relationship between intensity and direction. However, future research must attempt to incorporate such an approach and, therefore, two statistical recommendations are made here: One suggestion, that is particularly relevant in the context of the use of the CSAI-2, is Guastello's (1987) non-linear modelling method to examine the possibility that self-confidence determines the precise nature of the interaction between cognitive and somatic anxiety upon performance, as recommended by Hardy (1990). An alternative approach to examining the moderating influence of self-confidence upon the anxiety-performance relationship would be to use a hierarchical linear regression analyses as advocated by Smith, Smoll and Ptacek (1990).

Whilst acknowledging that future research needs to adopt a more interactive approach to the interpretation of multidimensional anxiety data, some recommendations can also be made concerning the statistical approach should researchers continue to examine the effects of cognitive and somatic anxiety separately. Certainly, future competitive state anxiety research will continue to utilize the CSAI-2 and recommendations can be made for those researchers who perpetuate this from a non-interactive perspective. Such research would benefit from an awareness of the methodological problems posed by multidimensional scales that have been articulated by Smith (1989). Since the CSAI-2 was derived on the basis of principal components analyses with varimax rotations that yielded orthogonal factors of cognitive and somatic anxiety, it is sometimes mistakenly assumed that the cognitive and somatic subscales scores are therefore statistically independent (Smith, 1989). However, subscale scores derived from unweighted item scores (i.e. summing the scores for the items on each subscale) are moderately correlated with one another within the CSAI-2. It is not unusual for cognitive and somatic subscales to correlate in the 0.50 to 0.60 range (Jones and Cale, 1989b; Karteroliotis & Gill, 1987). Since the subscales share a substantial amount of common variance, it can be difficult to 'disentangle' their effects. In statistical terms, multicollinearity can become an issue, and the difficulties this raises for multivariate analyses are well documented (see Cohen & Cohen, 1983; Tabachnick & Fidell, 1989).

This covariation between cognitive and somatic anxiety scales thus poses a challenge for researchers interested in distinguishing between the effects of the two anxiety components. However, one possible solution to the multicollinearity problem involves the use of factor analysis. Statistically independent subscale scores may be obtained by using factor scores derived from an orthogonal rotation rather than the usual summed unit scores. The separate item scores within each
subscale will be differently weighted to ensure statistical independence between scales. One must have a sufficiently large sample size for a valid analysis - a minimum of five times as many subjects as scale items (Tabachnick and Fidell, 1989).

The greater specificity of recently developed sport anxiety measures can advance our understanding of anxiety and sport-related variables, but the fact that their subscales are substantially intercorrelated also raises some challenging methodological issues. The factor score solution suggested by Smith (1989) may not be possible or appropriate in all cases, but it is well to keep the basic issue of multicollinearity in mind as the multiple dimensions of sport anxiety are considered.

One final statistics-related suggestion for future research that examines the separate effects of cognitive and somatic anxiety was identified by Gould et al. (1987). They stressed the critical importance for researchers studying the relationships between anxiety and performance to design investigations that allow them to identify both linear and curvilinear relationships between these variables. To date, investigators have over-emphasised examining linear relationships between these variables and virtually ignored the possibility of Inverted-U relationships. Consequently, more studies need to utilize polynomial trend analyses.

(11) Future researchers need also to address the issue of performance measures. A promising way to provide more sensitivity to the measurement of performance is to investigate the quality of movement and the physical processes involved in performing a task as opposed to assessing the global performance product. Weinberg & Hunt (1976) took an alternative approach to the study of anxiety and performance by focusing on the pattern of neuromuscular energy. They assessed the quality of movement by use of such electromyographic (EMG) measures of anticipation, duration, and perseverance, in addition to the standard measure of amplitude. These variables refer to the duration of the electrical activity in the muscles before, during, and after the movement. In addition, sequential and simultaneous muscle contraction were used as indices of motor patterning. High and low anxious subjects performed a task requiring throwing a ball at a target 25 feet away. EMG data indicated that the high anxious subjects used significantly more energy than low anxious subjects. Furthermore, lower anxious subjects displayed sequential contraction of their muscles, whereas high anxious subjects exhibited co-contraction. The movement pattern of the high anxious subjects constituted a highly inefficient use of neuromuscular energy compared to that for low anxious subjects and provides an explanation of performance differences between high and low anxious subjects. Another study which attempted to investigate the relationship between anxiety and performance through process-oriented analysis was conducted by Beuter and Duda (1985). Results indicated highly significant inter- and intra-individual differences in the patterns of ankle co-ordination during the stepping motion under high and low anxiety conditions, with movement becoming less efficient and less co-ordinated in the high anxiety states. In view of the value of such findings it is perhaps surprising that so little research of this nature exists in the sport.
psychology literature. Although the work of Hardy and Jones and their colleagues that was discussed earlier (e.g. Ussher and Hardy, 1986; Parfitt and Hardy, 1987; Jones et al., 1988) has examined the impact of anxiety on various cognitive and motor subcomponents of performance such as perception and anaerobic power, there remains an imbalance that needs to be addressed.

CONCLUSION

The underlying purpose of this thesis has been to establish a greater overall understanding of the anxiety construct by examining specific aspects of the competitive state anxiety response that are viewed as key areas of interest. Research into multidimensional anxiety in the context of sport is in its relative infancy and so this research was able to identify a number of valuable factors that appear to enhance our understanding from both a conceptual and applied perspective.

It has been shown that self-confidence and cognitive anxiety share common antecedents but there are factors that are peculiar to each and the importance of these findings from a general understanding and a stress management perspective is evident.

Further evidence has been provided that the individual difference variable of gender appears to mediate the predicted temporal patterning of the multidimensional anxiety components and that antecedents may differ as a function of that variable.

The traditional conceptualisation of competitive state anxiety has been challenged by suggesting that current psychometric measurement, namely the CSAI-2, is inadequate as it only measures the dimension of intensity. This research identified that there are other dimensions, namely frequency and direction, that need to be considered.

From a methodological point of view, the value of an ideographic approach to the assessment of anxiety as well as the benefit of incorporating mood scales in conjunction with traditional anxiety scales have been demonstrated.

However, there are a host of questions arising from this research, which is inevitable because of the preliminary and exploratory nature of a number of the investigations. Future research will hopefully clarify these issues and continue to foster a more complete understanding of this complex phenomenon.
REFERENCES
REFERENCES


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APPENDICES
APPENDIX 1

Competitive State Anxiety Inventory-2 and Accompanying Instructions

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

Directions: A number of statements that athletes have used to describe their feelings before competition are given below. Read each statement and then circle the appropriate number to the right of the statement. There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer which describes your feelings right now.

<table>
<thead>
<tr>
<th></th>
<th>Not At All</th>
<th>Somewhat</th>
<th>Moderately So</th>
<th>Very Much So</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am concerned about this competition</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. I feel nervous</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. I feel at ease</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. I have self-doubts</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>5. I feel jittery</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>6. I feel comfortable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. I am concerned that I may not do as well in this competition as I could</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. My body feels tense</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>9. I am self-confident</td>
<td>1</td>
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<td>4</td>
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<tr>
<td>10. I am concerned about losing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>11. I feel tense in my stomach</td>
<td>1</td>
<td>2</td>
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<td>4</td>
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<tr>
<td>12. I feel secure</td>
<td>1</td>
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<td>3</td>
<td>4</td>
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<tr>
<td>13. I am concerned about choking under pressure</td>
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<td>14. My body feels relaxed</td>
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<td>15. I'm confident I can meet the challenge</td>
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<td>4</td>
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<td>16. I'm concerned about performing poorly</td>
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<td>2</td>
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<td>4</td>
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<tr>
<td>17. My heart is racing</td>
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<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18. I'm confident about performing well</td>
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<td>4</td>
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<tr>
<td>19. I'm concerned about reaching my goal</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20. I feel my stomach sinking</td>
<td>1</td>
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<td>4</td>
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<td>21. I feel mentally relaxed</td>
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<td>22. I'm concerned that others will be disappointed with my performance</td>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
APPENDIX 2

The Pre-Race Questionnaire

ABOUT THE LAST FEW WEEKS

1. How do you feel you have been performing in training during the last 4 weeks?
   
   | Extremely Poor | | Extremely Well |
   | 1  2  3  4  5  6  7  8  9 |

2. How do you feel you have been performing in races over the last 4 weeks?
   
   | Extremely Poor | | Extremely Well |
   | 1  2  3  4  5  6  7  8  9 |

3. How do you feel your coach has influenced your performance over the last 4 weeks?
   
   | Very Negatively | | Very Positively |
   | 1  2  3  4  5  6  7  8  9 |

THE LAST RACE

4. How did you feel about your position in the last race?
   
   | Extremely Disappointed | | Extremely Pleased |
   | 1  2  3  4  5  6  7  8  9 |

5. How did your position relate to your pre-race expectations?
   
   | Very Negatively | | Very Positively |
   | 1  2  3  4  5  6  7  8  9 |

6. How did you feel about your time in the last race?
   
   | Extremely Disappointed | | Extremely Pleased |
   | 1  2  3  4  5  6  7  8  9 |

7. How did your time relate to your pre-race expectations?
   
   | Very Negatively | | Very Positively |
   | 1  2  3  4  5  6  7  8  9 |

8. How do you feel your coach influenced the result of your last race?
   
   | Very Negatively | | Very Positively |
   | 1  2  3  4  5  6  7  8  9 |
### THE NEXT RACE

9. How important is it for you to do well in this race?
   - Not at all
   - 1 2 3 4 5 6 7 8 9
   - Extremely

10. Have you set yourself a position goal for this next race? YES/NO
   - Yes
   - 1 2 3 4 5 6 7 8
   - No
   - Extremely

11. To what degree do you think that you can achieve this goal?
   - Definitely
   - Yes
   - 1 2 3 4 5 6 7 8
   - No
   - 9

12. How difficult do you think it will be to achieve this goal?
   - Extremely
   - Difficult
   - 1 2 3 4 5 6 7 8
   - Easy
   - 9

13. Have you set yourself a time goal for this race? YES/NO
   - Yes
   - 1 2 3 4 5 6 7 8
   - No
   - Extremely

14. To what extent do you think you can achieve this goal?
   - Definitely
   - Yes
   - 1 2 3 4 5 6 7 8
   - No
   - 9

15. How difficult do you think it will be to achieve this goal?
   - Extremely
   - Difficult
   - 1 2 3 4 5 6 7 8
   - Easy
   - 9

16. How well do you feel you are running at the moment?
   - Extremely
   - Well
   - 1 2 3 4 5 6 7 8
   - Poor
   - 9

17. How fatigued do you feel at the moment?
   - Not at all
   - 1 2 3 4 5 6 7 8
   - Extremely
   - 9

18. Do you feel ready physically for this next race?
   - Not at all
   - 1 2 3 4 5 6 7 8
   - Very much so
   - 9

19. Do you feel ready mentally for this next race?
   - Not at all
   - 1 2 3 4 5 6 7 8
   - Very much so
   - 9

20. Are the weather conditions suitable for you in this next race?
   - Not at all
   - 1 2 3 4 5 6 7 8
   - Extremely
   - 9

21. Are the track conditions suitable for you in this next race?
   - Not at all
   - 1 2 3 4 5 6 7 8
   - Extremely
   - 9

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APPENDIX 3

'Percentage Thinking Time' Item Instructions

TO WHAT EXTENT IS THE EVENT OCCUPying YOUR MIND AT THIS STAGE?
Please rate this in terms of a percentage, by circling the appropriate value below.

% % %
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
## APPENDIX 4 - Competitive State Anxiety Inventory-2 - Modified Version-I

The effects of highly competitive sports can be powerful and very different among athletes. The inventory you are about to complete measures how you feel about this competition at the moment you are responding. Please complete the inventory as honestly as you can. Sometimes athletes feel they should not admit to any nervousness, anxiety or worry they experience before competition because this is undesirable. Actually, these feelings are quite common, and to help us understand them - I want you to share your feelings with me candidly. If you are worried about the competition or have butterflies or other feelings that you know are signs of anxiety, please indicate these feelings accurately on the inventory.

Equally, if you feel calm and relaxed, indicate those feelings as accurately as you can. Your answers will not be shared with anyone. I will be looking only at group responses.

Directions: A number of statements that athletes have used to describe their feelings before competition are given below. The questionnaire is divided into 3 sections. Read each statement and then circle the appropriate number in each of the 3 sections, to the right of the statement to indicate how you feel right now - at this moment. There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer which describes your feelings right now.

### How frequently do you experience this thought/feeling at this stage? If you have just scored '1' (Not At All) on the first scale, then circle '1' again on this scale.

<table>
<thead>
<tr>
<th>Not At All</th>
<th>Somewhat</th>
<th>Moderately So</th>
<th>Very Much So</th>
<th>Never</th>
<th>All Of The Time</th>
<th>Very Negative</th>
<th>Very Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am concerned about this competition</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>2. I feel nervous</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>3. I feel at ease</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>4. I have self-doubt</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>5. I feel jittery</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>6. I feel comfortable</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>7. I am concerned that I may not do as well in this competition as I could</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>8. My body feels tense</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>9. I am self-confident</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>10. I am concerned about losing</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>11. I feel tense in my stomach</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>12. I feel secure</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>13. I am concerned about choking under pressure</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>14. My body feels relaxed</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>15. I'm confident I can meet the challenge</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>16. I'm concerned about performing poorly</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>17. My heart is racing</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>18. I'm confident about performing well</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>19. I'm concerned about reaching my goal</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>20. I feel my stomach churning</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
<tr>
<td>21. I feel mentally relaxed</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>5 6 7</td>
<td>-3 -2 -1 0</td>
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<td></td>
</tr>
<tr>
<td>22. I'm concerned that others will be disappointed with my performance</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
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<td>5 6 7</td>
<td>-3 -2 -1 0</td>
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<td></td>
</tr>
<tr>
<td>23. My hands are clammy</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
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<td>5 6 7</td>
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<td>24. I'm confident because I mentally picture myself reaching my goal</td>
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<tr>
<td>25. I'm concerned I won't be able to concentrate</td>
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<tr>
<td>26. My body feels tight</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
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<td>5 6 7</td>
<td>-3 -2 -1 0</td>
<td>+1 +2 +3</td>
<td></td>
</tr>
</tbody>
</table>

### Now that you have this thought/feeling, do you regard it as negative or positive in relation to your upcoming performance?

A. If you have scored '1' (Not At All) on the first scale, then respond to relation to that feeling, e.g. If you responded 'Not At All' to question 4, then you would respond to this scale as if you had no self-doubts.

### Instructions

- **For each statement:**
  - Circle the number that best describes your feelings right now.
  - There are no right or wrong answers.
  - Do not spend too much time on any one statement.
  - Choose the answer that describes your feelings right now.

### Interpretation

- **Very Positive:** Feeling positive about the upcoming performance.
- **Very Negative:** Feeling very negative about the upcoming performance.
- **Modestly So:** Feeling moderately positive or negative about the upcoming performance.
- **Moderately So:** Feeling moderately positive or negative about the upcoming performance.
- **Somewhat:** Feeling somewhat positive or negative about the upcoming performance.
- **Not At All:** Feeling not at all positive or negative about the upcoming performance.
APPENDIX 5 - Competitive State Anxiety Inventory - Modified Version-2

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

Directions: A number of statements that athletes have used to describe their feelings before competition are given below. Read each statement and then circle the appropriate number immediately to the right of the statement, on the scale from 1 - 4, to indicate how you feel right now at this moment. Then, for each statement, circle the appropriate number on the scale from -3 to +3 to signify how facilitative (i.e. positive) or debilitative (i.e. negative) you perceive your response to be. There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer which describes your feelings right now.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Not At All</th>
<th>Somewhat</th>
<th>Moderately So</th>
<th>Very Much So</th>
<th>Very Negative (i.e. debilitative)</th>
<th>Very Positive (i.e. facilitative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am concerned about this competition</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I feel nervous</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+1</td>
</tr>
<tr>
<td>3. I feel at ease</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>4. I have self-doubts</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>5. I feel jittery</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>6. I feel comfortable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>7. I am concerned that I may not do as well in this competition</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>8. My body feels tense</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>9. I am self-confident</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>10. I am concerned about losing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>11. I feel tense in my stomach</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>12. I feel secure</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>13. I am concerned about choking under pressure</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>14. My body feels relaxed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>15. I'm confident I can meet the challenge</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>16. I'm concerned about performing poorly</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>17. My heart is racing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>18. I'm confident about performing well</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>19. I'm concerned about reaching my goal</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>20. I feel my stomach sinking</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>21. I feel mentally relaxed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>22. I'm concerned that others will be disappointed with my performance</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>23. My hands are clammy</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>24. I'm confident because I mentally picture myself reaching my goal</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>25. I'm concerned I won't be able to concentrate</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>26. My body feels light</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
<tr>
<td>27. I'm confident of coming through under pressure</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-3</td>
<td>+2</td>
</tr>
</tbody>
</table>
APPENDIX 6 - Sport Competition Anxiety Test - Modified Version

Below are some statements about how people feel when they compete in sport and games. Read each statement and decide if you feel this way 'hardly ever' (A), 'sometimes' (B) or 'often' (C). Circle the appropriate answer. Then, for each statement, (except 6 and 11), if you stated that you feel this way 'often' (C) state the degree to which you regard it as being 'facilitative' (i.e. wanted) or 'deleterious' (i.e. unwanted) to your performance. If you stated that you feel this way 'hardly ever' (A) or 'sometimes' (B), please state how you would regard it if you felt like this 'often'. For statements 6 and 11, if you answered 'hardly ever' (A), state the degree to which you regard it as being 'facilitative' (i.e. wanted) or 'deleterious' (i.e. unwanted) to your performance. If you stated that you feel this 'sometimes' (B) or 'often' (C), please state how you would feel like this if you felt like this hardly ever. There are no right or wrong answers. Do not spend too much time on any one statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Hardly Ever</th>
<th>Sometimes</th>
<th>Often</th>
<th>Very Deleterious</th>
<th>Very Facilitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Competing against others is socially enjoyable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Before I compete I feel nervous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Before I compete I worry about not performing well</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I am a good sportsman when I compete</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. When I compete I worry about making mistakes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Before I compete I am calm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Setting a goal is important when competing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Before I compete I get a queasy feeling in my stomach</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Just before competing I notice my heart beats faster than usual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. I like to compete in games that demand considerable physical energy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Before I compete I feel relaxed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Before I compete I am nervous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Team sports are more exciting than individual sports</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. I get nervous waiting to start the contest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Before I compete I usually get uptight</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 7

Activation-Deactivation Adjective Checklist: Administration and Scoring

Instructions

Each of the following words describes feelings or mood. Please use the rating scale next to each word to describe your feelings at this moment.

EXAMPLES:

relaxed  vv  v  ?  no  If you circle the double check (vv) it means that you definitely feel relaxed at the moment.
relaxed  vv  v  ?  no  If you circle the single check (v) it means that you feel slightly relaxed at the moment.
relaxed  vv  v  ?  no  If you circle the question mark (?) it means that the word does not apply or you cannot decide if you feel relaxed at the moment.
relaxed  vv  v  ?  no  If you circle the no it means that you're definitely not relaxed at the moment.

Work rapidly, but please mark all the words. Your first reaction is best. This should only take a minute.

<table>
<thead>
<tr>
<th></th>
<th>vv</th>
<th>v</th>
<th>?</th>
<th>no</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>active</td>
<td>vv</td>
<td>v</td>
<td>?</td>
<td>no</td>
<td>definitely feel</td>
</tr>
<tr>
<td>quiet</td>
<td>vv</td>
<td>v</td>
<td>?</td>
<td>no</td>
<td>feel slightly</td>
</tr>
<tr>
<td>tired</td>
<td>vv</td>
<td>v</td>
<td>?</td>
<td>no</td>
<td>cannot decide</td>
</tr>
<tr>
<td>tense</td>
<td>vv</td>
<td>v</td>
<td>?</td>
<td>no</td>
<td>definitely do not feel</td>
</tr>
<tr>
<td>placid</td>
<td>vv</td>
<td>v</td>
<td>?</td>
<td>no</td>
<td>calm</td>
</tr>
<tr>
<td>sleepy</td>
<td>vv</td>
<td>v</td>
<td>?</td>
<td>no</td>
<td>pumped-up</td>
</tr>
<tr>
<td>nervous</td>
<td>vv</td>
<td>v</td>
<td>?</td>
<td>no</td>
<td>at-rest</td>
</tr>
<tr>
<td>wakeful</td>
<td>vv</td>
<td>v</td>
<td>?</td>
<td>no</td>
<td>drowsy</td>
</tr>
<tr>
<td>placid</td>
<td>vv</td>
<td>v</td>
<td>?</td>
<td>no</td>
<td>fearful</td>
</tr>
<tr>
<td>sleepy</td>
<td>vv</td>
<td>v</td>
<td>?</td>
<td>no</td>
<td>lively</td>
</tr>
<tr>
<td>jittery</td>
<td>vv</td>
<td>v</td>
<td>?</td>
<td>no</td>
<td>energetic</td>
</tr>
<tr>
<td>still</td>
<td>vv</td>
<td>v</td>
<td>?</td>
<td>no</td>
<td>wide-awake</td>
</tr>
<tr>
<td>intense</td>
<td>vv</td>
<td>v</td>
<td>?</td>
<td>no</td>
<td>up-tight</td>
</tr>
</tbody>
</table>

Scoring Instructions:

The AD-ACL is scored by assigning 4, 3, 2 and 1, respectively to the 'vv', 'v', '?' and 'no' scale points, and summing the five scores for each subscale. In order of appearance, the subscale adjectives are as follows: Energy (active, pumped-up, vigorous, lively, energetic); Tired (tired, wakeful, sleep, drowsy, wide-awake); Calmness (quiet, placid, still, calm, at-rest); Tension (tense, jittery, intense, fearful, up-tight). Scoring for 'wakeful' and 'wide-awake' must be reversed for the 'Tiredness' subscale. If full bipolar dimensions of 'Energy' and 'Stress' are used, then 'Tiredness' and 'Calmness' scores must be reversed (but not 'wakeful' and 'wide-awake' in this case) before summing the ten scores.
APPENDIX 8
Subjective Performance Measures

Please circle the appropriate response to the three questions below:

(1) How pleased were you with your performance?

<table>
<thead>
<tr>
<th>Extremely Disappointed</th>
<th>Extremely Pleased</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9</td>
<td></td>
</tr>
</tbody>
</table>

(2) How pleased were you with your time/distance/height?

<table>
<thead>
<tr>
<th>Extremely Disappointed</th>
<th>Extremely Pleased</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9</td>
<td></td>
</tr>
</tbody>
</table>

(3) How pleased were you with your position?

<table>
<thead>
<tr>
<th>Extremely Disappointed</th>
<th>Extremely Pleased</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9</td>
<td></td>
</tr>
</tbody>
</table>
Biographies of the Ten Interviewees Involved in Study 3.1

<table>
<thead>
<tr>
<th>Athlete No.</th>
<th>Sex</th>
<th>Age</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athlete 1</td>
<td>Male</td>
<td>26</td>
<td>Hammer Thrower</td>
</tr>
<tr>
<td>Athlete 2</td>
<td>Female</td>
<td>21</td>
<td>100 - 400 metre runner</td>
</tr>
<tr>
<td>Athlete 3</td>
<td>Male</td>
<td>22</td>
<td>1500 - 3000 metre runner</td>
</tr>
<tr>
<td>Athlete 4</td>
<td>Male</td>
<td>19</td>
<td>800/1500 metre runner</td>
</tr>
<tr>
<td>Athlete 5</td>
<td>Male</td>
<td>21</td>
<td>High jumper/ Sprinter</td>
</tr>
<tr>
<td>Athlete 6</td>
<td>Female</td>
<td>21</td>
<td>100 metre hurdler</td>
</tr>
<tr>
<td>Athlete 7</td>
<td>Female</td>
<td>21</td>
<td>Javelin thrower</td>
</tr>
<tr>
<td>Athlete 8</td>
<td>Female</td>
<td>24</td>
<td>800/1500 metre runner</td>
</tr>
<tr>
<td>Athlete 9</td>
<td>Male</td>
<td>19</td>
<td>800/1500 metre runner</td>
</tr>
<tr>
<td>Athlete 10</td>
<td>Male</td>
<td>19</td>
<td>100/200 metre runner</td>
</tr>
</tbody>
</table>
Appendix 9b

Biographies of the Eight Interviewees Involved in Study 3.2

<table>
<thead>
<tr>
<th>Athlete No.</th>
<th>Sex</th>
<th>Age</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athlete 1</td>
<td>Male</td>
<td>23</td>
<td>800 metre runner</td>
</tr>
<tr>
<td>Athlete 2</td>
<td>Female</td>
<td>23</td>
<td>1500 - 3000 metre runner</td>
</tr>
<tr>
<td>Athlete 3</td>
<td>Male</td>
<td>21</td>
<td>1500 metre runner</td>
</tr>
<tr>
<td>Athlete 4</td>
<td>Male</td>
<td>19</td>
<td>800/1500 metre runner</td>
</tr>
<tr>
<td>Athlete 5</td>
<td>Male</td>
<td>22</td>
<td>Hammer thrower</td>
</tr>
<tr>
<td>Athlete 6</td>
<td>Male</td>
<td>21</td>
<td>800 metre runner</td>
</tr>
<tr>
<td>Athlete 7</td>
<td>Male</td>
<td>20</td>
<td>1500 metre runner</td>
</tr>
<tr>
<td>Athlete 8</td>
<td>Female</td>
<td>22</td>
<td>100 metre runner/Long jumper</td>
</tr>
</tbody>
</table>
APPENDIX 10a
Interview Schedule for Study 3.1

Part 1: Introduction

This part of the interview involved establishing a rapport with the participants and orienting them to the forthcoming discussion. Brief mention was given to the use of the data, the reasons for taping the session and the confidential nature of the process.

Part 2: General Thoughts and Feelings

I'd like to ask you some questions about how you generally feel before competition. I'm particularly interested in the nature of the thoughts you experience in the period leading up to an event. Therefore, I'm going to ask you to think about your usual physical and mental state at various stages during the week prior to competing. Do you have any questions?

One Week Before:

I'd like you to concentrate for the moment on your thoughts and feelings one week before an event. Can you tell me to what extent your mind is generally occupied by the event, at this stage?

Can you quantify that amount in any way by attaching a numerical value to it? e.g. what % of the time is your mind occupied by the event?

Still thinking about one week before the event, can you tell me what form your thoughts take about the competition? i.e. when you think about the event at this stage, what's actually going through your mind?

Also, at this stage, how would you generally describe your physical state, in relation to the event?

And, at this stage, how would you generally describe your level of self-confidence about the event?

Two Days Before:

If we can move closer to the event now, I'd like you to concentrate on your thoughts and feelings two days before. Can you tell me to what extent your mind is generally occupied by the event, at this stage?

Can you quantify that amount in any way by attaching a numerical value to it? e.g. what % of the time is your mind occupied by the event?

Still thinking about two days before the event, can you tell me what form your thoughts take about the competition? i.e. when you think about the event at this stage, what's actually going through your mind?

Do these thoughts differ from the thoughts you were experiencing about the event a week before, or are they just more/less of the same?

Also, at this stage, how would you generally describe your physical state, in relation to the event?

Have these feelings changed at all from those you experienced a week before the event?
And, at this stage, how would you generally describe your level of self-confidence about the event?

Have these feelings changed at all from those you experienced a week before the event?

**One Day Before:**

Getting closer to the event again. I'd now like you to concentrate on your thoughts and feelings one day before. Can you tell me to what extent your mind is occupied by the event, at this stage?

Can you quantify that amount in any way by attaching a numerical value to it? e.g. what % of the time is your mind occupied by the event?

Still thinking about one day before the event, can you tell me what form your thoughts take about the competition? i.e. when you think about the event at this stage, what's actually going through your mind?

Do these thoughts differ from the thoughts you were experiencing about the event either a week before or 2 days before, or are they just more/less of the same?

Also, at this stage, how would you generally describe your physical state, in relation to the event?

Have these feelings changed at all from those you experienced a week before the event?

And, at this stage, how would you generally describe your level of self-confidence about the event?

Have these feelings changed at all from those you experienced a week before the event?

**Two Hours Before:**

If I can now ask you to think about your thoughts and feelings actually on the day of competition itself. Firstly, I'd like you to concentrate on your thoughts and feelings about two hours before your event. Can you tell me to what extent your mind is generally occupied by the event, at this stage?

Can you quantify that amount in any way by attaching a numerical value to it? e.g. what % of the time is your mind occupied by the event?

Still thinking about two hours before the event, can you tell me what form your thoughts take about the competition? i.e. when you think about the event at this stage, what's actually going through your mind?

Do these thoughts differ from the thoughts you were experiencing about the event at any of the previous stages we've been talking about, or are they more/less of the same?

Also, at this stage, how would you generally describe your physical state, in relation to the event?

Have these feelings changed at all from those you experienced a week before the event?

And, at this stage, how would you generally describe your level of self-confidence about the event?
Have these feelings changed at all from those you experienced a week before the event?

30 Minutes Before:

I'd like you to concentrate on your thoughts and feelings about 20-30 minutes before your event. Can you tell me to what extent your mind is generally occupied by the event, at this stage?

Can you quantify that time in any way by attaching a numerical value to it? e.g. what % of the time is your mind occupied by the event?

Still thinking about 20-30 minutes before the event, can you tell me what form your thoughts take about the competition? i.e. when you think about the event at this stage, what's actually going through your mind?

Do these thoughts differ from the thoughts you were experiencing about the event at any of the previous stages we've been talking about or are they just more/less of the same?

Also, at this stage, how would you generally describe your physical state, in relation to the event?

Have these feelings changed at all from those you experienced a week before the event?

And, at this stage, how would you generally describe your level of self-confidence about the event?

Have these feelings changed at all from those you experienced a week before the event?

Part 3: Specific Thoughts and Feelings

You'll remember answering a series of questions for me at the Borough Road / British Polys match and I'd now like to ask you to try and think back - to the best of your ability - about that match.

These were your % thinking time responses:

1 week before ........
2 days before ........
1 day before ........
3 hours before ........
30 minutes before ........

Would you say that this is a normal % thinking time 'profile'?

If not, why might there have been a difference?

Now, can you try and think back to your thoughts on each of these occasions? Can you remember what your thoughts were?

1 week before ........
2 days before ........
1 day before ........
3 hours before ........
30 minutes before ........

Did your thoughts about the event change or alter at any of these stages? Or did the thoughts remain the same, but just occur more frequently?
Part 4: General Anxiety-Related Thoughts and Feelings:

I'd like to finish with some questions about any thoughts or feelings of anxiety you generally tend to experience in the lead up to a competition. I'm going to ask you whether there are any stages where you are more anxious than at others and also what form the anxiety takes? i.e. is it mental anxiety, e.g. worry, or is it physical anxiety, e.g. butterflies - or both - or how is your self-confidence affected? Do you have any questions?

So if we analyze more closely the 5 stages we've been discussing, think about both your mental anxiety, your physical anxiety, and also your self-confidence.

Do these feelings or expressions of anxiety vary during the pre-competition period? i.e. are you more anxious/less self-confident at certain times than at others?

Do you generally experience any anxiety 1 week before competing? If yes, what are the symptoms?

Do you generally experience any anxiety 2 days before competing? If yes, what are the symptoms?

What about 1 day before competing? If yes, what are the symptoms?

What about 3 hours before competing? If yes, what are the symptoms?

What about 20-30 minutes before competing? If yes, what are the symptoms?

N.B. Consider both modes of anxiety and self-confidence.

Part 5: Specific Anxiety-Related Thoughts and Feelings:

You've just responded to a series of questions about the feelings and thoughts of anxiety that you generally experience in the period leading up to a competition. To complete this interview I'd like you to again think back to the Borough Road/British Polys match and reflect on the feelings and thoughts of anxiety you experienced on the lead up to that competition.

So, if we again analyze the 5 stages we've been discussing, think about your mental anxiety, your physical anxiety, and also your level of self-confidence.

Did these feelings or expressions of anxiety vary during the pre-competition period? i.e. were you more anxious/less self-confident at certain times than at others?

Did you generally experience any anxiety 1 week before competing? If yes, what are the symptoms?

Did you generally experience any anxiety 2 days before competing? If yes, what are the symptoms?

What about 1 day before competing? If yes, what were the symptoms?

What about 2 hours before competing? If yes, what were the symptoms?

What about 20-30 minutes before competing? If yes, what were the symptoms?

N.B. Consider both modes of anxiety and self-confidence.
APPENDIX 10b

Interview Schedule for Study 3.2

Part 1: Introduction

This part of the interview involved establishing a rapport with the participants and orienting them to the forthcoming discussion. Brief mention was given to the use of the data, the reasons for taping the session and the confidential nature of the process.

Part 2: General Anxiety-Related Thoughts and Feelings

Two Days Before:

I'd like to ask you some questions about any thoughts or feelings of anxiety/arousal you generally tend to experience in the lead up to a competition. I'm going to ask you whether there are any stages where you are more anxious than at others and also what form the anxiety takes? i.e. is it mental anxiety, e.g. worry or concern, or is it physical anxiety, e.g. butterflies - or both - or how is your self-confidence affected? Do you have any questions?

Do these feelings or expressions of anxiety vary during the pre-competition period? i.e. are you more anxious/less self-confident at certain times than at others?

Do you generally experience any anxiety 2 days before competing? If yes, what are the symptoms?

How do you perceive this anxiety? Do you interpret the worry/concern as positive or negative? In other words, do you want it or prefer to be without? Why? How would you actually label it?

Do you interpret the physical nerves as positive or negative? In other words, do you want them or prefer to be without? Why? How would you actually label it?

What is your self-confidence like at this stage? How do you perceive your self-confidence levels?

One Day Before:

Do you generally experience any anxiety 1 day before competing? If yes, what are the symptoms?

How do you perceive this anxiety? Do you interpret the worry/concern as positive or negative? In other words, do you want it or prefer to be without? Why? How would you actually label it?

How does it compare to the previous day?

Do you interpret the physical nerves as positive or negative? In other words, do you want them or prefer to be without? Why? How would you actually label it?

What is your self-confidence like at this stage? How do you perceive your self-confidence levels? How does it compare to the previous day?

Two Hours Before:

Do you generally experience any anxiety 2 hours before competing? If yes, what are the symptoms?

How do you perceive this anxiety? Do you interpret the worry/concern as positive or negative? In other words, do you want it or prefer to be without? Why? How would you actually label it?

How does it compare to the previous times?
Do you interpret the physical nerves as positive or negative? In other words, do you want them or prefer to be without? Why? How would you actually label it?

How does it compare to the previous times?

What is your self-confidence like at this stage? How do you perceive your self-confidence levels? How does it compare to the previous times?

30 Minutes Before:

Do you generally experience any anxiety 20-30 minutes before competing? If yes, what are the symptoms?

How do you perceive this anxiety? Do you interpret the worry/concern as positive or negative? In other words, do you want it or prefer to be without? Why? How would you actually label it? How does it compare to the previous times?

Do you interpret the physical nerves as positive or negative? In other words, do you want them or prefer to be without? Why? How would you actually label it? How does it compare to the previous times?

What is your self-confidence like at this stage? How do you perceive your self-confidence levels? How does it compare to the previous times?

Part 3: Specific Intensity Responses

You'll remember answering a series of questions for me at the Borough Road / AAA's match and I'd now like to ask you to try and think back - to the best of your ability - about that match.

These were your intensity responses for cognitive anxiety:

2 days before .......
1 day before .......
2 hours before .......
20-30 minutes before ........

Would you say that this is a normal 'profile'? If not, why might there have been a difference?

These were your intensity responses for somatic anxiety:

2 days before .......
1 day before .......
2 hours before .......
20-30 minutes before ........

Would you say that this is a normal 'profile'? If not, why might there have been a difference?

These were your intensity responses for self-confidence:

2 days before .......
1 day before .......
2 hours before .......
20-30 minutes before ........

Would you say that this is a normal 'profile'? If not, why might there have been a difference?
Part 4: Specific Frequency Responses

These were your frequency responses:

2 days before .......
1 day before .......
2 hours before .......
20-30 minutes before .......

Would you say that this is a normal 'profile'? If not, why might there have been a difference?

Now, can you try and think back to your thoughts on each of the these occasions? Can you remember what your thoughts were?

2 days before ........
1 day before .........
2 hours before .......
20-30 minutes before .........

Did your thoughts about the event change or alter at any of these stages? Or did the thoughts remain the same, but just occur more frequently?

Part 5: Specific Direction Responses

These were your direction responses for cognitive anxiety:

2 days before .......
1 day before .........
2 hours before .......
20-30 minutes before .........

Would you say that this is a normal 'profile'? If not, why might there have been a difference?

Now, can you try and think back to your thoughts on each of the these occasions? Can you remember what your thoughts were in terms of being positive or negative?

2 days before ........
1 day before .........
2 hours before .......
20-30 minutes before .........

Did your thoughts about the event change or alter at any of these stages? Or did the thoughts remain the same?

These were your direction responses for somatic anxiety:

2 days before .......
1 day before .........
2 hours before .......
20-30 minutes before .........

Would you say that this is a normal 'profile'? If not, why might there have been a difference?
Now, can you try and think back to your thoughts and feelings on each of these occasions? Can you remember what your thoughts and feelings were in terms of being positive or negative?

2 days before ............
1 day before ............
2 hours before ............
20-30 minutes before ............

Did your thoughts about the event change or alter at any of these stages? Or did the thoughts remain the same?
APPENDIX 10c

Interview Schedule for Study 4

Part 1: Introduction

This part of the interview involved establishing a rapport with the participants and orienting them to the forthcoming discussion. Brief mention was given to the use of the data, the reasons for taping the session and the confidential nature of the process.

Tuesday night's game against ___________ General comments about the game. How did it go/How did you think you played? Aspects of your performance that you were dis/pleased with?

How did you feel before the game? A few days before (to what extent were you thinking about it then)/in the changing room/warm-up?

Part 2: Cognitive Anxiety

You'll appreciate that the first questionnaire looks at different aspects of thoughts and feelings that you may experience before a game. What were the kind of things that were going through your mind at that stage, 20 minutes before the game? What were you thinking about? (May need to provide some leads - e.g. refer to antecedent questions?)

You scored 'x' on the 'worry' scale - which is high/low - would you say that's a fair reflection of your mental state on Tuesday night? Would you say that you were/were not worried?

How did you perceive that worry/concern? As good or bad, for you? You scored 'x' on that scale. Would you agree with that?

Can you think back to your mental state last week and compare it to last night? Were you less/more/same worried? If so why?

Did you perceive your worry/concern this week to be any more positive or negative than last week? If so why?

If we now try and relate that 'worry' that you were experiencing to aspects of your performance - do you think it affected/influenced any part of your game at all? Or did it vary depending on a particular part of your game (e.g. rebounding versus shooting)?

Part 3: Somatic Anxiety

What were the kind of physical reactions that you were experiencing in the changing room 20 minutes before a game? Had you been experiencing them any earlier than that?

You scored 'x' on the 'physical arousal' scale - which is high/low - would you say that's a fair reflection of your physical state on Tuesday night? Would you say that you were not/aroused?

How did you perceive those bodily symptoms? As good or bad, for you? Did you want them or not? You scored 'x' on that scale. Would you agree with that?

How do you think your physical state compared to last week? Did you experience less/more/same levels? If so why?

Did you perceive your physical arousal this week to be any more positive or negative than last week? If so why?
If we now try and relate these 'physical reactions' that you were experiencing to aspects of your performance - do you think they affected/influenced any part of your game at all? Or did it vary depending on a particular part of your game (e.g. rebounding versus shooting)?

**Part 4: Self-Confidence**

How self-confident did you feel before the game? Because you scored x on the self-confidence scale, you would, therefore, disagree with that?

How do you feel about that level of self-confidence? Do you feel it is good or bad for you, being self-confident before a game?

How do you think your self-confidence compared to last week? Did you experience less/more/same levels? If so why?

Did you perceive your self-confidence this week to be any more positive or negative than last week? If so why?

If we now try and relate this level of 'self-confidence' that you were experiencing to aspects of your performance - do you think it affected/influenced any part of your game at all? Or did it vary depending on a particular part of your game (e.g. rebounding versus shooting)?

**Part 5: Mood**

I'm now going to ask you some questions specifically about your mood. I know some of your answers may be similar to the comments you've just made, and I apologise for that - it's because I'm trying to validate a questionnaire - but I'm not specifically talking about anxiety.

What was your general mood like in the changing room? How would you compare it to last week?

(Energy) How much energy did you feel you had? How alert/sharp did you feel? Did you perceive this as positive or negative?

(Tiredness) Did you feel heavy, tired or lethargic, at all? Did you perceive this as positive or negative?

(Tension) Can you remember feeling uptight or tense? Did you perceive this as positive or negative?

(Relaxed) Did you feel calm and relaxed? Did you perceive this as positive or negative?

**Part 6: Performance**

Were you pleased with any particular aspects of your performance? e.g. you 'scored' 'x' number of rebounds which was much better/worse than last week - comment.
Throughout the following section the interviewer's questions and comments will be presented in normal type-face and the interviewees' responses will be presented in bold type-face.

ATHLETE 1

• I'd like to ask you some questions about how you generally feel before competition. I'm particularly interested in the nature of the thoughts you experience in the period leading up to an event. Therefore, I'm going to ask you to think about your usual physical and mental state at various stages during the week prior to competing. Alright? Fine. I'd like you to concentrate for the moment on your thoughts and feelings one week before an event. Can you tell me to what extent your mind is generally occupied by the event, at this stage?

I tend to think about it in a dull moment. If I'm busy at work or studying then my mind's occupied that way. But if my concentration breaks or in a coffee break or something then I'd think about it briefly then.

• Can you quantify that amount in any way by attaching a numerical value to it? So, like you did with the AAA, could you say what % of the time your mind is occupied by the event, usually, at this time?

It should be related to my training. So when I go training at five o'clock it's on my mind 90% of the time because my training is geared to what I need to do to prepare for the weekend. My concentration level is high and I am thinking about the meet a lot. But, earlier in the day there's a low level of concentration. A day-dream may creep in now and again and then it's back to the back of my mind. The only emphasis is in training.

• So in that low concentration 'phase', could you put a percentage on that?

I'd say about 10% - in the sense that I think about it in a dull moment. But that's all and it's only momentarily.

• Fine. Still thinking about one week before the event, can you tell me what form your thoughts take about the competition? So, when you think about the event at this stage, what's actually going through your mind?

Basically, what I've been working on - and what I am working on. I'm looking to eradicate the weak points. I've no nerves at this stage - I'm purely thinking about technical points.

• So how would you generally describe your physical state, in relation to the meet - at this stage - you mentioned no nerves there?

As far as anxiety or nerves are concerned, I'm never worried a week before unless I'm carrying an injury. So no nerves, no. I'm calm, laid-back. It's more thinking. Seven days is a long way away. I've still got a lot of avenues to explore in training. Although in a week I can't make any strength gains, I might still do a heavy session at the start of the week to consolidate. At this stage I'm planning out my training. So I'm starting to think about technical things - light and fast stuff later in the week and when I'm going to do it.

• And, at this stage, how would you generally describe your level of self-confidence - in relation to the competition?
It depends on my most recent throw and on my recent training. This is still a week before? Actually, a week before I'm probably not affected because if things haven't gone well I'll try and be positive at this stage. If I'm still training poorly later in the week then my confidence would be damaged.

- If we can move closer to the event now. I'd like you to concentrate on your thoughts and feelings two days before. Can you tell me to what extent your mind is generally occupied by the event, at this stage?

Considerably more. Before, it was at a low level generally and at a high level in training. Now, generally, it's slightly higher more often. It probably doesn't spend a lot of time on my mind - but it's definitely increased.

- Can you say what % of the time is your mind occupied by the event?

That's very difficult. A fair bit? I don't know, what's that? It's gone up put it that way!

- O.K. so it's gone up. When you do think about the competition, what's actually going through your mind now?

My week's training has gone by. Two days before I've got one fast session to do. I think my thoughts are dependent on how the training has gone. I look at and focus on the positive aspects of training - what's gone well. I'll be looking to consolidate. I'm concentrating on being relaxed and positive, getting myself in the right frame of mind.

- Do these thoughts differ from the thoughts you were experiencing about the event a week before or two days before?

I'm honing in now. I would say they're different in that they're becoming more specific.

- Also, at this stage, how would you generally describe your physical state, in relation to the race?

I'll get some periods of nervousness. I'll try and be positive and consolidate on the good points, but again, it depends on training. Normally, if I've been consistent, then I'm confident - but above all I make certain there's no dwelling on the negatives.

- What might those negatives be?

Timing wasn't quite there. Rhythm was wrong. In which case it would probably be on my mind a touch more because in a spare moment I'd do some practice turns or feel myself do some practice turns.

- Getting closer to the event again. I'd now like you to concentrate on your thoughts and feelings one day before. Can you tell me to what extent your mind is occupied by the event, at this stage?

I'm thinking about it totally now. I'm running it over in my mind. I'll be thinking about my warm-up. What specifics I need to work on in my warm-up. While I'm watching T.V. I'll be running over little details.

- Can you quantify that amount?
Well, when I'm thinking about it - a 100% undivided attention - but the rest of the time my mind will drift on to the T.V. or something else. On balance it would have to be at least 50%.

• Do the thoughts you get about the event differ from the thoughts you were experiencing about the event either a week before or 2 days before, or are they just more or less or the same?

My thoughts are now more defined. A week before there's a wide band - what can I work on, what do I need to work on. Now, a day before, you've worked on it - the planning is over and it's now a case of reviewing.

• At this same stage, how would you generally describe your physical state, in relation to the event?

Relatively nervous. It depends on who'll be there. At the AAA's, for example, there were a lot of top class competitors and I was looking to perform better to match them. I feel under more pressure when I feel there are others there who are better. It's more pressurizing than if they were equal or the others were worse.

• Why's that?

I'm not too keen on being shown up!

• Have these feelings changed at all from those you experienced earlier in the week?

A little more because it's getting closer and because it's on my mind more.

• What precise form do these nerves take?

Oh. it's not much. I tingle a bit. I'm a bit twitchy, especially if I've really peaked for it. But that's good because it shows I'm ready.

• And, at this stage, how would you generally describe your level of self-confidence?

I have some 'what if' scenarios occasionally - like I no throw my first throw - and that can damage it a bit - but generally it's still relatively high providing I ignore any negatives.

• If I can now ask you to think about your thoughts and feelings actually on the day of competition itself. Firstly. I'd like you to concentrate on your thoughts and feelings about two hours before your event. Can you tell me to what extent your mind is generally occupied by the event, now?

A 100% of the time. It's similar to the evening before but a little more intense. I'm now occupied totally. I'm trying to relax and ease the nerves and think about getting a good warm-up. I definitely think about my warm-up a lot as well as the weather, the opponents.

• Go on

I concentrate on what's gone well in training and that I'm really going to go for it. Things like that.

• Do these thoughts differ from the thoughts you were experiencing about the event at any of the previous stages we've been talking about?
Yes, they do. I review the positive and the negative the day before but now I review just the positive. It helps to keep the self-confidence high and keep me relaxed. If my confidence is low then the tension increases and I never throw well when I'm tense - everything becomes too jerky. So I try to shut out the negatives and visualize and picture a good throw.

• Do you do that often?

Yes. I use good images a lot to get me in the right frame of mind

• How about your physical state now - two hours before training?

The butterflies come now. Nothing major though. It helps if other throwers are around. You talk over various points and the companionship helps. If I don't know the others then that can be off-putting. But above all I keep being positive.

• I'd like you to concentrate on your thoughts and feelings about 20-30 minutes before your event now.

I'm sizing up the competition now. Who do I know? If its going to be close I'm looking for tell-tale signs of nerves. If I don't know them I'm trying to assess their performance level. Are they looking strong? I'm probably doing this about 20 to 30% of the time. The rest of the time I'm looking for things to wind me up. I need the aggression factor.

• So what kind of things do you do?

I think about who's pissing me off. I can't go ape-shit unless I get riled. I need something to spark me off. I'm thinking what can I use to get the adrenalin going.

• So, do these thoughts differ from the thoughts you were experiencing about the event at any of the previous stages?

Very much so. They're all aggression related - there's no point getting aggressive any earlier, so my thoughts are very different now, yes.

• Also, at this stage, how would you generally describe your physical state?

There's a bit of a trough regards nerves. There's a bit of a lull. I have a few final refined thoughts on technique and I'm narrowing all the time - I'm honing down to a fine point.

• So how would you actually label your physical state then?

I'm very relaxed. I'm chatting to the others.

• And what about your confidence level?

My confidence is still relatively high - but it's not at a peak at that point. In fact, it may have dipped slightly because I get the odd 'what if'. It's because I'm waiting for my warm-up throws. You can never be sure until you let go some warm-ups.

• O.K. That's great. Now, you'll remember answering a series of questions for me at the AAA's match and I'd now like to ask you to try and think back - to the best of your ability -
about that match. These were your % thinking time responses from a week before through to 20 minutes before. Would you say that this is a normal % thinking time 'profile' for you?

Yes it is. They're similar to the values I've just given you, aren't they? Yes, I mean the AAA's is obviously a big match but it's not massive because the hammer takes place right at the start before the crowd arrives so it's not that different in that sense.

* Can you try and think back to your thoughts and feelings on each of the these occasions? Can you remember what your thoughts and feelings were?

Yes I should be. If I think hard enough!

* What about a week before?

Everything was very flexible at that stage. I wasn't feeling any anxiety because they were so many different outcomes. I knew I had a week to sort things out.

* Two days before?

I remember the session I had on the Wednesday hadn't gone very well and I was a bit down mentally and physically. But I quoshed it very quickly by pulling out something positive to avoid the negative. It was worse when I was on my own and I would've preferred to have had some friends around to take my mind off it at that stage. A day before was pretty similar. I was a bit anxious. Some mental anxiety because I would have preferred a better session - a few doubts - a few butterflies. But nothing too substantial or that unusual. I was just a bit worried about the big 'guns'. As I said I tend to worry about getting beaten by the real big guys.

* O.K. what about two hours before, against the AAA's?

I was trying to lie down, trying to relax, trying to be positive. Starting to hone in.

* Any physical reactions? That could be anything.

I definitely got butterflies - I always do - that's fairly normal. I don't know why, it's one of those things. I got a dry sticky throat as well and I remember finding it hard to swallow. Sunday was worse because it was so humid but I do normally feel the need to drink.

* And how about later?

There was a lull in my nerves about half an hour before we started because of the friendly atmosphere. I don't think runners have the same camaraderie - I don't know, I could be wrong. But by now I was waiting to throw, chatting and waiting to get going. The important thing is that your anxiety - certainly you mental anxiety and your confidence can change as late as your warm-up throws. If you have a bad warm-up throw then it knocks your confidence. You only get two throws so if either of them go badly it can cause you high anxiety. That is when if you ever get a peak to your anxiety it's then - if you have a bad warm-up throw. If they're both bad then I'd be very worried because you only get three competition throws to sort it out.

* Did that happen to you before the AAA's?

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No, not really. They could have been better but they were O.K. I wanted to mention it because although half an hour is quite close a lot can happen to change things after that.

• If they did go badly how would you lower your anxiety?

I'd try and work out what the fault was or I'd try and relax - or hope! You really need to get one good one in early.

• But before the AAA's you were O.K.?

Yes. Not bad. The second one was alright. I was a little worried about mucking up in front of everyone but I managed to be positive enough. To be honest your anxiety is fairly high until you've got one in. You need to get one in and I certainly have some anxiety until that happens. To be honest even the nerves I have with my warm-up throws don't compare if I have a bad first throw.

• O.K. Thanks for that. That's important to know. You've been very helpful. Thanks very much.
ATHLETE 2

- I'd like to ask you some questions about how you generally feel before competition. I'm particularly interested in the nature of the thoughts you experience in the period leading up to an event. Therefore, I'm going to ask you to think about your usual physical and mental state at various stages during the week prior to competing. O.K. Questions along those lines. Before we start do you have any questions yourself? I'd like you to concentrate for the moment on your thoughts and feelings one week before an event. Can you tell me to what extent your mind is generally occupied by the event, at this stage?

It all depends on the importance of the race and the opposition.

- We can talk in terms of important races if you like. I mean a lot of the races you run must be important.

You're right. Yeah, I'll think about the bigger races.

- Can you quantify the amount in any way by attaching a numerical value to it? So what I mean is what % of the time is your mind occupied by the event at this stage a week before?

It'll be on my mind about 50% of the time a week before.

- That much?

Probably. Certainly of my waking day!

- In that case, can you tell me what form your thoughts take about the competition? i.e. when you think about the event at this stage, what's actually going through your mind?

A week before it'll be things like tactics - how I'm going to run. I'm gradually getting ready. I'll be thinking about training - I want training to be perfect, so I'll be mapping out my training carefully. I'll also be concerned with planning how I'm going to run it - who's there - who might be in it. How I run it depends on who's there so that'll vary. If there are heats heat or semis I'll be thinking about them. They're the kinds of things I'm thinking about.

- Fine. Thanks. Now, at this stage, how would you generally describe your physical state, in relation to the race?

I'm paranoid about getting a cold. I'm worried it'll affect training - if I feel good then everything is great. But if I get any snuffles during the week then I'll dive for the Lemsips!

- And, at this stage, how would you generally describe your level of self-confidence about the event?

My confidence is probably quite high a week before. It's not something I think about to be honest.

- Alright, thanks. Let's move on so we're closer to the event now. I'd like you to concentrate on your thoughts and feelings two days before. Can you tell me to what extent your mind is generally occupied by the event, at this stage?

I'm probably not quite as confident. That's because I now know it's (the race) actually going to happen whereas a week ago it still seemed a long way off and I didn't feel threatened I suppose. If I'm not in the physical shape I want to be
I panic. It means that if I'm not, I want to pull out. This time is certainly more nerve-racking. I'm more nervous.

- So can you quantify that amount in any way by attaching a numerical value to it? E.g., what % of the time is your mind occupied by the event?

It's increased to 70%, I'd say.

- So a lot then?

Yes. A lot

- If we concentrate on this time then, two days before the event, can you tell me what form your thoughts take about the competition? So when you think about the event at this stage, what's actually going through your mind?

Well I'll have found out who's running and I'll know who's injured so I might think I may get bronze here or I could get a position so I start thinking where I think I'll finish. How will I run in the final?

- Do these thoughts differ from the thoughts you were experiencing about the event a week before, or are they just more/less of the same?

No, they're different I think. A week before I dream that I'll win but two days before I'll dream that I'll lose.

- Do you dream about competing a lot?

Yes, especially for the important races. The dreams two days before aren't very nice. It's like I'm in slow motion and I can't get going and everyone beats me.

- Why do you think they (the dreams) change from a week before?

I don't know. It might be because I lack a bit of confidence. I'm not one of those people who think they can always win. I often psyche myself out and I think if I'm worrying about it during the day then I tend to have bad dreams about it.

- Any sleep-walking?

No! No!

- Also, at this stage, how would you generally describe your physical state, in relation to the race?

Again I'm panicking if I've got a cold and if I have any injury I get to see the physio straight away. I'm also conscious of any strains I might have.

- And have these feelings changed at all from those you experienced a week before the event?

No, just more panic if I think there's something wrong.

- And, at this stage, how would you generally describe your level of self-confidence about the event?

I'm not so confident, because you know it's going to happen. I can feel the pressure mounting and well, that's it really.
• Getting closer to the event again. I'd now like you to concentrate on your thoughts and feelings one day before. Can you tell me to what extent your mind is occupied by the event, at this stage?

The night before? All the time.

• Can you quantify that amount again? What percentage?

Just all the time. It never leaves my mind. At this stage I'm thinking about it a lot. There's been a sudden shift because there's no going back.

• So, still thinking about one day before the event, what's actually going through your mind?

Have I had a good enough meal. Enough carbohydrates, etc. Everything I do is affected. If I have a night in, then it's on my mind. I can't sit still and relax! I'm totally paranoid that I'm going to tighten up. I sometimes imagine that my hamstrings are tight so I go for a walk. I get very narky as well.

• Anything else?

People go through my mind. The individuals I've got to race against go through my mind. Yes my rivals go through my mind. I wonder if they'll turn up. They're always there (on my mind). It's always the people who are faster. But I'm also concerned I'll beat the slower ones. In my mind I never see myself beating these people. It's negative in that sense, but I never think I'll be beaten by someone I've beaten before. I'm not thinking about me, I'm thinking about the others - I wonder if they're in shape and everything.

• If we move onto your physical state, how would you generally describe your physical state, in relation to the race?

I can't sleep. I panic.

• What does that panic involve?

Worrying about running badly and getting beaten.

• Any actual physical responses to that panic?

No physical responses, no. I behave uptight though and I'm certainly on edge.

• So mood changes, in fact?

Yes, definitely! I'm really narky. Jane knows to avoid me!

• And, at this stage, how would you generally describe your level of self-confidence about the event?

Not good. I want more confidence. I would run better if I had more. I worry about losing and what a disaster it would be if I lose.

• Have these feelings changed at all from those you experienced earlier in the week? I mean is your confidence even lower?

Yes, I think it is. It's certainly lower than a week before. I find it much easier to think you can cope when the race is further away.
If I can now ask you to think about your thoughts and feelings actually on the day of competition itself. Firstly, I’d like you to concentrate on your thoughts and feelings about two hours before your event. Can you tell me to what extent your mind is generally occupied by the event, at this stage?

Now, I’m not thinking about me at all - just about the other runners. I’m wondering what form they’re in and if they look good that worries me I’m thinking about the race all the time. I’m totally thinking about it. I’d be driving to the track, probably, so I’ve not seen the track or the people yet, but I’d be waiting to see how they looked.

So if you quantified that amount, would it be sort of 95 to 100%? Tell me if I’m wrong.

No, that’s right. All the time.

This time, two hours before the race stage. Can you tell me what’s actually going through your mind, now?

I feel awful in the car. I experience a lot of physical nerves now. My heart beat’s going, butterflies. I’ve got a lump in my throat - it’s horrible! I think there’s a change in my mind now. I think more about physical symptoms and sometimes I say to myself “why do I do it?”. It’s so bad but I do think it’s part of the process I have to go through. I would probably worry if I was too calm! I’d know I need the buzz, got to have those feelings. I’m still thinking about the competition - who’s there, who’s in the heat, is it seeded? that kind of thing. I wonder now and then a few ‘what if’ thoughts. What if I lose my rhythm or I can’t concentrate? I also think about how I’ll act when I arrive. Shall I try to appear lively - that’s all part of the psyche-up. But really I prefer to be quiet and talk to no-one.

Anything else?

I might think about where I’ll do my starts.

So, how would you generally describe your physical state, now?

I’m very conscious of how I’m feeling physically.

You mentioned butterflies and a lump in your throat.

Yes, those types of things. My throat gets dry and sometimes the butterflies are so strong I feel a bit sick.

How much have these feelings changed from those you experienced earlier?

Oh, totally different I only get them on the way to the track or when I arrive.

And, at this stage, how would you generally describe your level of self-confidence about the event?

Confidence is part of the act. I tell myself I’m going to look confident but really I’m not so confident and I’m conscious of everyone else. I watch the others and can be affected by how good they’re looking. So if they’re looking good my confidence goes down. The thing is that on the day you’re confronted with everything. People everywhere. There’s usually a crowd and instead of thinking about the race in a relaxed atmosphere at home, it’s very different to the hostile surroundings you get. People are pretending to be nice to each
other and I don't like that. It makes me suspicious! It's far more difficult to get rid of any doubts about yourself at the track than it is if you're away from it all.

• Lastly, then your thoughts and feelings about 20-30 minutes before your race. What are you thinking about now?

Well I'm in the waiting area and I've finished my warm-up and I think this is the worst part. I just want to get it over with. I'm definitely the most nervous. In the warm-up I've had loads to think about and they've taken some of my mind off it. But now the pressure comes back on. I also think about my lane, that makes a difference. If I've got an inside lane then I'm more confident. I'm definitely concerned who is in near lane and if I've got a fast person outside me I feel great, but yeah, I'm very aware of my lane draw. I also start thinking about tactics. I need to pay good attention to my technique. I'm thinking technique things now and they help me to concentrate on the race. There's no turning back now so I try to psyche myself up.

• How do you do that?

I tell myself I've got to go for it - that sort of thing.

• Also, at this stage, how would you generally describe your physical state?

Physical state. It's awful. I'm trying to hide my nerves and I can't be near other people. I can't chat like some of them do. I just want to hurry up and be done!

• What type of nerves do you get?

Lots of butterflies and I shiver a lot as well. My heart beat has gone up as well. Things like that.

• How does this compare to two hours before?

I'm more nervous I think, but at least I can move around. In the car it gets uncomfortable. At least I can do some strides to calm me down.

• And, at this stage, how would you generally describe your level of self-confidence?

I'm so nervous I'm not very confident. I think it depends on my previous performance - if I've had a bad race recently, then my confidence is a lot lower. I also get more pressure when running in Scotland because more people know me and are watching me. But at Loughborough I'm more relaxed because I think there's less pressure on me.

• You'll remember answering a series of questions for me at the Borough Road / British Polys match and I'd now like to ask you to try and think back - to the best of your ability - about that match. These were your % thinking time responses at each of the stages during the week. Would you say that this is a normal % thinking time 'profile'?

It's not always the same - it depends on the competition, but Borough Road was a fairly big one for me because Rachel Kirby was running. I was thinking about racing her a lot as soon as I found out she'd be running. I didn't want to get beaten by her - but she's very good and running well at the moment.

• Does it depend on anything else?
Yes. If my health has been good then I don't worry so much - and also if my weight has been regular. If I've seen my coach that can also help as he puts my mind at rest about things - so I'm not spending my time worrying.

• O.K. so do you think you can think back to your thoughts on each of the these occasions? Can you remember what your thoughts and feelings were at these stages?

At each stage? I'll try.

• One week before.

One week before. It was on my mind. I was concerned, but not necessarily anxious.

• Why concerned?

Because Rachel was running. It made me suddenly realize I was in a big race.

• And two days before?

I was constantly thinking about it and slightly anxious because my ankle has been sore. I talked about it a lot more than usual perhaps, with my flat-mate. She's quite a help in calming me down - although she keeps suggesting going down to the 'Gate'!

• That would help!

Perhaps it would - you never know! I remember two hours before or on the morning anyway - it hit me. I felt a bit sick. I couldn't centre in on my running.

• Why?

It had been on my mind a lot the night before but at that stage I get my usual feeling, it's a totally different feeling - physically, I feel a lot different. I certainly had my heavy butterflies and time seemed to be rushing by. I remember getting wrapped up in myself which is pretty usual but I didn't want to because there were a lot of people from the Holt there and I didn't want to appear rude. I know they just want to be friendly but I don't think they understand that I prefer to be on my own - so I was worrying about that!

• What about at the final stage - 20 - 30 minutes before?

20 - 30. I was even more focussed - more nervous. Rachel looked very smooth and confident and I managed to convince myself that she was too good and was looking too good. So I psyched myself out. I remember I didn't want to talk to anyone. I've got to learn to control myself in those situations. I mean I ran O.K. but I didn't run great and she didn't beat me by much so - you know!

• Thanks, that's been fantastic. The things I didn't know about Holt students!

I hope that was O.K. It helps to think things through you know - it's useful to think about what it is that worries me.
ATHLETE 3

• I'd like to ask you some questions about how you generally feel before competition. I'm particularly interested in the nature of the thoughts you experience in the period leading up to a race. Therefore, I'm going to ask you to think about your usual physical and mental state at various stages during the week prior to competing. Is that O.K.? Good. Do you have any questions yourself? Right. I'd like you to concentrate for the moment on your thoughts and feelings one week before an event. Can you tell me to what extent your mind is generally occupied by the event, at this stage?

It obviously depends on the importance of the race, but normally I'm not that worried a week before unless I'm carrying an injury. No, generally I'm never actually worried that much before. I don't think much about competing that far ahead - I think the reason is that so much can happen in between.

• Fine. Can you quantify that amount at all by attaching a numerical value to it? So, for example, what % of the time is your mind occupied by the event - generally, at this stage?

Again it depends on how big the meet is, I suppose. Although my actual approach is the same, so I would probably be the same every time. I'd say about 5% of the time. I get very brief flashes of 'oh! I've got that race next week'. Especially at the moment because my running is having to fit in around everything else.

• Although it's only five percent of the time, can you tell me what form your thoughts take about the competition? You mentioned very brief flashes. I might think about it in training. Am I tired? How do I feel generally. Do I need to 'back off' a bit this week and that kind of thing. Unless I was training 'through' I'd probably relate my training to the race - from about a week away. So some thoughts would definitely involve training.

• At this stage, how would you generally describe your physical state, in relation to the race?

In relation to the race? I'm experiencing no nerves at all in that physically I'm very calm. I'm not specifically thinking about the race. So, as I said, nothing really. Relaxed, if anything. I never get nervous until a couple of hours before normally.

• And, at this stage, how would you generally describe your level of self-confidence about the event?

That will vary depending on who is there. I'm probably not as confident if I'm think I'm going to get beat.

• As a matter of interest does that make you worry at all?

No. That's different. I tend to be worried, if I ever get worried, in races where I probably should win but it might get close. The races you really should do well in. I don't worry about losing to a better guy - but if there is someone like that in the race then I tend not to be confident about winning. I know that sounds obvious.

• Not necessarily. If we can move closer to the event now. I'd like you to concentrate on your thoughts and feelings two days before. Can you tell me to what extent your mind is generally occupied by the event, at this stage?
2 days before? Yes, I'm thinking about it a lot more now because I'll have done all my training and any training now will be geared to the race itself. I'm not really worried about the race unless I'm feeling under the weather, or if my last session went badly. If I felt tired during that session then that wouldn't be good. But with two days to go you can always get plenty of rest so it wouldn't worry me that much.

- Can you quantify that amount in any way? What % of the time is your mind occupied by the event now?

About 20-25%. I mean that's still a lot - about a quarter of your time at that stage.

- That 20 to 25 %: when you think about the event at this stage, what's actually going through your mind?

Oh, it's just general things like - I need to be careful about what I'm doing over the next 2 days to make sure I'm OK for the race. Things like eat well, sleep well, rest up, sort of things. So it's on my mind in that way. Looking after myself - a bit of discipline to make certain I don't blow the training by doing the simple things badly.

- Do these thoughts differ from the thoughts you were experiencing about the event a week before, or are they just more/less of the same?

They don't differ as such. Just more of them, I suppose. Although I do specifically think about sleeping. Getting some extra sleep in during the day, which a week before I wouldn't have thought about.

- How would you generally describe your physical state two days before racing?

Very similar. I only start getting physical nerves - like butterflies - on the race day or maybe occasionally the night before if it's a really big race. But even then it's very transitory.

- Getting closer to the event again. I'd now like you to concentrate on your thoughts and feelings one day before. Can you tell me to what extent your mind is occupied by the event, at this stage?

The night before, I usually try and take my mind off the race - like going to the pictures. You know, actually get out of the house and preferably away from other runners, because I just don't want to think about it. I've plenty of time the next day to do that.

- Can you put a percentage on that?

Probably less than two days before, because I've probably eaten and slept OK and so I know I've prepared in that way as best as I can. So I try and switch off a bit and stay relaxed. - So 10% maybe - not much unless I get reminded by bumping into someone who is running and they might talk about it or ask how I'm going.

- Although it's only 10 % can you say what's actually going through your mind when you think about the race?

If I'm still feeling tired the day before then I'll maybe worry a bit more. In the evening before I sometimes get negative images about running badly, about getting beaten by someone who is supposed to be slower than me.
• Do these thoughts differ from the thoughts you were experiencing about the event either a week before or 2 days before, or are they just more/less of the same?

Probably slightly less of the same.

• What's your physical state like at this stage?

Occasionally I might get a bit of a tingle, just thinking about it, but it's all pretty low key still.

• And, at this stage, how would you generally describe your level of self-confidence about the event? Have these feelings changed at all from those you experienced a week before the event?

I'm not really aware of my confidence. That might even be influenced as late as how I feel warming-up. It would also depend on how I'd be going to a certain extent. But as I said, it's mainly related to who else is there and I can't do anything about that so generally it stays the same.

• If I can now ask you to think about your thoughts and feelings actually on the day of competition itself. Firstly, I'd like you to concentrate on your thoughts and feelings about two hours before your event. Can you tell me to what extent your mind is generally occupied by the event, at this stage?

I'm beginning to switch in now. There's no point thinking about it too much, because you just burn yourself out - and there are not a lot of decisions to make in running. I think if I did another sport, that time before might be spent thinking about what I had to do, more often, but I start concentrating and preparing and warming-up, because it's all the same really, about an hour and a half before and so 2 hours before I'm gradually thinking about numbers, pins, spike length - at this stage - get that sorted then.

• Can you quantify that amount? Percentage thinking time?

I'm thinking about the race in that way - the way I've just said - say, 50 to 60%. The rest of the time I'm just watching who's running and the other events. I find that quite relaxing in a way and it starts to get me prepared as well.

• What's actually going through your mind, at this stage then?

Organisational things - to avoid any last minute panic. Going through my stretch routine. Nothing specific, just gradually building.

• Do these thoughts differ from the thoughts you were experiencing about the event at any of the previous stages we've been talking about, or are they more, less or the same?

They differ I suppose, yes. They're different in that I'm thinking about the functional necessaries that I wouldn't have concentrated on before. Before, my thoughts were on rest and food - nice things really!

• How would you generally describe your physical state, in relation to the race, now?

Some nerves. I'm usually a bit edgy, in that I can't totally relax - so even though I'm lying or sitting down and watching I'm not completely calm - but that's good, because otherwise I wouldn't be in the right frame of mind.
• Can you expand on that last comment?

Well, I need some nerves to show that I want it and that it's not just a training run. The competition gives you the edge you need to run fast.

• Have these feelings changed at all from those you experienced a week before the event?

Yes. slight increase in my nerves. I mean they didn't exist earlier.

• And, at this stage, how would you generally describe your level of self-confidence about the event?

My confidence will vary, as I said, on who is there. It may vary from earlier in the week, say, if I suddenly find out that so and so has dropped out or something, but otherwise it stays the same.

• Right. Thanks. So far so good. I'd like you to now concentrate on your thoughts and feelings about 20 to 30 minutes before your race, the final stage? Can you tell me to what extent your mind is generally occupied by the event, at this stage?

Completely now. You have to tell yourself it's going to hurt. I have to just get it into me that it'll be hard and fast, but I can cope with that. I can easily stride round in about 3.50 and feel quite tired and con myself that I ran hard, but there's a difference if I run aggressively. So I'm telling myself "Be strong", "Be aggressive" and I might end up going 3.45. You never know. But at least I give myself a chance of going that fast.

• A percentage?

90 to 95%. I maybe drift out of it to watch a race, but nearly all the time by then.

• Do these thoughts differ from the thoughts you were experiencing about the event at any of the previous stages we've been talking about or are they just more/less of the same?

Well, a lot of them for sure - but they've changed, I suppose, in that I'm getting myself pumped up to be aggressive and respond to some fast running and not to be afraid of going with it - or be surprised when it happens.

• So what might you tell yourself?

That I've done it before. That in some recent track session I put some good splits together - just little reminders to make certain I don't back off.

• What about your physical state at this stage?

I'm fairly nervous, but in a good way. I tend to go to the loo a lot and that irritates me some, because it can be a hassle, obviously - but in other ways it's good. It all comes back to having to be aggressive, so providing it doesn't stop me from concentrating and thinking clearly, then the nerves are good like that.

• Have these feelings changed at all from those you experienced earlier in the week or earlier in the day?

Whereas before in the afternoon I am nervous, but it comes and goes in spurts. Now, it's not really any different but it happens more often. No pauses, it's with you all the time to the line.
• And, at this stage, is your self confidence still related to who is in the field?

Yes.

• You'll remember answering a series of questions for me at the Borough Road / British Polys match and I'd now like to ask you to try and think back - to the best of your ability - about that match. These were your % thinking time responses for the five time periods: Would you say that this is a normal % thinking time 'profile' for you? If not, why might there have been a difference?

Yes. I think so. I'm surprised it's as high a week before. That's maybe unusual.

• Why a difference - from normal?

Don't know. Maybe I did it - filled it in at a time when I was thinking about it particularly. In fact, yes, that's when I remembered to do it. You said fill it in at the same time of day to when your race would be, yeah? - Yeah, so maybe that's it.

• O.K. Do you think your responses in general for the Borough Road match were "normal". I mean your reponses to the questionnaire?

Yes. Yes, they probably were. I think they were pretty typical. Certainly my approach or whatever was typical on the day, in that I was telling myself to get aggressive - you know, not to get boxed, not to get bossed about.

• Do you think you can think back to your thoughts on each of the separate stages? Can you remember what your thoughts and feelings were?

A week before. I don't really get anxious or get negative thoughts unless I've been running badly in training or I've been injured. Then I do worry about letting myself down or being made to look stupid. I've been going well lately though so I was fairly positive a week before Borough Road. Two days and a day before things were pretty standard. I remember thinking that I was looking to get in the first three and with a pace maker a 3:45 plus was on the cards. Two hours before, I remember I stuck to my routine. I find that if I concentrate on the things I've got to do and I stick to my routine then I'm usually O.K. The only slight change to normal was doing the questionnaire!

• Physical state?

My nerves were pretty normal as well. I get butterflies before every race. I get more of them perhaps for the really big races. Yeah, of course I do, but the gradual build is the same, yes.

• And it was for Borough Road?

It was for Borough Road. With Chris and Dave in the race it's always likely to be fast so I had to get up for it in the usual way.

• It's interesting, based on what you've said, that your cognitive anxiety scores, that's the worry or concern element, are pretty secure - they don't change much at all - and they're also fairly high, which in view of what we've just talked about is interesting. Any comment on that?

Could you say that again?
• Well, things like concern for the race from the questionnaires were fairly high and yet you've talked about not being worried a week before and only very marginally worried two days before etc. You've agreed that your percentage thinking time scores increased as the week went on so I was wondering if you knew perhaps why your cognitive anxiety scores from the questionnaire stayed the same - because that implies that any anxiousness you experienced remained the same. Have I explained that better?

I think so! but I wouldn't agree that my anxiety stayed the same. You can't start to compare the state or mood you're in - or not for me anyway. A week before everything is still fairly distant. Yes, of course, I want to do well. Of course I don't want to let myself down - but that's a general thing, the way I am. I'm always keen to do well. You could ask me about the AAA's in July and I'd say I was concerned but that's not the same sort of concern I get on the start line or warming-up. That's a totally different feeling. It's with me all the time. There's no getting away from it.

• Fine. That's very clear. Thanks for your time. That's been a great help.
APPENDIX 11b

Interview Transcripts From Study 3.2

Throughout the following section the interviewer's questions and comments will be presented in normal type-face and the interviewees' responses will be presented in bold type-face.

ATHLETE 1

• I'd like to ask you some questions about any thoughts or feelings of anxiety or arousal that you generally tend to have in the lead up to a competition. I'm going to ask you whether there are any stages where you are more anxious than at others and also what form the anxiety takes? So is it mental anxiety, for example, you know, worry or concern, or is it physical anxiety, things like butterflies - or both - or how is your self-confidence affected? That sort of thing. Do you have any questions? Right. Do these feelings or expressions of anxiety vary during the pre-competition period? i.e. are you more anxious or less self-confident at certain times than at others?

Oh! Yes, of course, I am. Totally. My anxiety certainly changes. I mean, it'll vary on how important the meet is - in that I'll get more anxious if it's a big one but I still get more nervous nearer the start, whenever.

• So if we look at specific occasions. Do you generally experience any anxiety 2 days before competing? And, if yes, what are the symptoms?

If it's an important race, then definitely I'm a bit anxious. If its just a mickey mouse event, then no not at all - but before a big one, then yes.

• Can you expand on that a bit?

I'm worrying about not making it. I mean I don't ever psyche myself out - but I definitely worry a bit.

• Is it a particular kind of worry?

It's just on my mind. You can never be totally sure that on the day you're going to be O.K. So it's like a hope that you're going to be O.K.

• How do you perceive this anxiety at this stage? Do you interpret this worry as positive or negative? In other words, do you want it or prefer to be without it?

Probably neither nor. If anything, slightly negative, you've got to say you don't like being worried - because these little, nagging doubts sometimes tighten me up.

• You mentioned tightening up there.

Yes, nothing much though. Across the shoulders maybe. But that only tends to happen when there's a lot of pressure.

• What about physical nerves at this stage? Two days before remember. Do you get any?

No, not really. That stuff comes on the day - but occasionally, yeah, I get butterflies and stuff when I think about it for a while.

• Do you interpret those physical nerves as positive or negative?
If I do tighten up then I just try and think positive and I'm usually O.K. So if I tighten up then that's negative but occasionally I might get butterflies which is like excitement so that wouldn't be negative.

• What is your self-confidence like at this stage?

It all depends on who is going to be there. If I know I'm going to win then, yeah, I'm very confident but if not then not really. In major championships, a lot depends on how I've run in the heat. If my heat's gone well then my confidence is high. In one off races, like the McVitie's then it's not so easy.

• And is that good for you?

Oh! yeah. The more the better. I mean you can be too confident and not treat the race seriously - but it has to be positive.

• If we move closer to the race now. Do you generally experience any anxiety 1 day before competing? If yes, what are the symptoms?

A day before? I suppose it's the same as 2 days before. There's no change there. I've done all my training so just a bit of worry that when I start warming up, I'll feel O.K. That's about it?

• So in terms of how you perceive your 'worry-type' anxiety? - in other words whether it's positive or negative? How does it compare to the previous day?

Same, to be honest.

• What about the physical nerves?

Same goes for physical nerves

• So no real response?

Not at this stage.

• So the same as the previous day really?

Yes. I mean I don't get any. Some people do - but not me.

• What is your self-confidence like at this stage? And how does that compare to the previous day?

Same. To be honest. Unless it had reason to change. Like somebody's had to drop out or I hear that so and so has been going well - or whatever - but no, about the same.

• If we move even closer to the start of the race, now. Do you generally experience any worry 2 hours before competing?

At this stage, I'm probably what you'd call the most mentally anxious, that I get - because I usually start warming up about an hour and a quarter before I race and that tends to help relieve nerves but 2 hours before I'm thinking this is it, come on, this is it and just hoping that I can produce the goods. A lot of the big races I've been in over the last couple of years have been trials with a lot at stake and I know I'm right on the verge of making it - but only if things go well. So I'm worried about that, just hoping I make it. Things about the race come into my mind more often. If I think about the race when it's a long way off then there's no pressure, but as you get closer to it, its more difficult to dismiss any negative
thoughts I might have. And the other thing for me is is that I can sometimes tell
how I'm going to run in the warm-up - two hours before I wouldn't be able to
tell.

• O.K. How do you perceive this anxiety? Do you want it or prefer to be without?

Oh, no, it's negative because I can't concentrate as I'd like. That's why when I
warm up it helps because that distracts me in the way I want to, and I can think
about running.

• How does it compare to the previous times?

Just more intense. Similar, but on my mind much more.

• How would you label it precisely? Could you put a term or phrase to it?

It's a constant battle at this stage - on the big occasions - between 'will I be
fine?' and 'yeah, you'll be fine?'. I sometimes talk to myself in that way. I
couldn't put one word on it though.

• No, that's O.K. That's fine. Do you have any physical nerves two hours before? How do you
feel?

I'm just trying to stay loose and relaxed. I certainly feel that I want some nerves
because that gets me ready but I know that getting too pumped up can leave me
drained on the line. It has before, so I try to keep it under control - but I do get
that buzz which I like.

• How would you label that feeling, that buzz?

It's a sort of anticipation. A wanting to get out their feeling, I suppose.
Butterflies can help - they make me feel gee-ed up which is good. Adrenalin is
good for you. I quite like that feeling. There's a certain type of feeling that I
know is good for me and usually lots of butterflies is like that, providing they
don't get out of control.

• And how do those feelings compare to previous times?

Very different. Definitely. I'm off to the loo about every 20 minutes at this stage!
Everything just feels active. It's that anticipation I suppose.

• What is your self-confidence like at this stage? Any changes in that?

No, like I said - my confidence stays about the same. The only things that might
change it are whether I've a better chance of winning than I did, or than I thought
I did earlier. But that's only going to happen if someone's pulled out.

• O.K. The final stage now. Do you generally experience any mental anxiety 20 to 30 minutes
before competing?

By now, I'm not really anxious. I'd probably say I was restless. A sort of 'get it
over-with' attitude. My mind kind of goes into neutral at this stage. I don't think
I'm actually thinking about much at this stage.

• How do you perceive this 'state' you're in? Do you want it or prefer to be without?
I think I'd almost label that positive because I'm waiting to just let it all go when the gun goes. The hanging around isn't that nice but providing I don't think too much I'm usually O.K. that score.

• What about your physical nerves?

I suppose when you think about it, the nerves you get are supposed to be good. I know my heart rate increases but you need to keep that in check or else you'll waste it. I would prefer that at this sort of time, I'm gradually getting more and more nervous by the minute but I'm always trying to control it. I know when I'm ready. It's a certain feeling I get. Very loose and lots of energy and it really gets me going, providing I control it. It makes me think I'm going to run well. In fact, I know I'm going to run well.

• How do you control it?

Deep breaths and stuff. I know I can't control it totally and I wouldn't want to, but if I think it's getting too much - then lots of deep breaths in through my nose and out through my mouth. It seems to work.

• Are these feelings positive or negative?

Yeah, fairly positive. If I control it, I got too nervous at the AAA's last year and I knew that was negative. I ran like an elephant - really heavy because I hadn't been able to control things.

• Why was that?

Well - they were the trials for Seoul and I think I was worrying too much to concentrate on staying loose. I don't know. Something like that. I don't want to talk about it!

• Has your self-confidence altered at all at this stage? Or is generally the same as it has been throughout?

Yes.

• You'll remember answering a series of questions for me at the Borough Road / British Polys match and I'd now like to ask you to try and think back - to the best of your ability - about that match. These were your frequency responses for worry and for physical nerves: 2 days before your worry response was 20 and your physical nerves score was 12.1 day before was 24 and 17 and so on. Scores range from 9 to 63. So a score of 36 is moderately thinking about the race or moderate feelings of nervousness. So everything about that is quite a lot and so on. Would you say that this is a normal 'profile'?

Well, for a match like that, Yes - but it wasn't one that was crucial for me. It was important in that I needed a good time to show I was going well - so, yeah, I was up for it - but it wasn't like a big event no. In the major championships its very different from just normal meets. In Athens (World Junior Championships) I was just trying to save energy, and I was getting worried about wasting energy because we had 3 races in 3 days. It was stupid, looking back, but that sometimes bothers me in majors where you've got heats and finals. I worry about being able to put quality races back to back.

• Now, can you try and think back to your thoughts on each of the these occasions? Can you remember what your thoughts were?
2 days before:

I think my attitude was - this is a useful opportunity to run a fast time but I'm still training quite hard at the moment so it wasn't on my mind that much.

1 day before:

Similar stuff.

2 hours before:

It's like anything if you've decided to do it then do it properly. The race fitted into my plans so I was up for it, enough. I mean my concentration was good, definitely. It was definitely important that I got a good time out of it.

20 to 30 minutes before:

Just concentrating - thinking a bit about tactics. In big races my only tactic is to stay with the pace and kick if I've got the strength - so there's not much to think about. But in these races I remind myself that a kick at say 600 would do it - that sort of thing.

• These were your direction responses. 2 days before you responded with a score of +6 for worry and 0 for physical nerves and so on. Would you say that this is a normal 'profile'? What about the worry scores?

Yes - for that type of match - because I usually know I'll win and I like winning! They're positive because I know if I get up for the race and treat it properly I'll win and in terms of a good time the competition should do the rest - because Chris or someone will push me to a good time - and basically it's about how I feel in getting that time - so it's a good test.

• And the physical scores? Are these typical?

They probably are.

• That +17 value is very high

Yes half an hour - I felt very good, very light in my warm-up nicely on edge. Yeah, so that was high.

• And the scores seem to be going up as the race gets nearer.

Yes, they got more positive because I knew I was getting closer to the start of the race, so it was more important, or more relevant to my run. I felt good that I was up for it - so it meant that a time should come.

• And it did yeah?

Yeah, not bad. The pace could have been harder off the front - but things are going O.K.

• Fabulous. Thanks for your help and your time. It's really been a great help. Hope things go well at the AAA's.
ATHLETE 2

I'd like to ask you some questions about any thoughts or feelings of anxiety and arousal that you generally tend to experience in the lead up to a competition. I'm going to ask you whether there are any stages where you are more anxious than at others and also what form the anxiety takes? So is it mental anxiety, for example, worry or concern, or is it physical anxiety, things like butterflies - or both - or how is your self-confidence affected? They'll all be questions of that nature. O.K.? Do you have any questions? Right. Do these feelings or expressions of anxiety vary during the pre-competition period? By that, I mean are you more anxious or say, less self-confident at certain times than at others?

I think, well I know, I'm more physically anxious just before I run. The mental anxiety will depend though on how well I'm going.

What will that depend on?

If I'm going well then I'd say that over that time I'm pretty confident all the time and I wouldn't worry much at all.

O.K. so if we look at specific occasions. Do you generally experience any anxiety 2 days before competing? And if yes, what are the symptoms?

Generally? Again, that depends, I think 2 days before I'll only be anxious if I've been injured or I'm not going well in training. Otherwise, I'm probably alright then.

So, if you're not going well what tends to happen?

Just thinking a lot. Just worrying about being strong enough. Wondering whether I'm going to be alright basically. Wondering if I can stay with it - if it gets fast - that sort of stuff.

Does that wondering and worrying effect you in any way?

No. Apart that it tends to drain me. You know, I sort of feel drained. Is that what you mean?

Yes. Fine. So in that case how do you perceive this anxiety? Do you interpret the worry/concern as positive or negative?

Oh, it's bad - not good at all. No. Very negative because I just see myself falling off the back. And I get uptight just thinking about it. I sometimes think its a vicious circle. In fact, I'm probably O.K, but I manage to convince myself I'm not and then, of course, I'm not.

So you see yourself in the race?

Yes, sitting at home. I imagine a fast pace and not being able to go with it, whereas if I'm going well I sometimes feel I could stay with anything. It's weird!

So you obviously prefer to be without those visions. Could you label that state you get in at all?

You never want to be worried because you just see yourself doing badly....probably just the word 'worry'. Yeah, like fretting to yourself. It's like a sort of daydreaming for me.
• What about physical nerves at this stage?

At two days before? No...no physical stuff...like butterflies? No, none at all. If I knew I was going well then maybe just thinking about it might get me excited a bit.....you know. A bit of a buzz. But only very briefly.

• If you did get any physical nerves at this stage would you interpret the physical nerves as positive or negative?

It would be positive because I only tended to get them at that point if I'm excited about the race

• What is your self-confidence like at this stage? And how do you perceive your self-confidence levels?

Yeah, like I said. Completely fits in with how I'm going. You see I'm not usually that bothered with where I finish in some of these races, as long as I'm still improving then that's alright, -especially at this stage, but to be honest, for me the more self confident the better. I know you can be arrogant and so maybe you'll blast off and not pace things well, but 9 times out of 10 self confidence has got to be good.

• If we move to 1 day before competing, do you generally experience any anxiety here?

To be honest, it's the same as 2 days before. If I've been going well then no worries, but if not then I'm trying to stop myself being negative.

• Does that happen quite often?

Yes, I suppose it does. The last 2 winters I've picked up injuries, so I haven't put as much work in as I should, so I sometimes think about that if I'm a bit off the pace now.

• Are the symptoms similar as well?

Yes.

• And negative?

Yes, very similar. You see, if I'm not worried because recent sessions have gone well, then I'm fine, I think 'yeah, it's coming together' and I wouldn't label it because it's neither one thing or another, but so far this year, I suppose I've tended to be negative.

• And physical nerves a day before?

Still none really. Again, if I'm really looking forward to it, then I'll get that buzz now and again, but your butterflies don't come until before.

• What is your self-confidence like at this stage? Any changes at all?

No. I think it's pretty constant between one day and two days.

• If we move onto the day of competition itself now. Do you generally experience any anxiety 2 hours before competing?

Yes, I'd say things are quite different now. Especially on big races. I certainly get a lot of physical anxiety now. I get butterflies a lot. A slight headache. I
Sometimes want to sleep, or at least close my eyes, but I can't because my heart beat's going. Yes, my heart beat definitely increases.

- Do you interpret the physical nerves as positive or negative?

I'd prefer not to get the headache, because I sometimes feel tired and I don't want to get tired, obviously. But the butterflies can help. If I'm worried about losing then it just follows that I'm tense. I get tight in my neck in particular. I try to relax but it doesn't help. If I think I'm going to lose everything seems to get affected. If I'm feeling O.K warming up then I don't usually worry that much. If I'm heavy in my strides then yes, I'll worry a lot, which can make it worse.

- How does it compare to the previous times?

From 2 hours onwards it tends to accelerate slowly, nothing really up till then, but you start warming up and you start to think about how you're feeling and so on.

- So what exactly is going through your mind at this stage?

I'm thinking more about the race itself now. Things like 'stay out of trouble', who to keep an eye on, 'relax your shoulders', that sort of thing. If I felt heavy in the warm-up then I might focus on those thoughts. You see with the winter I've had it's not hard to dent my confidence quickly. The other thing is that on the day I can't settle to anything else. My whole day is geared to the meet so it's difficult to get away from worrying about it. Two days before you're busy with other things so your mind is occupied with them - but on the day I just can't settle or concentrate.

- So from what you're saying this worry is negative and you'd prefer to be without it?

Not necessarily. Sure if you get too much then that has to bad but I have to be worried to a certain extent because without it I don't get psyched up properly. It helps me get focused on the things I need to do.

- Such as?

Things like don't get boxed. Stay loose in the arms.

- What is your self-confidence like at this stage?

It's completely related to how I've felt warming up and how I've gone in the last training session. Whether or not I've beaten these guys or not is irrelevant - because form can change so quickly. I will say though that if I'm feeling confident then everything feels good. I feel comfy about everything about me and I feel relaxed but in a confident way.

- If we focus in on the last stage now. Do you generally experience any mental anxiety 20-30 minutes before competing?

At this stage, I'm thinking 'you'll be alright you know'! Just stick with it and go with moves. You know I'm only really worried here if I've felt lousy in the warm-up. Otherwise, I'm thinking little reminders - 'relax', 'don't get boxed' 'you'll be fine' - stuff like that.

- And physically?
To be honest, it's the same things as I said for 2 hours before. Maybe at 2 hours before, those feelings aren't that strong, but they are stronger now. I'm more aware of my heart beating and my chest lifting now and again.

• Could you label it?

I'd label it as 'on edge', but a nice on edge. It's not an uptight on edge. I think it's a fine dividing line, but usually it's alright.

• So do you interpret the physical nerves as positive or negative? In other words, do you want them or prefer to be without?

Oh. I'd prefer to have them. It's just a stage of preparation you have to go through. As soon as you start (the race) you forget about those nerves. I've run my best races feeling nervous. So although sometimes it doesn't feel too good, I know it's helping.

• What about your self-confidence?

It's fairly neutral, I'd say. I wish sometimes I was more confident, because I tend to run really well when I am, but again that comes from going well before, so I suppose that's obvious. I think it may deep-down decrease a bit. If someone looks good striding and you feel a bit off then I sometimes think 'he looks good, I could struggle here'. But on other occasions it doesn't fluctuate at all.

• You'll remember answering a series of questions for me at the Borough Road / British Polys match and I'd now like to ask you to try and think back - to the best of your ability - about that match. These were your frequency responses for cognitive anxiety - the worry part - and for somatic anxiety - the physical nerves: Would you say that this is a normal 'profile'?

Yes. Probably. Certainly for this season. I'm still trying to catch up from a naff winter. So, at the moment, that's normal. Yes.

• In what way does a bad winter affect those responses?

Well I'm worrying about it a few days before which if I was confident I wouldn't be doing probably. That's all.

• Now, can you try and think back to your thoughts on each of these occasions? Can you remember what your thoughts were?

The thoughts 2 days and 1 day before are all sort of 'am I going to go under 3.55' ? or 'can I go under 3.55' ?, because if I'm going to get down to 3.47 by August, which is a target, then off a fast pace which I knew it would be, then I should be getting near 3.55 and so whenever I thought about it, it was wondering about that. On the day, it was pretty standard. I suppose I was just reminding myself that Heathys going to go 3.43ish so leave him and just don't blow up, just aim for a 3.55, that's realistic. Don't be stupid and try and stay with him. Get pulled along.

• So you've set yourself some specific goals there.

Yes. They kind of change, depending on how much training I've done. I use them (goals) to make certain I do nothing silly and try and run 3.45 because I couldn't at the moment. I'd end up crocking myself.

• Finally, these were your direction responses: Would you say that this is a normal 'profile' for your cognitive anxiety?
Yes, they look about right. I was a little bit worried in the wrong way. I'd raced on Saturday, an 800m for my club and I hadn't felt sharp, so that was on my mind a bit, so that's negative. But I think I'm a bit of a negative bugger anyway!

- What about the physical scores there?

Generally, I would rate my physical anxiety as helpful, unless I felt really uptight. If you're going to run hard for 4 minutes, a bit of adrenalin's got to be good for you!, so yeah, that's why they're up (Somatic Anxiety Direction scores). They get more positive because 2 days before, they're not important, but if you get butterflies and what have you, 20 minutes before, then, yeah, I'm quite pleased, because the adrenalin will help. I got fairly nervous actually. I was definitely a bit worried about running badly. I didn't want to let myself down running in front of the crowd. Occasionally, I'd get a 'you're not up to it' thought but then I'd get rid of that and convince myself I was - so by the end it was just about positive.

- O.K. That's it. Thanks for your help. I hope you keep 'getting there'. August is a long way off yet!

Yeah I know. Thanks!

- Thanks again.
ATHLETE 3

I'd like to ask you some questions about any thoughts or feelings of anxiety or arousal that you generally tend to experience in the lead up to a competition. I'm going to ask you whether there are any stages where you are more anxious than at others and also what form the anxiety takes? O.K. so for example, is it mental anxiety, worry or concern, or is it physical anxiety, which includes things like butterflies - or both - or how is your self-confidence affected? Those types of things? Do you have any questions? O.K. First question then. Do these feelings or expressions of anxiety vary during the pre-competition period? i.e. are you more anxious or less self-confident at certain times than at others?

I'm certainly more anxious before the race - I mean just before the race - than I am at other times. Everything just builds and builds, gradually.

- When you say just before the race?

I mean like 15 to 20 minutes before we're called to the line.

- Fine. So if we get a little more specific. Do you generally experience any anxiety 2 days before competing? And if yes, what are the symptoms?

No, not that early. The race might flit across my mind - but that's about it. And that's always the same. Maybe an Olympic final would be different! but 2 days seems a way away and there's no point getting uptight. I mean, there's nothing you can do at that stage at all. So forget it and get on with it when it happens!

- How do you perceive this anxiety or lack of it? Do you interpret that lack of worry or concern as positive then?

Yes - I'm happy not thinking about it - like I said there's nothing you can do - so if I was anxious and worrying then I'd think that was negative because I'd be getting uptight and not be able to do anything about it. I think it can help earlier in the year, because it gives me a kick up the back-side to get out there and train, but 2 days before the race - no, that would be negative.

- Could you label your mood in relation to the race at this stage?

Good one! Detached perhaps, in that I don't focus in until the day.

- Do you experience any physical nerves two days before?

No. None whatsoever.

- Do you prefer that?

Absolutely, they would serve no purpose if I did experience some

- What is your self-confidence like at this stage? And how do you tend to perceive your self-confidence levels two days before?

Well I always try and be confident. There's no point competing if you think you're going to get beaten. You have to think you're going to win. If I wasn't confident then that would worry me, so it would be negative, definitely, in that situation.
If we move closer to the start of the race. Do you generally experience any anxiety 1 day before competing?

No, very rarely. No, never. It's pretty similar to my attitude two days before, whatever the circumstances. I never worry really, I just say "go out there and enjoy, give it your best shot" kind of thing.

How do you perceive this anxiety? Do you interpret this lack of worry and concern as positive again? Do you prefer to be without it?

At one day before? Yes, absolutely. I can't see anything to be gained from worrying at that stage before a race. Providing I don't go out and train too hard and go to a party or something because I couldn't be bothered. Then I see no benefit in worrying the night before. It would only cause me to lose sleep.

And physical nerves? Any?

No, none at all.

Similar to the previous day then?

Yep, very similar.

Self-confidence at this stage? Any change?

No.

Now - the day of the race itself. Do you generally experience any anxiety 2 hours before competing? and if yes, what are the symptoms?

Yes, but I wouldn't call it anxiety. Anxiety is where you just get gripped and you can't run. You're worried about the others and you feel heavy and just run badly. 2 hours before, I think about the race a lot, but that's different. I sit down and visualise. I visualise the start, the first bend, I feel myself running hard, but relaxed. I feel myself go with every surge and so on. That sort of stuff. If I feel I need to run some kind of tactics then I play that through and that helps. I must admit my preparation like that tends to go well. I can never blame lack of thinking about the race properly as an excuse. Very occasionally, if I've been sluggish in training then an occasional negative thought might get in. But that's rare.

How do you perceive this mental 'activity'? Do you interpret it as positive or negative?

Positive. Yes, definitely - because it shows I'm in gear and want to run well.

How would you actually label it?

Concentration, I think. Good concentration. Shutting out all the irrelevant stuff - like noise and the other runners.

I'm interested that you say they're irrelevant

Well because at the end of the day if I've given it my best and I've run well then that's all I can do.

How does it compare to the previous times?

More focused. In fact, it's very different because before, until about three hours before, I didn't think about the race at all. Everything happens more often. Two
days before, a negative thought might (his emphasis) creep in and then be gone - but on the day, or just before I run they're (negative thoughts) harder to get away from. Although that doesn't happen to me often.

- Physical nerves?

Yes, I get the physical stuff now - like butterflies and my head goes a bit light, when I see myself in the race, when I'm visualising or when I feel I need to 'put the gas on'. But otherwise, I'm just staying calm. Two hours before is still a long way to go, there's no point getting hyped then. When I get the butterflies when I'm visualising, then that is very positive because that shows that everything is geared up like it should be.

- What is your self-confidence like at this stage?

Pretty much the same as before. I think my confidence would only ever change if I felt like death warming up. So it could probably fluctuate as late as when I'm warming-up. If I don't feel too sharp warming up then that might affect me. Well, it does for sure. It affects how I run. If I feel good then I'll hit the front early and drive it. If not then I'll probably sit back and hope I have a kick left.

- And now to the final stage. Do you generally experience any anxiety 20 to 30 minutes before competing?

That time 20 minutes before is very important for me. When I'm doing my strides, I'm just imagining myself striding past people in the back straight or the home straight - staying relaxed. I'm gradually building myself up. Geeing myself up - getting more and more into it. I respond to the pressure.

- You said you respond to the 'pressure'. Can you expand on that?

Yes I definitely need some (pressure). I need some kind of spur. I've run badly before in low key meets because I just didn't get up for it. If I feel a little worried at this stage then that's a good sign - unless I start panicking and then that's no good - but that's rare.

- How do you perceive this anxiety in terms of positive or negative?

Very positive. Has to be. I can shut out things when I have to.

- So how does this compare to previous times?

I'm narrowing all the time. Whereas before I might have been thinking 'O.K. let's go', now it's 'Good start, leaders shoulder' - specific things I tell myself.

- What about your the physical nerves at this time?

I'm conscious that my breathing has increased. What else. A bit light headed and butterflies.

- How do you perceive these symptoms?

Very positive. Much, much happier with them than if they came earlier. The 800 is an aggressive event. You make a mistake and it's all over. When the pace is cranked up, you need to react and be ready for it. If I'm pumped up then I'm ready to respond normally. Without it I'm lethargic.

- How does this compare to the previous times we've been talking about?
Just more often - probably no more severe than 2 hours before, but more constant, if you know what I mean. They're there all the time. Not sporadically.

• You'll remember answering a series of questions for me at the AAA match and I'd now like to ask you to try and think back - to the best of your ability - about that match. These were your frequency responses for your mental anxiety and your physical type of nerves. The frequency scores range from 9 to 63 - so a score of 36 is moderately frequent. Anything above is increasingly quite a lot. Would you say that this is a normal 'profile'?

So 9 is the lowest score possible? In that case, yes that's fairly normal. My thoughts at those first 2 times is nothing, other than occasionally thinking ahead to the race. That's natural because you're not training and you'll want to get an early night, so it's on your mind abit - but apart from that, nothing. On the afternoon before, I'm was doing my usual visualising bit. Seeing myself staying with Ikem, not letting him get away. Feeling strong, despite a fast pace - which I knew it would be. That sort of stuff.

• You've kind of answered the next question already. It relates to your thoughts on each of these occasions? Can you remember what your thoughts were? In a bit more detail?

Certainly, no thoughts really as I said, at those two (2 days and 1 day before). Two hours before - being strong, being confident, getting organised early. That's about it.

• O.K. Finally, these were your direction responses for both cognitive and somatic anxiety: Would you say that this is a normal 'profile'?

Yes, about right. The AAA's was a big one. I mean, it was for me, because of who was in the race. I've basically got to get my act together if Ikem is in the race or else he'll make me look silly. So, I always treat races like that as a chance to have a pop at him. It's natural for the physical one to increase because before its fairly nonexistent at the start so it's neither nor then. I felt quite good warming up. Quite lively. I was looking for a fast time and I was happy with how I felt. My psyche was good. They had a couple of guys I wanted to beat and so I needed to get aggressive. So the nerves I got helped. I can remember just saying to myself, 'I can stay with the heat. I can stay with the heat'. It's a phrase my old coach used to say, 'let's turn up the heat'. I knew there was a pacemaker in, so it was always going to be quick. Saying that made me feel good - so that was positive; definitely.

• O.K. Excellent. That's been a great help. Thanks very much
APPENDIX 11c

Interview Transcripts From Study 4

Two complete transcripts for all four subjects have been included in this Appendix. For each subject, the interview proceeding Game 1 has been chosen. In each case, the second transcript that is reported is the interview that followed a Game that formed an intra-individual contrast to Game 1, in terms of quantitative responses and/or objective performance score.

Throughout the following section the interviewer's questions and comments will be presented in normal type-face and the interviewees' responses will be presented in bold type-face.

SUBJECT A: (Game 1)

• O.K. let's get going. Tuesday night's game, then. How did it go ? How did you think you played ?

Not too well. We played badly, really. We weren't good at all. I don't know why - maybe it's because we're still getting to know each other.

• What about yourself ?

I didn't play well either, no. I turned the ball over too many times and I was rushing everything.

• So it was turnovers you were particularly unhappy with ?

Yes, and I didn't shoot well either. The first couple missed and my confidence bombed.

• I move onto your feelings before the game, now. How did you feel before the game ? If I backtrack, a few days before, to what extent were you thinking about it then ?

Oh! quite a lot. I'm keen as hell at the moment. It's all new and exciting and I'm just looking to get out there.

• So what about your feelings closer to the game. You'll appreciate that the first questionnaire looks at different aspects of thoughts and feelings that you experience before a game.

Yes

• So, I'll ask you what were the kind of things that were going through your mind at that stage, 20 minutes before the game ? What were you thinking about ?

I can't wait to get started. I did feel a bit tense, a bit nervous, especially as it was a big, important game. But most games I feel a bit funny - just waiting to get on and play.

• Can you be more specific ? If you remember, some of the questions were about concern or worry - think about that - you scored quite high on that. What were you thinking about ?

I always worry about whether I'm going to play well or not - it's my own performance - I don't worry about the team. I take that for granted. I worry about whether I'm going to play well and if the shots are going to go in.
• How did you perceive that worry/concern? As good or bad for you? Do you feel you need that or not?

I think I need a certain level. I think it's to get me psyched - it gets you aware and ready to play. Yeah, I think there should be a bit of that that will help.

• You scored +2 on that scale. Would you agree with that? Is that about how you felt on Tuesday? So that's marginally positive.

Yeah. About right. I didn't feel that good but I know I need some to get me psyched up. Yeah, sometimes I think 'yeah, I'm a bit worried, but it's difficult getting psyched up otherwise. Other times I think it is detrimental. I could definitely have felt happier. Like I said I was too uptight about doing well. It was good in that I knew it meant that I was going to give it everything and hustle and all that, but I wasn't loose. I was thinking too much about how important it was to show them what I could do instead of thinking about how I could do that. I wasn't thinking about the right things.

• Can you think back to your mental state last week and compare it to last night? Were you less worried or more worried?

I think I was more worried. I was probably too uptight before the game. I wanted more than anything to do well. I was just waiting for my chance and was hoping that when it did come that I'd be up to it. I didn't relax when I got in and in the end tried some stupid things that weren't on at all.

• Did you perceive your worry/concern this week to be any more positive or negative than last week? If so why?

Well, I can't really compare last week's game because it was only a friendly and Chris wasn't there, and they were useless anyway. But we knew, whoever it was, were good. So it was different.

• Any knock on effect on your performance - might it affect one part - but not another?

I've never really looked at it.

• I wondered if you ever thought that what's going on in terms of your thoughts and feelings before a game - does it make you shoot well or not read the game well or not pass well.

No - it isn't easy to see.

• Moving onto physiological arousal - again you scored fairly high on that. How did you feel physically? What were the kind of physical reactions that you were experiencing in the changing room 20 minutes before a game?

Yeah, I was ready to go. I'm always ready to go. I feel full of energy. I start running around. Basically, it's that feeling - get out there and play and get on with it. I don't like standing around. Outwardly, I don't show that I'm pumped up, but inside I know I'm ready to go out and give it everything.

• And you felt like that on Tuesday? Lots of energy?

Yes, I'm always ready to go.

• And do you perceive that as good?

Yeah.
High arousal is positive then? So the fact that you're pumped up, you prefer it that way?

Yeah. I think you can go over the top, but generally, yes.

So if you weren't that pumped up, you'd feel the need to be?

Yeah. I'd feel I'm not quite ready. There have been a couple of times I haven't felt that well - but ten five or ten minutes into the game I start to get really into the game. It's taken me a few minutes because I haven't been feeling right before the game.

O.K. Got it! As a matter of interest though, before Tuesday night's game, you rated yourself as - I on the positive/negative scale for your physical state and yet you scored quite high in terms of the amount. Can you explain that?

It was high, yes. I think perhaps Tuesday was a little different. It meant I couldn't quite settle. I prefer to be up and bouncing around but wasn't quite right. Something wasn't right. I think I was too keyed up.

It's just that from what you've said I expected you to be a little more positive?

Well I am pretty positive, normally. I wasn't that unhappy with how I felt. I had some -3's in there though - because to have clammy hands is not good for basketball. I don't like feeling too uptight either. But some of the other things - what is there?

Sinking stomach, increased heart rate.

Yes. You see - they're good. I'll have some of that!

O.K. I've got the picture. Thanks. Now, how did you feel on Tuesday as far as your own self-confidence?

Not that good. I felt I had to go out and prove I could play. I wasn't that confident because I knew they were good players and because I'm not settled yet. If I get settled then I'm sure I'll be O.K.

Is that because you're new here then?

Yeah. being a fresher - back at home I've played for a team for a couple of years now - I just go out and I'm fine, full of confidence because I know the players. I know my game and everyone knows what to expect from me, whereas here coming in my first term and when you get out on court you feel you've got to prove what you can do. The other thing is that I've not been playing too well in training - it helps my overall confidence if I've done well in training, because the others guys will have confidence in me.

That's reflected in your answers to the questionnaire. You scored 17 on the self-confidence scale which isn't that high. So, the next question is how do you feel about that level of self-confidence?

I'd want it to be more. The more self-confident the better I tend to be. You can get to the point of being too self-confident, but I don't think I've ever got that self-confident. I'm more confident against teams that people think we'll beat. I'm a bit more self-conscious against teams that are going to be tough - like Tuesday. I get a bit more anxious, a bit more worried as to how I was going to play - letting the side down if it's going to be tough.
Did that affect you mentally or physically at all?

Oh, yes. I'm more physically nervous if I think we're going to get beaten. Sometimes at the start particularly, I get butterflies or whatever you call it - if it's going to be a close game I do tend to get that more often than not.

Is there any part of your performance that is particularly affected by your level of confidence?

I haven't really thought about it. I've thought about the questionnaire and after I haven't really thought about what I do at all. I think I shoot better but that depends on sinking one early in the game - not necessarily how I feel in the changing rooms before.

O.K. Fine. I'm now going to ask you some questions specifically about your mood. I know some of your answers may be similar to the comments you've just made, and I apologise for that - but I'm not specifically talking about anxiety. O.K.? What was your general mood like in the changing room?

Expectant. Raring to go. I wanted to get out there and warm-up. We only have a short warm-up so I want to get out there and make the most of that.

How much energy did you feel you had? So how alert or sharp did you feel?

Very alert. Yes, I felt lively as well.

Did you perceive this as positive or negative?

Very positive. Sometimes I don't always feel that sharp. But if I do then it's positive.

Did you feel heavy, tired or lethargic, at all?

No, not Tuesday. I have played when I've felt tired. My legs had been aching the day before - so that makes you feel a bit lethargic - but that only happens on odd occasions. I'm usually well prepared.

How did that affect your performance? Not feeling tired.

I don't think about it that way. I only notice when I am tired. I often think that I was a bit slower that game on defence or I could have had a steal a couple of times. Yes, it affects me more in that way - if I'd been a bit quicker, I would have got that.

What about tension and relaxation. How relaxed were you? Did you get tense?

Yeah, not tensed in that the body tenses up. I get anxious rather than tense.

What's the difference between the two?

I don't know. I'm just anxious about the way things are going to go, what's going to happen. I don't tense up in the body - I just feel worried now and again - that's the way.

And it was like that on Tuesday?

Yeah.
• Did you feel calm and relaxed before the game?

Not before the game. Sometimes during the game - especially when we nudged in front. I only ever relax if we're winning easily and everyone's laughing and joking.

• How do you perceive the fact that you can't relax before a game?

Sometimes I wish I could be a bit calmer. But if was too relaxed then I couldn't get psyched up and I need to get psyched up if I'm going to play well.

• O.K. Good. Coming to the end now, can I ask you when did you start thinking about the game? Do you think about it all day or do you just switch on half an hour before.

I think about it occasionally during the day. I don't really start thinking about it until I'm in the changing room. It's the waiting around. If we're supposed to meet at quarter past six and I'm there at ten past waiting, I start getting anxious. It's that time really.

• Fantastic. That's been a great help.

SUBJECT A: (Game 6) - Contrast to Game 1: Best objective performance as compared to worst objective performance.

• Tuesday night's game then. Any general comments? How did you think you played?

I was pleased again. Yeah, it's going well at the moment. I really feel I'm contributing now - not just making up the numbers. I'm getting loads of court time.

• Anything in particular going well?

No, all of it really! I know that sounds big-headed. But I find that if I'm feeling good then everything seems to go well.

• So Tuesday then, let's talk again about what were you thinking about?

I was thinking totally about how well the last game had gone and how I couldn't wait to get out there. I was thinking that I'm going to show them it wasn't a flash in the pan. That that's the way I always play.

• You scored 27 on the 'worry' scale, which is the same as it's been throughout. Was is about the same?

Yeah, there's no difference. I always treat each game the same. I obviously want to win them all - but for me it's still important to get pumped up for each game. I haven't established myself totally yet - I've got to keep playing well - so I keep getting the chances. I want a regular starting five place, not just now and again. So, I've got to get out their and keep doing it.

• And you perceived it as +7 which is the most positive that you've labelled it?
I'm feeling happier in myself before the games. The one to four scale is always going to be similar unless it's a joke game, because I want us to win and I'm always that little bit on edge as you know. But because I'm feeling more confident it easier to feel more positive about things.

- Can you think back to your mental state last week and compare it to last night?

Very similar, Austin. It was similar to last week but I was pretty positive last week as well.

- O.K. so the next question about relating that 'worry' to aspects of your performance - do you think it influenced any part of your game at all?

Yeah, I think it's all wrapped up together. In the early games I was worried about performing well - about doing myself justice, making certain they thought I was worth it - and so I was worried about that. That kind of feeling changed as I felt I got to know everybody better, because the team spirit is great. I got accepted and like after the last game they'd say "S.... playing well" and so I started to feel better. That doesn't change my attitude at all. I still wanted us to win so I still scored high because I really want us to do well. So it changes in a way.

- O.K. Moving onto your physical reactions before Tuesday's game. How did you feel?

Pretty normal. Some butterflies. Quite a lot of adrenalin because I was looking forward to it so much.

- And did you start to get that adrenalin at the same stage as usual - in the changing rooms?

More or less. Perhaps I got it on occasions earlier in the day when I was thinking about it. I remember thinking about in the middle of a management lecture in the afternoon and getting really excited about playing. I think that excitement is because I'm playing well and I want to play so much.

- So what are you trying to say about you management lecture?

Not a lot. It wasn't that bad actually!

- You scored +2 on that scale. Would you agree with that? I mean it's the most positive you've had it, but only just. Is it the same as usual - you're fairly positive generally, but ..?

Yeah. I felt good. It was about right. That clammy hands. Again, I have to put -3. I think I changed my answer on the 'feel tense' - it wasn't so negative.

- Why?

I didn't feel in a negative mood about anything. I think I was trying to show you that yeah I'm in a good frame of mind here. I was nicely keyed up and looking forward to it. I remember thinking the changing rooms were a bit warmer than usual. Maybe because it's colder outside they've turned the heating up and that meant that I got a bit too warm and almost a bit sleepy. So it wasn't as positive as it should have been. But by the time I started warming-up in the gym I felt lively again.

- Now onto self-confidence. How self-confident did you feel before this game?

Good. As high as it has been. It's all down to how I felt coming from the last game. Chris had said that he thought I'd played really well and from him that really means something! He doesn't normally pick out individual players - so that
was a real boost. I'd felt good in training on the Monday - so yeah. I mean it wasn't very high because I'm just not that type. I always have some doubts but that's always bad.

• In what way is that not necessarily bad?

I don't mean it's good to have doubts - I meant that if I'm not too confident it keeps me realistic. I don't get overambitious and make silly shots or take it too far. But I would prefer to be more confident.

• But the fact that your confidence is up a bit - is that why you perceived it a bit higher?

Yeah. But I still lack a bit of confidence before the game - because every game is a new one - and you don't know what's going to happen. I would prefer though to feel even more confident before I start, because I know it helps me so much.

• Can you relate this level of 'self-confidence' to aspects of your performance?

I know people could say that I've improved because I've been playing a lot and we're playing well as a team now, but last night was all about confidence. By the end I didn't think I could miss! It was just one of those things when you get on a hot streak - you just keep going. I feel a key member of the team now.

• To finish with then, those questions on mood. How much energy did you feel you had?

Well in the afternoon and on the way to the game I felt very lively - but as I said those changing rooms were a bit stuffy and it made you drowsy - because we're in there for a while with the badminton going on.

• But your response was very similar to all your earlier ones.

Oh yeah. I was fine - still lively. A bit of fresh air and I was away again.

• So you felt a bit lethargic?

Only very briefly - and it didn't play on my mind at all. I mean it wasn't tired like aching legs or from playing too much - it was only very brief.

• Can you remember feeling uptight or tense?

No, I was pretty calm. I was definitely feeling less tense because I'm more comfortable in the team. It's the same as I've been saying, but now I feel under less pressure and so any tenseness I got - that was negative tenseness - was only in the earlier games.

• How does that affect how you play?

It's all about my confidence again. If I'm not tense I'll do it instinctively without thinking about it. If I think about it that uses up time. At this level if you hesitate, you get buried. But I know I can cope at this level. I'm good enough to cope and play well.

• Well, that's good news. Keep up the good work. Great. Thanks again.
SUBJECT B: (Game 1)

- Before we start, any general comments about the game last night. How did you think you played?

Me personally, or..?

- Yeah - or the team.

Well, I thought we were pretty awful, going on diabolical. We just panicked under pressure. But it's gone now, so - hopefully we've learned from it.

- And yourself?

Not so good. I'm certainly not shooting well and some of my decision-making was ropey. I think I was a bit generous with that rating I gave myself after the game. On reflection I made too many mistakes.

- O.K. This may prove painful then but I'd like you to think back to how you felt before the game last night.

Sure. It doesn't matter. I'm over it now! I didn't feel too nervous - I rarely do unless it's a very big game - usually I feel fairly relaxed.

- So last night was fairly typical in that sense?

Yes. It depends on who's going to be there - in the audience - in the crowd -if it's a UAU game, the finals - with the selectors there to pick UAU teams - so it depends on who's there as much as what happens on court. It also depends on if you've been playing badly recently - then that makes me nervous - if you've been playing well recently then you feel more relaxed.

- O.K. That's fine. So if I specifically talk about the confidence element, the worry side of things and the physiological arousal separately. We'll go on like that O.K. Your worry score was very high. Is that a fair reflection and if so is that usual?

Yeah. I don't tend to get clammy hands and butterflies in my stomach, but I do worry about us winning. So I do worry a lot, yes - and last night was definitely like that. They're a good side and without 'Ropes' we were always going to struggle.

- So, what were the kind of things that were going through your mind at that stage, 20 minutes before the game - when you filled out the questionnaire? What were you thinking about?

I'm always thinking about the game a lot. What's going to happen, that kind of thing. I'm concentrating on how to perform better and worrying about it. It'll be things like 'are we going to win?'; 'what am I going to say to them before the game?'. Telling myself what I need to do. So still not so much butterflies and clammy hands but more thinking about what's going to happen.

- That brings me onto the next question about the next scale. How do you perceive that? We've agreed that you tend to worry quite a lot?

Yeah.
• So the actual score that was so high is definitely a true sort of picture

Yeah.

• So is it good or bad for you?

No, I don't think being worried matters much at all. Not thinking about the game in the way I do. The only time that things would affect me are when I'm very nervous - physically - which is not very often.

• So it tends to be positive?

Yes. It's good. The thinking about it is good. I don't think of clammy hands, butterflies and feeling tight and tense and so on, is necessarily advantageous - but concentrating on how you will perform in the team, concentrating on how to perform better and worrying about it. I find that kind of concentrates you.

• O.K. Sure. So, thinking about the actual worry for a moment - worrying about being captain and people watching - do you tend to think that this is positive?

Yeah. I'd say it's positive. As long as - it can get out of hand if you worry too much and you're thinking of what is going. But generally it's positive.

• And in relation to last night that was the case?

Oh! before the game it was good last night.

• In what way precisely - sorry to labour the point - but do you think you could put a label on it?

It switches me on - gets me concentrating. That's it really.

• Fine. Fine. Thanks. Now how did this effect or relate to your performance. Does it in any way? Is there an aspect of performance that appears related to this worry aspect in some way? or not?

Yes. I find I play better if there is pressure on me. I do play well if there is pressure on me and people are watching. I find that my game isn't necessarily central to scoring points - it is more centred around defence and control. I feel that I want to be in control of the game, not just because I'm captain but because of my position. I know I can control it from my position. I find it kind of concentrates you, especially the defence - because it's all concentration and peripheral vision, and that goes better when I'm anxious or worried about it. My shooting can go out of the window but the other two tend to improve.

• That's interesting. So what about the game last night. What might you put that down to. I mean your score was very positive - so it wouldn't appear that you didn't play too well because you were too anxious.

No, I felt pretty good before the game, that's why that score is probably so high. I was certainly very anxious because I wanted us to win so much - you see it's different when you're captain, winning almost becomes more important - but I was still happy before the game because I was so looking forward to it and getting the season going and so on. I think I played badly because I threw that air-ball early on and I let that get to me as well as their guy hitting everything in sight. That didn't help, so I guess I panicked. He was very good. To be honest I couldn't handle him.
• Now what about the physical stuff. You've talked about it already. Your response last night wasn't that low.

But it's not as great as the worry. I'm not usually aware of it. I suppose I was a bit last night because I was a bit more nervous that usual, because I want us to start the season winning. It's much easier being captain of a team that's winning.

• So you're usually aware of physical nerves?

It's only important if I get too sweaty, but otherwise I don't think it's important at all. Because once I get going I'm too busy thinking about the game. I call most of the plays so all my thoughts are busy with that, so I'm just not aware of what happens to me in that way. In that way, it can't be important.

• How did you perceive those bodily symptoms? I mean on the questionnaire you scored -2. Is that because you were aware of them last night?

Yes, normally, I never really think about what my body itself is doing. If I'm very nervous and my hands get very sweaty then I would say 'yes, this is bad for me' - especially as I get sweaty anyway. But normally I don't tend to think about it at all. I'm too busy thinking about other things!

But last night I was definitely too nervous and I prefer to be calmer. I actually had some butterflies. The fact that I knew I had some and so on meant that I was being distracted from what I was going to say to the boys. So that's probably why it was a minus. It was strange because I was in a good frame of mind but I was put off a little because I don't normally like butterflies.

• So butterflies are negative?

Yes, normally. I suppose if I think about it, the time when I get most tense is the UAU's but even then it can be positive in that you get on court and you just sort of explode. The tip-off goes and you just go bang - it is the releasing explosion of the tension and nervousness. I think that's why I don't bother about my physical side too much because as soon as I get on court everything goes. But the sweaty palms is a bit of a problem - especially with me because I sweat buckets.

• Good. Self-confidence. Your self-confidence score wasn't that high. Would you agree with that? How confident did you feel before the game last night?

Not too much. I think it was because it was our first proper game and I wasn't sure if we'd win and I really wanted us to get off to a good start. Because I'm captain, I kind of answer those like it was the team - and then you know why things didn't go too well. Maybe, I was thinking about the team too much.

• So you'd agree that that value was an accurate reflection of how you felt last night but was last night particularly different?

Not that different. I'm not a particularly confident player out there on court. Last season I was quite worried about that - about my self-confidence. I didn't play during any of the trials and stuff - and a lot of the people on the sidelines who hadn't been picked for the first team squad and they hadn't seen me play before and I'd been the person standing out at the front with the whistle and ordering them about and my self-confidence was quite low and I was tensed up shooting and catching people's eye in the crowd and thinking, you know. But so far this year it's been O.K. so far although we haven't been stretched yet. But I'm more accepted in the captain's role now and so the confidence is better.

• What about in the changing room before the game - that 20 minutes before tip?
I never feel really self-confident in the changing room - it's the shooting side of things - quite a few players take the scoring sheet and jot down their points - say 26 or whatever. I'm five or seven or whatever, but I know that my job is defence and to control games so my confidence there is quite good, but my shooting self-confidence can be low.

• In terms of a positive/negative response to this your response which implies it could be higher.

I'm quite happy being in that middle ground, because if I'm not self-confident it means I feel I have something to prove or I have an improvement to make I can, therefore, go out and concentrate on that improvement. At the end of it if I've done something better then that's an improvement. But I never go out on court feeling really self-confident but I don't see that as being negative at all.

• The final set of questions I'm going to ask you are related to your mood. I know some of your answers may be similar to the comments you've just made, but I'm not specifically talking about anxiety. O.K. Questions related to that second part of the questionnaire over the page. How much energy did you feel you had?

So how alert/sharp did you feel?

I didn't feel drowsy - I felt quite energetic and that's usual.

• So you had no feelings of tiredness?

No

• What about tension?

I felt mentally tense but not physically tense.

• There's a distinction there?

Yes. Physically tense is where muscles feel tight and so on - and I don't tend to get that, whereas mental tenseness is positive. Intense is probably the word I'd use - when you're right there, concentrating.

• Relaxed? Calm? Were you?

No. I think if you're too calm or relaxed then you're not concentrating. It might make you complacent and you're not focussing on what you're going to do. Calmness I wouldn't feel too bad about because that's physical. Relaxation is more of a mental thing and I wouldn't want to be too relaxed.

• Super. Thanks for your help.

SUBJECT B: (Game 5) - Contrast to Game 1: Best objective performance as opposed to worst objective performance; most positive perception of somatic anxiety as compared to least positive perception.

• So what about last night's game. Were you happy with how it went?

Yes. We're playing well at the moment and stringing some good performances together. That's been the pleasing thing - whereas at the start we play brilliantly
one game and then terribly in the next - we've now managed to put some wins together.

• How about yourself?

Yes. I was pleased with my own game last night. I hit some outside shots for a change, a couple of important steals. All in all I was pleased. I gave myself a five and I don't think I've done that yet. They've all been fours until now.

• Yes, you're right. Any particular reason.

I gave myself five because for the first time in a while I sunk a couple of those outside shots. Although I'm not out there to do that - it obviously helps us if I can. It takes the pressure off Andy or Chris if I can do that.

• So, if we turn to your mental anxiety score - it was 30, so again very high and similar. Does that sound about right?

Yes, my attitude's going to be the same. All these games that you do are going to be close. We can't afford to slip up in any of them. I mean we even struggled against Uppingham and that's because our attitudes were poor - I think we had a 'oh we can blow these guys away without even trying' sort of attitude and we were sloppy and deserved to lose. Now if we go into of the games that you do with that attitude we'll get beaten.

• And you're still perceiving that level as very positive.

Yeah. I've no reason not to! It was definitely very positive. I felt that I was in control, thinking very clearly. There were no distractions and I just felt ready. I had no minor things on my mind or thoughts that shouldn't have been there. I was up for it.

• Right. You've just answered my next question which was that before this game you seemed even more positive that usual. You scored +19 whereas last week was +14. A subtle difference but a difference.

Yes, you're right. I was in a good mood! I'm looking at that as being very similar right through, though. Maybe only one game you did, against O'Shea's lot. I didn't feel right there for some reason. Otherwise, it's more or less the same.

• Now, your somatic anxiety. Can we talk about the kind of physical reactions that you were experiencing in the changing room 20 minutes before a game? Because there appeared to be a slight change here as well. You scored 23 on the 'physical arousal' scale - which for you is high. Would you say that's a fair reflection of your physical state last night?

Yes, it was funny. I guess this is something I learned from your study. As I've said before I rarely take any notice of my - how my body feels as such unless it's really obvious and it's stopping me or interfering with my thinking about the game and what I'm going to say. Usually, I'm so wrapped up in team-talks and what have you, that I don't notice.

• So what was different?

I don't know. I think I was more conscious of my body because I was less concerned with my team-talk. Because we've been playing well I haven't had to say much. It's easy being captain to a winning team. I was nervous but it was in a good way. I kept telling myself to be positive and the adrenaline would help me. I was actually really looking forward to the game. By now, I feel more comfy
as 'skips' and so I think it helped. I certainly felt like I had a lot of energy. I was waiting for the tip to go so I could just go 'bang'.

- So was that why you responded +10 whereas in the first interview you did, you reported -2 for the same level of arousal?

Yes. I didn't feel hassled by it. You see if I've ever had butterflies before, I've not liked them because they distract me - but if I'm not thinking too much like last night, especially as Chris was there early, then I might as well use them.

- Use the butterflies you mean?

Yes. I might be talking about different things, but I put a +3 next to sinking stomach because that was the one question that's like having butterflies - and I suppose having them can make you feel lively and want to get out there and hustle and chase - which is a major part of my game.

- O.K. So did these physical feelings and a more positive attitude towards them affect your performance at all.

It may have done - but that might be stretching it a bit to say it was because of that. I certainly did a lot of running but then I always do - but I was sharp. I snatched in and got a couple of big steals and we scored from them, so it certainly didn't do any harm!

- And how about your confidence before the game - in the changing rooms?

Fairly normal. No real change. I felt we were going to win - I felt the attitude was right. They're a good side but we were only likely to slip up against that lot if we thought it was going to be easy, but I could sense the attitude was there. We were at full strength as well.

- Your perception of it was low though - only slightly. I mean your confidence level was the same, yes, at 24, but the direction had come down from 18 to 12. Is there anything in that?

I can't explain that to be honest. It might have been that I was afraid of being complacent, but I wasn't because I knew we were determined. I can't say. Sorry!

- Don't apologise! We'll finish with the questions about mood. You said a little earlier that you were in a good mood.

I was. Don't know why really. I was looking forward to the game. Things are going well, that sort of thing.

- How much energy did you feel you had?

A lot. I felt good. They're not a bad side and I knew I'd be on for a tight game with their captain. I've matched up with him before and done well and I know that some of their team see me as a key player so I wanted to respond to that and play well.

- So that would have been positive?

Oh, yeah.

- How much of a difference does it make having played them before? Last season you mean?
Yeah. They finished third last year. I think it boosts self-confidence. Because we've played them in the past and won is a good sign because there's little turnover in their team. Although our team is young and has changed quite a bit, we're starting to settle down now. If we'd played those guys at the start I may have been worried, but I reckon this team is as good if not better that last year's, so I was confident.

* Any feelings of tiredness at all?

No. There were after, it was a hard game.

* And you got a lot of court time.

Yeah. It was good.

* Can you remember feeling uptight or tense?

No. No real tension

* If you compare your score on this scale to your first you're much lower on the tension side of things.

Yes, that figures. That first game you did I was a bit uptight. I think mainly because I hadn't got that used to being captain and I wasn't playing too well so I felt under a bit too much pressure that way.

* You also seemed in quite a lively mood before the game. Quite relaxed, messing around a bit. I don't mean in a sloppy way - but the general mood seemed very happy.

Yes. You're right. The team spirit is great at the moment. We've done well considering there's so many new faces. I'm pleased with how it's going.

* Good job. That'll do us. Thanks very much.
SUBJECT C: (Game 1)

• I'll start with a general question about Tuesday night's game. How did you think you played?

Terrible. In all the time I've been here it was probably the worst I've played.

• Any particular aspects go badly for you?

I didn't start well - so Chris pulled me off. Then in the second half I was trying to do too much - I just wasn't with it.

• Any idea why?

No. It was just one of those things. Maybe my attitude wasn't quite right.

• I'd like to concentrate if I may on how you felt before the game? A few days before, for example, to what extent were you thinking about it then?

Not at all. I've had too much on to think about it that much and maybe that's been the problem.

• In what way has that been a problem?

Well, I think attitude about a game comes from quietly thinking about the job you've got to do. It doesn't suddenly happen. You've got to carefully and gradually build yourself up for it, and I didn't manage that on Tuesday. But that was particularly bad. I've learned from it.

• What about in the changing rooms that 20 to 30 minutes before tip. Any general comments about how you felt, before I get more specific?

Looking back I felt more anxious than usual - I don't know if that affected how I played - and I think generally I've been a bit bogged down with various things - I felt a bit run down and so on. I certainly wasn't looking forward to the game as much as usual.

• What do you mean by 'anxious'?

Worried - not confident in my ability to play well.

• O.K. So if we concentrate on that aspect then, the worry part, yeah? You scored 23 on the 'worry' scale - which is fairly high - would you say that's a fair reflection of your mental state on Tuesday night?

Yes. I was. Definitely more than usual. It wasn't as I would have liked it.

• Any idea why that might be? More worried than usual.

Basically, I played badly last week and because we've got a few good freshers in this year, for the first time I've been here I'm under pressure for a start spot. I've never not started and I was being stupid and negative about it all. I've been busy and not practised as much as I'd want which is probably why I was so lousy - but I'll sort it out.
But that amount of worry is unusual for you?

Oh yes. I'm not a worrier. That doesn't mean I don't take things seriously - but I don't charge around getting pumped up like some of them.

So this relatively high score of 23 - how did you perceive it? As good or bad, for you. You scored +3 on that scale.

Well, I think in a very important game such a high score would probably have been bad for me. Under normal circumstances I don't like high anxiety because I like to prepare quietly and thoughtfully. The reason why that's a little positive is that I told myself that my feelings had to be good for me because I needed a kick up the bum. I try and be positive at all times. So although I was a little too worried there was some good in it - if you see what I mean.

If we now try and relate that 'worry' that you were experiencing to aspects of your performance - do you think it influenced any part of your game at all?

Shooting maybe. As soon as you think twice about shooting, you've had it. Towards the end I got to a situation of letting it go and hoping - and then it becomes a vicious circle because as it misses it becomes more frustrating. And then you tense up and so on.

If I move onto your physical reactions now. What were you feeling physically in the changing room 20 minutes before the game?

I was a little nervous - but nothing much. I rarely get any feelings of nerves. I think the only reason I felt a bit on edge was because I was a bit worried, like I said.

Any particular response. I mean you scored 15 on that scale which sounds about right from what you've said, but it does show some elevation.

I think the closest you could say would be 'jittery'. One of the questions asks that? I just occasionally get a bit of a tremble or a shiver or I get a bit tense but otherwise I'm fairly calm. I don't get clammy hands at all. It's never totally calm because that shows I'll be slow but nice and relaxed instead.

So on Tuesday how did you perceive those bodily symptoms?

I think they were probably fairly good.

You responded with a total of +5, which isn't that positive.

Yes. I think that score may have been affected by my attitude. I think that my general mood was a bit deflated so I wasn't being as positive as perhaps I should.

If we now try and relate these 'physical reactions' that you were experiencing, albeit somewhat limited, to aspects of your performance - do you think they influenced any part of your game at all? So that feeling of jitteryness did that have any impact?

No. None at all, because as soon as I got out there those feelings went.

O.K. Fine. Now what about you self-confidence. How self-confident did you feel before the game?

Not as much as usual - for the reasons I mentioned. No, I definitely didn't feel over-confident. I scored mainly 3's on those questions which shows, you know,
that I was fairly happy but there was room was improvement. I also think, and this a personal thing and I'm sure I'll be proved wrong, but at the moment it's quite a young side with a few new faces, and I think for games like the last one we need Dave to be playing. He just adds so much experience and assurance. I know we've got to learn to play without him but that will come in time. I think we're vulnerable without him.

And that effects your self-confidence?

Yes, it does - especially when I tend to play well with him there. He can read me well - because we've played together so much - whereas the other guys haven't - that's not their fault - but it's still a factor.

So your confidence must be very high usually?

Yes, I think it is. You have to be confident. The whole game is about confidence. If you're not confident you don't do anything. You don't shoot, you pass it off. You don't get aggressive underneath. You don't drive at people - all sorts.

I'm going to finish with some questions now about your mood. Those were those second set of questions you answered on the questionnaire. Your answers may be similar to the comments you've just made - but I'm not necessarily talking about anxiety here - more your mood. O.K.?

What was your general mood like in the changing room?

I was just a bit down. My work's not going great. A few minor things getting on top of me - nothing major though. I'm just thinking hard for you - bearing my soul.

Nothing goes passed these four walls, you know that! O.K. let's be a bit more specific if you can. How much energy did you feel you had?

Not too much. Maybe that was the problem. I'd certainly felt tired earlier in the day and whereas normally if I'm looking forward to a game then I'll forget it and the anticipation overcomes any tiredness, but this time because my mood was a bit low then I didn't fight any feelings of tiredness.

You perceived this as negative or...?

I suppose I did. There wasn't a scale for that was there?

Can you remember feeling uptight or tense?

Not particularly. No.

Was that positive or negative, then?

That would be positive. If I ever get uptight it would cause me to worry too much. I like to quietly think about my game - go through my routine - concentrate on things I've got to do. I don't want to be distracted - whatever the cause may be.

And finally, did you feel calm and relaxed? I know that's related somewhat to what you've just said - but were you?

I wouldn't call it relaxed. No, I was a little worried. I prefer to be relaxed though because when I get on court I feel good on the ball.

So a feeling of being relaxed would be perceived as positive?
Yes. Providing it wasn't relaxed as in laid-back, but relaxed as in assured - then that's positive. That's the type of frame of mind that I prefer and I wasn't quite there on Tuesday.

• Fantastic. Thanks very much.

SUBJECT C: (Game 3) - Contrast to Game 1: Most positive perception of cognitive anxiety as compared to least positive perception; self-confidence at highest level of intensity as compared to lowest level of intensity.

• Last night's game then. A good win? Were you pleased with how it went?

Yes. Not bad. We're starting to come together now. The last few games everything's beginning to gel nicely. I don't think we've been really tested yet - but if we are, or when we are, we'll be in good shape to handle it.

• And what about your own game. Happy?

Yes, I'm playing alright. I didn't play as well as last week, maybe. Some nice passes, some good drives but I missed too much underneath.

• You grabbed a lot of them back though.

Yes, but against a better side they've got to go in first time.

• O.K. Well if we focus in on your thoughts and feelings before the game, what was going through your mind in the changing rooms?

The fact that I'd played well last week and that I felt I'd re-established my authority and my position in the team. What was good about last week was that people realised that I'd swung the game round for us - and you need to do that - to keep the freshers in their place! So I was telling myself 'go out and do it again', 'go out and do it again'.

• Your actual worry score was very low. Would you say that's fair? What was that like?

Yes, it was. Certainly much lower than that first game you did. As you know I don't often get worried before the game and yesterday was no different. I felt very confident, very relaxed and generally my attitude and everything was about right.

• So just compare your mental state for me - to the first game where your cognitive anxiety was much higher.

That first game wasn't typical. I don't know why I felt like that - I'd just let some niggly things get to me which normally wash over. But things are back to normal now. I felt good about playing so well last week. Practise has gone well. I was keen to get out there.

• So how did you perceive that worry/concern? As good or bad, for you.
Oh very good. I'd much rather be like that. I mean I was relaxed, but still concentrating. I would've thought my score was high on that - positive. Yeah?

- It was +18, which is very high. You were obviously very happy with that state. You filled that positive/negative side in very positively.

Yes, I know I did. There were even some +3's in there, I think. I was very relaxed and looking forward to the game. I couldn't wait to get out on court and I think I felt that that was very good for me. I don't often get that 'can't wait' feeling - that's why it was higher. It gives you time to think in a calm way about what you need to do.

- And how did that degree of positiveness compare to the two previous games?

No comparison. I had some negative thoughts that first game, as you know. Nothing like that this time.

- O.K. If we now try and relate that 'worry' or lack of it to aspects of your performance - do you think it affected or influenced any part of your game at all?

Well it didn't affect it negatively. No, I was in a positive frame of mind. I know I play well when I get like that. The way it helps is if I make a mistake. Whereas in that first game when I made a mistake, I got frustrated and blamed the others and got crabby - but if I'm positive then I can dismiss any mistakes and get on with it.

- Your performance wasn't quite as good as last week overall though?

No, you're right. I must have a look at the stats.

- Sure.

It was a funny game in that I felt I did a lot of good things but things didn't quite come off. I must have made about six or seven great little inside passes in under the basket and we go and miss them. Andy probably missed three that I'd given him that he'd never normally miss. It was the same with some of my drives. I couldn't believe they weren't called on some of them.

- O.K. That explains it. I know Chris was getting fairly irate.

Yes. He's funny when he gets like that. Very entertaining.

- Fine. Let's move onto your physical state before the game. What was that like?

Fairly calm. It was better for me than last week. Last week I felt too relaxed although in the end I played well - but that's because I got into it eventually. I was taking my time getting changed as usual but I had that slight buzz and I knew I was really ready for it.

- Any symptoms at all?

Nothing that's on that list. I've never had clammy hands in my life.

- So how did you perceive this way you were feeling? You said there was a buzz.

Yes, that buzz is positive. I did feel good beforehand, yes. Not nervous, but I was up enough to know that I was into the game. Last week I was too laid-back and it took me some time to get into it whereas the week before I was on edge and
niggled too much. I was much more positive. You need some buzz to make you concentrate and put pressure on in 'd'.

- That all figures. You scored +14 on the direction scale which is much higher than your two previous games. Now, can you say how that influenced your game at all? Did it in any way?

I think it did in that I was busy and into the game right from the start. Last week it wasn't until Coxy told me to get into it - I thought we'd win fairly easily last week, so my attitude wasn't quite right and I was going through the motions a bit. But this week I was much more on the ball from the tip. That's usually a good sign and important for me because very often if I do something right early in the game then it kind of sets me up for the rest of it.

- Right. I can see that. Moving onto your self-confidence. What was that like last night, before the game?

I was confident, yes. I was telling myself that I could do it.

- How would you do that?

I always tell myself before a game to relax. I know I can play well in this game - it's just a case of telling yourself or reminding yourself that you can.

- Do you need to tell yourself to relax?

Not really - I use it because if I tell myself to relax I'm telling myself I'm going to play well, I'm going to be fine.

- Being confident - is there any particular aspect of play that that helped last night.

Yes. My drives. I felt they couldn't handle my drives. That's why I got fouled a lot, although they should have been called more often. At least we got their big guy out of the game. I just had this feeling that I could take it all the way and make some moves - and it seemed to work.

- To finish with then, the questions about your mood. Energy first. How much energy did you feel you had?

A fair bit. I was feeling ready for the game. The atmosphere was good.

- One thing I meant to ask you. Did it make any difference it being a cup game at all? By that I mean in your approach - how you felt?

This is going to sound bad but I didn't even realise it was a cup game until afterwards.

- Yeah?

I know, that's sounds terrible. I'm going to get the spaceman tag if I'm not careful!

- Would it have made a difference?

No, I don't think so. The league's more important to us this year because we didn't win it last year when we should - so, no.

- Any tiredness? Any feelings of lethargy, at all?
None at all.

• Can you remember feeling upright or tense?

A little tense perhaps, but in a good way. In a way that shows I'm ready - it wasn't negative at all.

• And relaxed?

Yes relaxed, but in a concentrating type of way. It wasn't relaxed, laid-back - but a clear-headed relaxed.

• You see, you're not a spaceman at all! Thanks again. That was great. See you soon.
Subject D: (Game 1)

• Looking back to last night's game - how did it go and how did you think you played?

So-So. I thought the team as a whole played alright. I know everyone was disappointed but we played O.K. at times. The first ten minutes was O.K. and we kept it level, the beginning of the second half was a nightmare and that's when we lost it. I went out and I was playing badly I admit, but the others were doing O.K. We'll improve - that was just a bad game for us.

• When you say you played badly - anything in particular not go well?

Shooting outside was abysmal. Yes.

• O.K. I'm going to ask you about some general feelings. How did you feel before the game last night? Did you think about it the day before or just right on the day?

I think on the day itself. It was on my mind quite a bit, though. I didn't turn up when we played Bedford Town at Leyton. There was a lot of traffic and I was one of the late ones. So that hadn't created a good impression so I was thinking about how important it was to create a good impression.

• So, if we concentrate on the time when you're in the changing rooms - that time when you filled in the questionnaire - what were the kind of things that were going through your mind at that stage, 20 minutes before the game? What were you thinking about?

Before the game you think about what the opposition is going to be like. I feel confident that I can play well myself. If there are other things I am not as confident as to what we will be doing - like team plays - then I'll start to get a bit nervous before the game - not much because usually I can relax. I want to go out and enjoy the game.

• If we look back to last night - you reported a score of 23 for what they call the worry part of the scale - that's the mental type of anxiety, not necessarily the nerves - now that was fairly high. Is that how you felt last night?

I wasn't totally relaxed, you're right. I rarely get really, really anxious, but I'd have to say I do get on edge a bit. That's only natural for important games. If it wasn't or you aren't bothered about winning then you wouldn't get worried. I'm always telling myself to relax but it's natural if you're thinking about the game.

• So you were on edge last night?

Yes, I did feel under a lot of pressure. As a fresher, you know, I come here with a reputation - played for England - and I just felt a lot was expected of me and I let it get to me a bit. Instead of saying O.K. let's go! I just let it get to me. I suppose I tried to be a bit fancy but that was because I felt under pressure.

• So did you perceive that level as good or bad for you?

Slightly bad probably. In fact it wasn't good at all. I need some to get me going because I'm a lazy bugger - but it was too much last night. I had too many pressurising thoughts and I couldn't think clearly.
• If you try and relate your thoughts, your worry to your performance, do you think it helped certain aspects of your performance - or hurt certain aspects?

Yes, when you're out there and you start - the first five minutes you've got, you're anxious you want to play well for the team. Because Chris was there - you try and show him that you can play well - to me it's to get my first couple of shots in. But last night it wasn't going in - so you're not shooting so well and things start going through your mind - and if you keep doing it and the shots aren't going in you start to worry more.

• So it changes your attitude to the game?

You've got to stop shooting, which is wrong because you know you can shoot well. If you keep shooting badly it's bad for the team - so you're in a dilemma what to do.

• Good, that covers the worry side. 20 minutes before the game last night any physical reactions?

Not at all.

• Your score on that was very, very low. From what you say that's a very fair reflection of how you felt. Do you see that as being good or bad?

I see it as being good. If you're relaxed, you relax mentally and you can think about the game. Before, you need to be relaxed to think about the game. You might think and worry about who is going to be there - what's the other team going to do - these things cause worry. But if I'm relaxed then those worries don't matter - they don't get on top of me.

• And Tuesday night, despite feeling under pressure, you still managed to remain physically relaxed?

Yeah. I do tend to relax as much as I can. My past history when I was going for England under 15 - everything was too much and I worried about it too much and now I've learned to relax.

• What do you do?

Not worry, if the game is going to be tough. My mum was a great help - if I was worried we'd have a talk - so I would relax that way.

• So if you relate that to your performance - how you physically felt - does that influence any part of your game at all. Do you prefer to be relaxed physically for every aspect of the game?

No. You've got to be on the ball once you get out there. It changes. Before the game you might be relaxed, but once the game starts you know you're going to be in a tough game. A soon as I'm on court I don't want to be relaxed anymore. You get the adrenaline in you going. You've got to pass the ball quickly and you can't do that if you're relaxed...I want to be relaxed before the game so it gives me time to think about the game.

• So the more relaxed you are the better - so it helps you get in the right frame of mind?

Yes. So if I score high on that then it's because I know I'm getting into a good frame of mind about what I've got to do. But relaxed taking shots is no good, because when you're shooting you've got to be focused. If you're too relaxed on court you're too slow and people get in your face and block shots.
• Great. That's interesting. Thanks. Now, what about your self-confidence. Yesterday, did you feel confident before the game?

Yeah I feel self-confident before any game. I know I was a bit uptight and that affected me, but looking back I think the team needs to settle. Nobody played that well really. The other guys don't know my style of play yet and I wasn't getting the screens I wanted - but that will come as we get to know each other better.

• So yesterday, your self-confidence was pretty normal?

Yes - but when I start the game if my first few shots don't go in, you start thinking 'oh Jesus'.

• Is there any particular part of your performance that is dependent on confidence?

Shooting. If you feel confident in yourself then you shoot and you can do well. If you're not so self-confident then you become hesitant and you'd be only half-way taking a shot. But even if you miss you have to try and keep that confidence in yourself when you know you're good.

• Fine. To finish with I'd like to ask you some general questions about your mood. I'm sure some of your comments will be similar but we'll see how it goes. What was your general mood like in the changing room?

Just that I wanted to really go out there and win and show them what I can do. The trials went well and I've gone alright in training but I haven't been really on top form so I need to start showing it to them.

• There are different dimensions to that second questionnaire. How much energy did you feel you had?

I was a bit tight. I felt a bit drained. I wanted to be active but I felt a bit tight in the shoulders. But once on the court I was alright. In the first few minutes the referee got to me a little bit. I lost a 50:50 ball. I think that got my adrenalin going - you know, aggressiveness towards the other team. I think you need something like that to get you going. When you don't feel right you need a punch in the face - not literally, but you need a kick up the back-side to get you going.

• The next thing is tiredness - you said you felt a bit tired.

Yes. I did. I'd had a couple of late nights.

• So sitting in the changing room 20 minutes before did you perceive that as negative?

Yes, but I started to get psyched up for it and that soon went.

• And what about feeling relaxed?

I felt quite relaxed waiting for the game. The longer you wait, the less pumped up you get - you start slowing down until the last few points. You start doing lay-ups and you feel lazy doing the lay-ups, whereas you need to be quick. If you feel warm you don't feel ready for it - you need to be hot not warm.

• So you perceive being relaxed as positive?

Yes, before the game, so I can think straight - but then it changes once the game starts. I've got to be more aggressive.
• Fabulous. That covers everything for now. Thanks very much.

SUBJECT D: (Game 5) - Contrast to Game 1: Most positive perception of cognitive anxiety as opposed to least positive perception; far better objective performance score.

• So what about Tuesday's game then? How did you think you played?

Quite well. Could have been better, but I hit some nice three-pointers towards the end to finish them off. I was pleased. I think I proved a point.

• And yet you only gave yourself a four after the game.

Yeah, well I got so much stick from the lads for giving myself a seven earlier on that I daren't do that again. And anyway they were right, there's no such thing as the perfect game. You never play perfectly well - there's always room for improvement. So - in fact if there'd been a 4.5 I'd have put it in there.

• Right. O.K. If we start with your thoughts again. What were the kind of things that were going through your mind in the changing room, 20 minutes before the game? What were you thinking about on Tuesday?

I wanted to show something, do something. I feel confident in myself, so I wanted to show this time because the last time he didn't put me on. I think he thinks that big game I had - you were there - was a fluke and a one-off. I want to show him I can be like that most of the time - so I was thinking about that. I kept saying yeah, this is the time when you can do a good game and I could see myself doing better than last weekend.

• Why better that last weekend?

My attitude was better. I wanted to do better more - and show them or show Chris that he was wrong to bench me for so long.

• If we look specifically at your worry score. What was that like on Tuesday?

I wasn't anxious. I was eager to get on court and the whole build-up was great. Last night was great before the game. I was very clear - all my thoughts were on the game and not on 'God, I've got to play well here'.

• But you said you were keen to play well - to prove a point.

Yeah, but it was different. At the start I was worried because I knew they'd all be watching me, and if I made a mistake they'd be saying 'so what's all the fuss about, he's not that good'. So I felt under pressure. But now I know I'm better than most of them and I can play well here. I'm really going to show them.

• So how did you perceive your mental state? As good or bad, for you?

Very good. Very positive. That was one of the best things. I could go out there and meet any type of player and I could feel myself going by him. I could see myself doing really well.

• It was certainly the most positive that you've perceived it in the games so far - you totalled +17.
Yeah, I think my overall mood was better. I'd had a good day - I'm pretty happy at the moment and positive about most things. I just felt really good.

- If we now try and relate that attitude or overall mood to your performance. Did it affect your performance at all?

It definitely affected my work-rate. I ran up and down court much harder because I wanted to get my hands on the ball. I wanted to show them I could play like that other game.

- So it made you try harder?

Well, not try harder so much, because I always want to win. But I sometimes drift out of games because I don't concentrate and I think I concentrated harder last night.

- O.K. Fine. That was what was going through you mind. Now - what about - can you remember yesterday, how you were actually feeling - any physical symptoms?

No. I was very relaxed.

- So no increase in arousal at all in the changing rooms?

No. Not at that stage.

- That checks, because your response was 9 which is the lowest possible score in those situations.

But then towards the start of the game I started getting a little pumped up - in the last three minutes.

- Is that a regular thing?

No. I tend to stay relaxed right until the tip.

- So why the difference. I know it's only a subtle one.

I was just so keen to get out there.

- How would you compare that to other times in the season. Any comment on that?

I believe I was more physically ready - and I was more relaxed. This time I was more physically ready. Mentally I was hyped up because on account of what had happened before. I wanted to show them and that's where I think I was more tuned. The other times I may have been too confident myself. I'm now getting to the stage where I'm getting back to where I started. I think when I started here I wanted to show them. I wanted to get in the team and once I got in and played well, I kind of turned down a bit after a couple of games. I don't know why - maybe the fitness side of things. It was an effort - the training. Now my mental attitude is back again because of this dropping me down.

- When you say more physically ready - what's the change, if any, from the other games?

I was gradually starting to get alive. Getting really keen to show something, which I've not had in the last couple of games.

- Now your self-confidence. What about that?
Yeah. That felt good and I felt good during the game. I knew I could work and try hard.

• The more self-confident you feel the more positive you are about it?

Yeah. If you believe in yourself, as I've said before, I believe I shoot right in people's faces.

• Is that the particular aspect of your game which self-confidence helps?

Yeah, the shooting, yeah, it does. If you don't believe you can beat them, you won't.

• What was your general mood like in the changing room? Is it tied to the fact that you wanted to go out and show Chris and so on?

Yeah. The mood was that I wanted to play. I think it was because I'd had a weekend away from the place and coming back and I really wanted to play.

• O.K. How much energy did you feel you had at this stage - in the changing rooms?

In the changing room. At first I felt a bit tight in the shoulders but that soon went as soon as I got active. I felt good. I mean I didn't feel drained like I have done. I've really felt tired before some games - but this time I was ready for it.

• So no feelings of lethargy at all?

No.

• You mentioned feeling a bit tight in the shoulders there - can you remember feeling uptight or tense?

It was because I was there early - well early for me, and we'd been hanging around a bit. I think it was because I wanted to get out there. But I was fine, nice and relaxed.

• Splendid. Just one final question. In view of how good you felt, you said you played quite well. So were you a little disappointed?

No because I proved my point. Apart from Ropes nobody can hit the three pointers like me - not even Andy. So as soon as a few as those go in, I've got to be happy.

• You've got to make certain that happens every week.

Yeah. That's the thing.

• Thanks again. That's been great.
APPENDIX 12
Details of Post-Hoc Tests

Throughout this section the following key will be used in the tables:

M = Males
F = Females
d = day
h = hour
m = minutes
* = significantly different at the 5 percent level

Chapter 3: (Study 2) - Tukey Follow-up Tests

**Cognitive Anxiety**

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Chapter 4: (Study 3.1) - Scheffe Follow-up Tests

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Chapter 4: (Study 3.2) - Scheffe Follow-up Tests

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**Somatic Anxiety Intensity**

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APPENDIX 13 - Correlation Matrix - Study 4
Cog=Cognitive Anxiety; Som=Somatic Anxiety; SC=Self-Confidence; PL.PERF= Pleased with Performance; d=day; h=hour; m=min; l=Intensity; F=Frequency; D=Direction.

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## APPENDIX 14

### Details of Games Played

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<th>Opposition</th>
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<td>Leicestershire League Division 1</td>
<td>Wallace Ins.</td>
<td>73-61 Win</td>
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<td>Gateway</td>
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