DOCTOR OF PHILOSOPHY

Anxiety and performance: cognitive and motivational mediating variables

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Award date:
1998

Awarding institution:
Bangor University

ANXIETY AND PERFORMANCE:
COGNITIVE AND MOTIVATIONAL MEDIATING VARIABLES

Thesis submitted to the University of Wales in fulfilment of the requirements for the degree of Doctor of Philosophy at the School of Sport, Health and Physical Education Sciences, University of Wales, Bangor.

May, 1998

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PREFACE

The current research programme has examined the anxiety-performance relationship in competitive sport using a variety of research methodologies. A 'research training' approach was adopted during the period of study, whereby the research period was viewed as an opportunity to gain experience if conducting research using both quantitative and qualitative methodologies. This approach also seemed appropriate for the study of anxiety, due to its individual nature, and due to recent calls for more research using qualitative designs (c.f. Gould & Krane, 1992). The presentation of this thesis, which is written as a collection of research papers, each of which could be published independently, reflects the research training emphasis that was placed on the research. Indeed, one paper has been published (see Chapter 2), whilst two further papers have been presented at international conferences (chapters 3 and a summary of chapters 5-9). Each of the experimental chapters (chapters 2-10) contain a brief review of the directly relevant literature. Chapter 1 presents a general introduction to this programme of anxiety research, and chapter 11 presents a summary of the results of the experimental studies and general conclusions.

ACKNOWLEDGEMENTS

Many people provided the help and encouragement needed to complete this thesis. Firstly, I would like to thank Lew, my supervisor, to whom I am indebted for his invaluable expertise, advice and guidance during my postgraduate years. I would particularly like to thank him for his patience and skill in guiding me through the inevitable times of confusion (and despair!) and in helping to focus my attention to the process!!

I would like to thank my fellow postgrads. Particularly, Kieran, for not only being the second investigator in the qualitative analysis, but for his belief in me and his support throughout my PhD years. Thanks also to Lynne, for help with one of the data collections and perhaps more importantly for her moral support. Thanks also go to Dan and the friends I made at the University of North Carolina, Greensboro for making my five months there enjoyable and rewarding.

Thanks also to Nicky, for her invaluable friendship and support. Thanks also to Ali and Amanda for their intellectual support and empathy, particularly, for reminding me there is a light at the end of the tunnel!

Above all, I would like to thank my parents for their continuous unconditional love and emotional support (and financially!) throughout my all aspects of my PhD life. Thanks also to Lyndon, who has become a very important part of my life, his understanding, love and support have helped me remain relatively sane during the final stages of my PhD.

Finally, I would like to acknowledge the University of Wales, Bangor and the School of Sport, Health and Physical Education Sciences for funding this research.

SUMMARY

This research has investigated facilitative and debilitative anxiety effects upon performance, additional dimensions of anxiety, and processes underlying the anxiety-performance relationship, using quantitative and qualitative methodologies. The first section of the thesis examined the intensity and direction of competitive state anxiety symptoms and the interactive effects of anxiety subcomponents upon netball performance. Although the facilitative influence of anxiety upon performance did not emerge directly through the direction scale, a significant interaction emerged from the two-factor cognitive anxiety x physiological arousal quadrant analysis of performance, suggesting that anxiety may enhance performance, as proposed by catastrophe models (Fazey & Hardy, 1988; Hardy, 1990; 1996 a & b). Recognising the limitations of the modified CSAI-2 used in the first study, the second study was designed to explore modified versions of the mental readiness form (MRF, Murphy, Greenspan, Jowdy & Tammen, 1989). Results of the concurrent validity were disappointing; correlations with the respective CSAI-2 subscales and dimensions were inconsistent and low. Despite the overall inconclusive results, the cognitive anxiety subscale was identified as having potential in its current form, particularly if used in conjunction with training. The second section attempted to identify whether physiological arousal was a reflection of effort required, in the context of Eysenck's (1982) processing efficiency theory as an explanation for catastrophe models. Unfortunately, the cognitive anxiety and goal difficulty manipulations failed to produce significant effects. The third section of the thesis explored performance catastrophes via in-depth interviews following the entire catastrophic experience, that is prior to, during, following and coping attempts. Results emphasised the need for research to examine on-going performance. Partial support was found for the Hardy's (1990) proposed butterfly catastrophe model, and for the underlying explanation as a combination of Eysenck's (1982) processing efficiency theory and Masters' (1992) conscious processing hypothesis. The research programme provided support for performance catastrophes and a combination of two theories underpinning such catastrophes.

CHAPTER 1.

Introduction

1.1 Introductory comments

Coping with the pressure and anxiety of competitive sport at any level is an essential ingredient for athletic success (Gould, Eklund & Jackson, 1992; Murphy, 1988; Orlick & Partington, 1988). Élite performers generally manage to control their anxiety and their ability to cope with such competitive pressures, in fact often producing personal bests or peak performances. Sometimes, however, we see performers at the top of their sport, demonstrate catastrophic drops in their performance e.g. Greg Norman at the US Masters, 1996. Consequently, this domain of sport psychology has created considerable research interest (e.g. Jones & Hardy, 1990b; Martens, Vealey, & Burton, 1990) to better understand the anxiety-performance relationship and ultimately predict performance with a view to enhancing the preparation of élite performers. Models and theories examining such relationships mirror the test and clinical anxiety literature. This research has evolved from the unidimensional models to multidimensional models and then to interactive models. Although considerable advances have been made in the competitive state anxiety literature, theory development, specifically that explaining the emerging patterns in performance, still lags far behind.

1.2 Differentiating between constructs

One of the most noticeable factors hindering this area of research has been the interchangeable use of the terms, arousal, activation, anxiety and stress. Consequently, based upon previous research, the terms will be clarified for use in the present research programme. Pribram and McGuiness (1975) clearly differentiated between activation and arousal and it is these definitions which are used in this thesis. Specifically, activation refers to the cognitive and physiological activity that is geared towards preparing for a planned response to an anticipated situation; essentially representing an organisms' readiness to respond. Therefore, the optimum activation states should be referred to as 'appropriate' activation states rather than 'levels' of activation. Arousal, on the other hand represents the cognitive and physiological activity which takes place in response to some new input to the system; thus implying a lack of planned preparation and lack of energising the perceptual processes.

Anxiety can be viewed as the feelings of nervousness and tension associated with the activation or arousal of the organism. It represents feelings of insecurity as a result of perceived inability to cope (Spielberger, 1966). This construct is comprised differential states and traits of cognitive and somatic anxiety (Borkovec, 1976; Davidson & Schwartz, 1976; Morris, Davis & Hutchings, 1981 and Martens, et al., 1990).

Finally, stress (based on Cox, 1978 and Lazarus, 1966) represents the state in which a demand is placed on the individual who has to react in order to cope with the situation. Stress represents a person by situation interaction which is perceived to require some adjustment to the present state of readiness. Thus, depending on the persons' perception of their ability to cope, the stress may be perceived as challenging or threatening, thereby leading to facilitative or debilitative anxiety. Martens (1977) summarises this stress process;

> Stress is the process that involves the perception of substantial imbalance between environmental demand and response capability, under conditions where failure to meet demand is perceived as having important consequences and is responded to with increased levels of state anxiety (p.9).

1.3 Model and theory development

Several models and theories have been proposed to describe and explain the effects of the described constructs on performance. Some of these were proposed in clinical and test anxiety, whilst others were primarily developed in the sport domain. Theories of arousal and/ or activation include Easterbrook's (1959) Cue Utilisation theory; Hockey and Hamilton's (1983) multidimensional activation states; Humphrey and Revelle's (1984) two-arousal system model; and Sanders' (1983) three-arousal system model. As the nature of the present research programme focuses on the anxiety-performance relationship these models are beyond the scope of the thesis and thus the interested reader is referred to Hardy, Jones and Gould (1996) for an overview.

Stress and anxiety research ranges from the unidimensional models proposed by Yerkes and Dodson (1908; Inverted-U theory), Hull (1943; Drive theory), Hanin (1980; Zones of optimal functioning), Apter (1982; reversal theory), through to multidimensional models proposed by Martens et al., (1990; multidimensional anxiety theory) and interactive models by Hardy and colleagues (catastrophe model, Fazey & Hardy, 1988; butterfly model, Hardy, 1990 & 1996a).

1.4 Limitations of current models

The above models and theories have received varying levels of research attention, some of which produced rather ambiguous findings. Therefore, a brief overview will be given explaining the limitations of some of the more dominant models. Emerging from the limitations will be proposals for those models which have the potential to further our understanding of the anxiety-performance relationship.

1.4.1 Unidimensional models

The first of these, the inverted-U hypothesis (Yerkes & Dodson, 1908), has been referred to as a relationship between stress and performance, arousal and performance, and/ or anxiety and performance. This irregularity has been exacerbated by researchers not distinguishing between the constructs. Despite this fundamental limitation, there are several very distinct criticisms which can be levelled at the inverted-U hypothesis. Firstly, the relationship describes only a unidimensional construct, thus ignoring the differential components of anxiety, that is the cognitive and somatic components (as recognised by Davidson & Schwartz, 1976; Liebert & Morris, 1967). Secondly, the hypothesis fails to explain why performance is impaired at arousal levels above or below the optimum (Eysenck, 1984; Landers, 1980). Following on from this, it is unrealistic to assume that once performers become over-aroused and performance declines, if the performer is able to reduce arousal to previous levels, his/ her performance will regain its optimum (Fazey & Hardy, 1988). The hypothesis also fails to take into account the role of cognition and associated emotions. Finally, the hypothesis lacks clear empirical support (Naatenen, 1973; Neiss, 1988a & b), yet as Landers (1994) indicated it is "... nearly impossible to disprove since it would be unrealistic to expect better performance at what has been defined as extremes of low arousal (comatose state) or high arousal (i.e. panic attack)" (p.127).

Reversal theory (Apter, 1982) arose from a dissatisfaction with the inverted-U hypothesis. Essentially, reversal theory proposes that four 'metamotivational states' exist together in bipolar pairs, in which the change from one of the pair to the other is sometimes quite rapid. Indeed, the theory is defined as 'the study of the structure of experience, and the way which the nature of this structure changes over time' (Apter, 1982, p.368). Of the four pairs, the telic-paratelic pair has been the focus of much of the work conducted on reversal theory. The telic state behaviour is serious and planning-oriented, in which high arousal is likely to be perceived as anxiety; whilst the paratelic state behaviour tends to be spontaneous and present-oriented, in which high arousal is perceived as excitement. Although reversal theory is intuitively appealing, in addition to having important implications for applied interventions, it has its limitations. Specifically, it is difficult to test. Despite the development of a scale measuring metamotivational dominance (TDS, Murgatroyd, Rushton, Apter & Ray, 1978), and more recently one measuring states (TSM, Kerr & Cox, 1990), it has received very little research attention. In addition to the measurement limitation, reversal theory has a conceptual limitation, that is, it is unidimensional, not taking into account the findings of a large amount of research concerning the sub-components of anxiety, both within the test and cognitive anxiety theory (Deffenbacher, 1977; Davidson & Schwartz, 1976), and sport psychology (Fazey & Hardy, 1988; Martens, Burton, Vealey, Bump & Smith, 1990).

1.4.2 Multidimensional models

The current multidimensional approach to competitive state anxiety emerged through the work of Martens et al. (1990) and their development of the competitive state anxiety inventory-2 (CSAI-2), which measures cognitive anxiety, somatic anxiety and self-confidence. The multidimensional anxiety theory has received considerable research attention, but only rather tenuous support (Caruso, Dzewaltowski, Gill & McElroy, 1990; Gould, Petlichkoff & Weinberg, 1984; Parfitt, Jones & Hardy, 1990). Such ambiguous support led researchers, specifically, Hardy and colleagues (e.g. Fazey & Hardy, 1988; Hardy, 1990; Hardy, Parfitt & Pates, 1994) to seek alternative models and explanations. Further, Hardy (1990) identified fundamental problems with the multidimensional anxiety theory. Essentially, the theory attempts to explain a four-dimensional relationship between cognitive anxiety, somatic anxiety, self-confidence and performance in a series of two-dimensional relationships. Thus the theory assumes that the effects of sub-components are additive rather that interactive. Therefore, it has neglected the findings of interactive effects among worry, emotionality and performance within test anxiety research (Deffenbacher, 1977; Doctor & Altman, 1969; Liebert & Morris, 1967).

A Russian sport psychologist (Hanin), adopted a unidimensional anxiety based approach, the zone of optimal functioning (ZOF), which has since employed a multidimensional approach (Gould, Tuffey, Hardy & Lochbaum, 1993; Krane, 1993; Randle & Weinberg, 1997). Essentially, this model proposed that repeatedly observing individuals performances and associated pre-competition and performance state anxiety levels a zone of optimal functioning can be identified. An advantage of this approach is that the repeated measures design allows for intra-individual analyses. Furthermore, ZOFs have received some empirical support, making relatively precise predictions for when optimal performance is likely to occur (Gould, et al., 1993; Hanin, 1980; Krane, 1993; Morgan, O'Connor, Ellickson & Bradley, 1988; Randle & Weinberg, 1997), and therefore providing a useful and practical tool for the performer and sport psychologist. The main criticism of the ZOF hypothesis is that it offers no underlying theoretical explanation.

1.4.2.1 Facilitative and debilitative anxiety effects

An additional criticism of not only of multidimensional anxiety theory, but also anxiety-performance researchers generally, is that they fail to allow for facilitative anxiety effects. Thus, they have neglected test anxiety findings from as far back as 1960 (Alpert & Haber). Alpert and Haber (1960) distinguished between facilitating and debilitating anxiety and found that the Achievement Anxiety Test, which measured both provided a significantly stronger predictor of performance than a conventional debilitating anxiety scale. This scale was further utilised in test anxiety (e.g. Hudesman & Wiesner, 1978; Munz, Costello, & Korabek, 1975) and thus provided further support for facilitative and debilitative anxiety effects. Wine (1980) later proposed a bi-directional model of test anxiety, suggesting that the state anxiety response comprised both positive and negative effects.

Only more recently have researchers in competitive sport anxiety begun to examine the facilitative effects of anxiety (Jones & Cale, 1989; Mahoney & Avener, 1977; Parfitt & Hardy, 1987). Hardy (1996b) suggested that such (negative) cognitions may be the cognitions necessary to motivate high levels of cognitive and physical effort required to perform at an optimal level. Initially studies (e.g. Jones & Swain, 1992) exploring further dimensions of anxiety within sport psychology literature, revealed both frequency of anxiety symptoms and interpretation of anxiety symptoms in addition to the intensity of symptoms. Jones and Swain (1992) asked performers to rate the frequency with which they experienced the anxious thoughts and feelings, in addition to whether they perceived these symptoms as being facilitative or debilitative to performance. Findings suggested that performers' perceptions of anxiety may serve as a better predictor of performance that the intensity of the response, which clearly has implications for mental preparation. Since their exploratory investigation Jones and colleagues have consistently found that anxiety can have a facilitative effect on performance. Indeed, in four of their studies, they have shown that successful performers interpret their anxiety symptoms as being more facilitative than less successful performers (Jones, Hanton, Swain, 1994; Jones & Swain, 1995; Jones, Swain & Hardy, 1993; Swain & Jones, 1996). Interestingly, this line of research also fits comfortably with reversal theory (Apter, 1982), that is in the telic-paratelic pair an anxiety-provoking situation may change rapidly and become exciting (Kerr, 1990). The catastrophe models of anxiety and performance (Fazey & Hardy, 1988; Hardy, 1990, 1996a & b) also take into account the facilitative effects of anxiety upon performance. These models will be discussed shortly.

1.4.2.2 Frequency of anxiety symptoms

Temporal patterning of cognitive and somatic anxiety components have produced fairly consistent findings. Cognitive anxiety remains relatively stable prior to competition whilst somatic anxiety tends to increase rapidly close to the start of the event (Gould, et al., 1984; Martens et al., 1990). However, Swain & Jones (1992) suggested that cognitions regarding an impending event may be of the same intensity, but would occur much less frequently at one week than one hour before. Furthermore, experiencing 'worries' about a performance five percent of the time is likely to have less impact on performance than having 'worries' 95% of the time. Swain & Jones (1993) found that although intensity of cognitive anxiety symptoms remained relatively stable throughout the pre-competition period, the frequency with which the athletes were experiencing these symptoms increased progressively during that period.

1.4.2.2 Limitations of state anxiety measurement tools

The limitations of the research on the dimensions of anxiety are reflected in the inventories used to measure state anxiety, specifically the CSAI-2. This tool only measures the intensity of the symptoms, thus neglecting the interpretation of the symptom and the frequency of intrusions. Therefore, based on their previous findings (Swain & Jones, 1990) Jones and Swain (1992) developed a modified version of the CSAI-2, which incorporated the additional dimensions of directional interpretations and frequency of intrusions. However, the modified CSAI-2 has only received initial support for its validity. Specifically, Jones & Hanton (1996) explored the face validity of the direction scale. The study involved administering the modified CSAI-2, in addition to an adjective labelling list, on which performers recorded whether their emotional state was positive or negative. A greater number of positive emotional states were recorded by facilitated performers (i.e. those recording positive interpretations of anxiety symptoms on the modified CSAI-2), and a smaller number of negative adjectives were recorded by facilitated performers than the debilitated performers (i.e. those recording negative interpretations of anxiety symptoms on the modified CSAI-2). Therefore, results demonstrated that the direction scale distinguishes between those performers experiencing facilitative and debilitative performance states. Clearly, the psychometric properties of the modified CSAI-2 require further testing.

1.4.3 Interactive models: The cusp catastrophe

Emerging from the dissatisfaction with the inverted-U (Yerkes & Dodson, 1908) and multidimensional anxiety theory (Martens et al., 1990), and the unexplained contradictions in the literature (see Hardy, 1990; Hardy & Parfitt, 1991) were the catastrophe models applied to sport, as proposed by Hardy & Fazey, (1987). Catastrophe theory was first developed by the French mathematician Thom (1975), as a means of modelling discontinuities in functions which were normally continuous. His theory was later applied to both behavioural and natural sciences by Zeeman (1976). The most commonly applied of Thom's (1975) seven catastrophes is the cusp catastrophe. The anxiety-performance cusp catastrophe (Fazey & Hardy, 1988) assumes that anxiety has two components, a cognitive component and a physiological arousal component. It proposes that cognitive anxiety acts as a splitting factor, that is, it determines whether the effects of physiological arousal are smooth and small (i.e. under low cognitive anxiety), large and catastrophic (i.e. under high cognitive anxiety) or somewhere between these two extremes.

The selection of physiological arousal and cognitive anxiety as the two independent variables was based on the literature. For example, when cognitive anxiety is low, the relationship between physiological arousal and performance is predicted to be an inverted-U (the back face of the figure 1.4.3). When physiological arousal is high, such as on the day of an important event the model predicts that cognitive anxiety will negatively influence performance (right-hand face of figure 1.4.3; Gould, et al., 1984). When physiological arousal is low during the days prior to an important event, the model predicts that elevated cognitive anxiety should improve performance (left-hand face of figure 1.4.3; Parfitt, & Hardy, 1993). Finally, when cognitive anxiety is high on the day of the event, the model predicts that the effects of physiological arousal can be either positive or negative depending on the magnitude of physiological arousal (Parfitt et al., 1990).

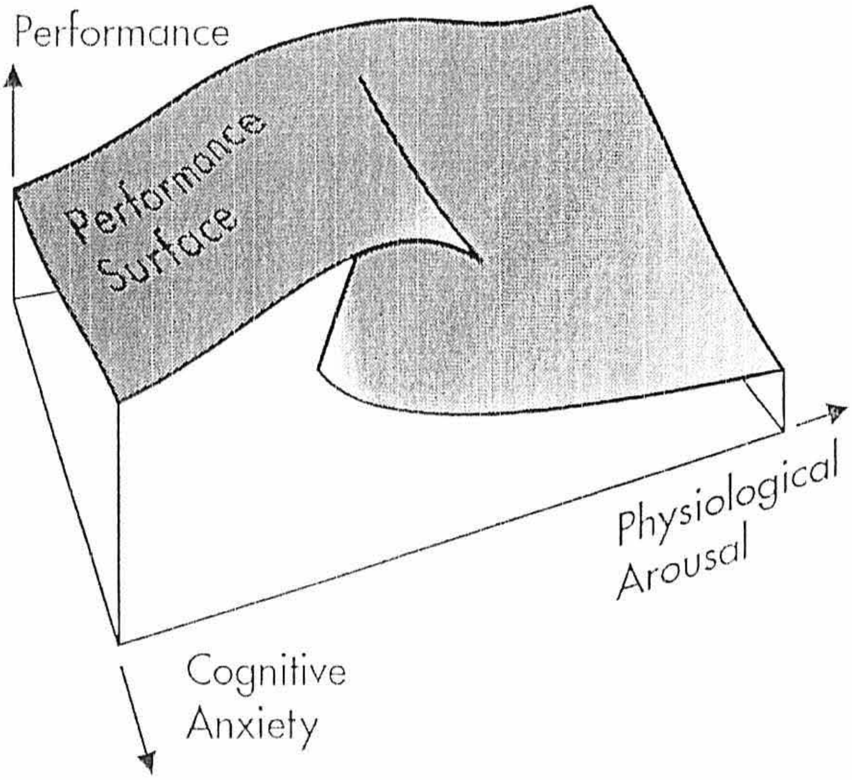

Fig 1.4.3: The cusp catastrophe model (Hardy, Jones & Gould, 1996)

Therefore, Fazey and Hardy (1988) proposed four testable hypotheses; 1) cognitive anxiety is not necessarily detrimental to performance. Only when physiological arousal is high will the effects be catastrophic; 2) hysteresis will occur under high cognitive anxiety; 3) performance should be bimodal under high cognitive anxiety and unimodal under low cognitive anxiety; and 4) it should be possible to fit the cusp catastrophe model to data using statistical methodologies (e.g. Cobb, 1981; Guastello, 1987; Oliva. Descarbo, Day & Jedidi, 1987).

At this point it is worth offering a brief explanation as to why physiological arousal was used in the catastrophe model in preference to somatic anxiety. Although studies have demonstrated that physiological arousal, in terms of heart rate, is similar in its temporal patterning to somatic anxiety prior to an important event (Parfitt, Hardy & Jones, 1990), differences may exist in their influence upon performance. Specifically, physiological arousal may influence performance directly or indirectly, whilst somatic anxiety may only influence performance indirectly. The direct influence upon performance refers to physiological arousal altering the availability of cognitive and physiological resources to performers, specifically the physiological functioning of the catecholamines, adrenaline and noradrenaline (as outlined by Gray, 1985). Conversely, the indirect influence refers to the effect that performers' perceptions/ interpretations of their physiological symptoms may have upon performance (Hardy, Parfitt & Pates, 1994; Jones & Swain, 1992; Parfitt, Hardy & Pates, 1995). Thus, somatic anxiety may only effect performance if the magnitude of the physiological response is so great that the performer becomes preoccupied with them (Martens et al., 1990).

1.4.3.1 Interactive effects

One study in test anxiety examined the interactive effects of cognitive anxiety and somatic anxiety upon performance. Deffenbacher (1977) revealed interactive effects for cognitive anxiety (worry) and somatic anxiety (emotionality) upon scholastic aptitude. Results revealed that emotionality was unrelated to performance for those who were not cognitively anxious, whilst for those who were cognitively anxious emotionality was negatively related to performance. In testing the ZOF hypothesis, Woodman, Albinson &

Hardy (1997) revealed a significant interaction between cognitive anxiety and somatic anxiety zone levels in relation to bowling performance. The combination of these findings providing some support for a catastrophe model and therefore, further research testing the interactions within the cusp catastrophes are required.

1.4.3.2 Hysteresis effects

The cusp catastrophe predicts that hysteresis will occur under conditions of high cognitive anxiety, but not under conditions of low anxiety. Essentially, hysteresis refers to performance following a different path when physiological arousal is increasing to the path it follows when physiological arousal is decreasing (front face of figure 1.4.3.2). Specifically, it predicts that under high cognitive anxiety, performance drops from the upper performance surface to the lower performance surface at a higher level of physiological arousal as physiological arousal increases (see point a in figure 1.4.3.2) than the level of physiological arousal at which performance flips back up on to the upper surface as physiological arousal decreases (see point b in figure 1.4.3.2.).

The hysteresis hypothesis has been directly tested on two occasions, both of which have provided support for it (Hardy & Parfitt, 1991; Hardy, et al., 1994). Hardy & Parfitt (1991) used the time-to-event paradigm to manipulate cognitive anxiety independently of physiological arousal in eight female basketball players on a basketball set shot. As predicted a two-way interaction emerged between physiological arousal and direction change in the high cognitive anxiety condition, but not in the low cognitive anxiety condition. Furthermore, as the catastrophe model suggests, performers' maximum performances were significantly better and their minimum performance significantly worse in the high cognitive anxiety condition than the low cognitive anxiety condition. However, the results were not completely unequivocal because Hardy and Parfitt's (1991) anxiety manipulation produced significant effects in both cognitive and somatic anxiety two days prior to the tournament. Hardy & Parfitt (1991) offered the suggestion for the cause of these results, that performers' anxiety may have reflected the demands of the experiment rather than the impending tournament.

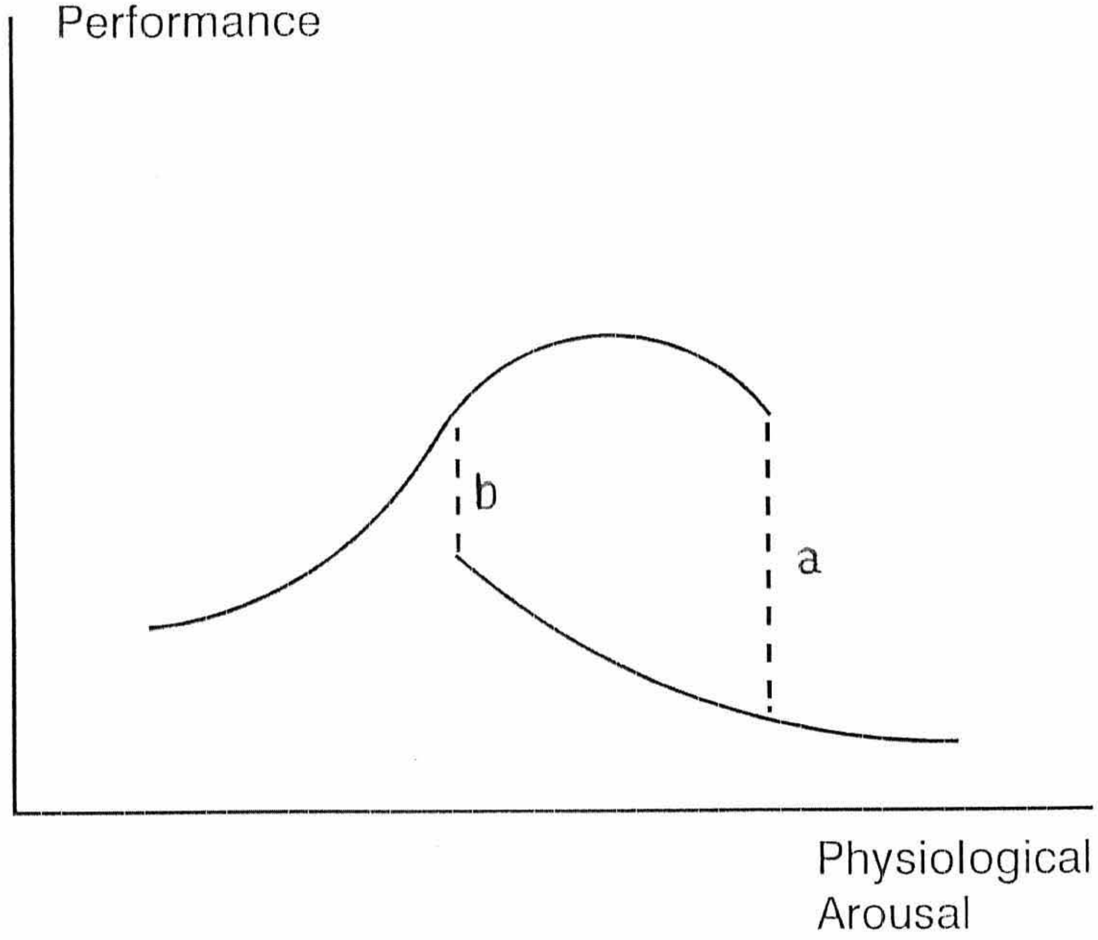

Fig 1.4.3.2: The hysteresis effect under high cognitive anxiety (Hardy, et al., 1996)

A second study by Hardy et al., (1994) attempted to replicate the first, using male participants and a different cognitive anxiety manipulation and a slightly different instructional set (neutral and ego-threatening to manipulate cognitive anxiety) in order to reassure performers about the experiment demands and thus control somatic anxiety. This experiment successfully manipulated cognitive anxiety independently of somatic anxiety, and a three-way interaction among cognitive anxiety, physiological arousal and the direction change of physiological arousal supported the hysteresis hypothesis.

1.4.3.3 Surface fitting procedures

Another way of testing the catastrophe models would be to use non-linear surface-fitting procedures to fit the catastrophe surfaces to the anxiety-performance data. However, the analyses available to fit overlapping data, that is, where data may fall on either the upper or lower performance surfaces depending on levels of physiological arousal and cognitive anxiety, are problematic. Several procedures have been proposed for use in the behavioural sciences; specifically by, Cobb (1981), Guastello (1987 & 1992) and Oliva, Descarbo, Day, & Jedidi (1987). To date, the only investigation within sport psychology using surface fitting procedures was Hardy (1996a); and he employed Guastello's (1987, 1992) procedures. Although Hardy's (1996a) results appear to lend considerable support to the catastrophe models, the analyses were not without problems. Indeed, Hardy (1996a) suggests that the results may actually reflect under representation of the extremities of the catastrophe surfaces within the data, given that two of the subjects only achieved a range of five points. Furthermore, the multidimensional anxiety theory model testing produced relatively poor predictive power, suggesting that the data were perhaps 'dirty'. However, the results offer some support for the structure of the catastrophe models being tested, and more importantly, the inclusion of self-confidence. Its addition to the multidimensional anxiety theory model significantly increased the proportion of variance accounted for by the model. Additionally, the inclusion of self-confidence within a butterfly catastrophe model (Hardy, 1996a) did not improve the overall predictive power of the models, but it did improve the structure of the model as indicated by the significant beta weights. Clearly, more research is required in this area.

1.4.3.4 The butterfly catastrophe model

As indicated above, a further of Zeeman's (1976) catastrophe models has been proposed within the sport psychology literature; the butterfly catastrophe. Fazey and Hardy (1988) speculated that this five-dimensional model include task difficulty and self-confidence. Fazey and Hardy (1988) selected task difficulty, suggesting that increases in perceptual complexity were known to advance the point at which performance decrements occur when performers are required to perform tasks under high levels of stress. Self-confidence was selected due to the considerable research findings that it is an important predictor of performance (Bandura, 1977; Mahoney & Avener, 1977) and that it is at least partially dependent of cognitive anxiety (Martens et al., 1990; Thayer, 1978). Despite the sound grounds for selecting these two variables, Hardy (1990; 1996a) has since criticised them and has thus suggested alternatives. Task difficulty is a cognitive variable concerned with lower level processing, whilst cognitive anxiety and self-confidence are metacognitive variables concerned with higher level processing. To overcome this problem, Hardy (1990) suggested that self-control (another metacogntive variable) would be more appropriate as the bias factor, thus enabling intermediate levels of performance.

Self-confidence was initially proposed as the butterfly factor. If this was so, it should be associated with trimodal performance as moderate levels of cognitive anxiety. Essentially, this implies that under moderate levels of anxiety highly confident performers may produce intermediate performances rather than being either brilliant or disastrous. According to findings (Mahoney & Avener, 1977; Ravizza, 1977) high self-confidence is associated with peak performance. Therefore, Hardy (1996a) suggested that self-confidence be better included as the bias factor; in essence, proposing that self-confidence moderates the effects of physiological arousal and cognitive anxiety upon performance (see figure 1.4.3.4). However, such suggestions are merely speculation and only one study has tested the butterfly catastrophe model in any form (Hardy, 1996a). As previously identified, self-confidence clearly emerged as an important factor within the model, given that it did improve the structure of the models as indicated by the significant beta weights. However, the investigation did not offer any clear evidence for the

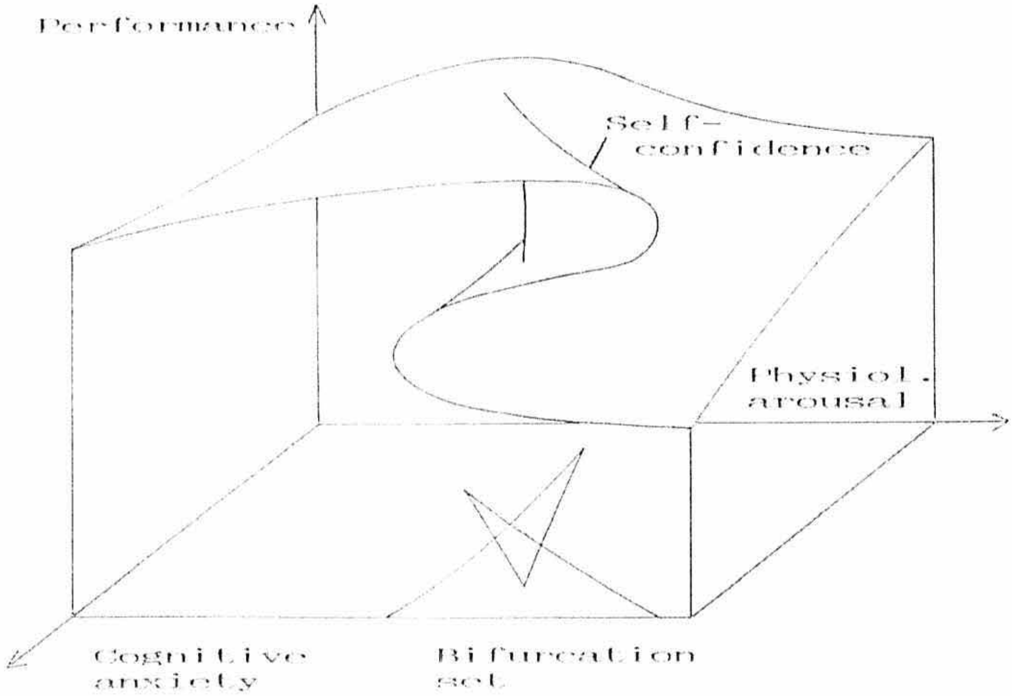

Fig 1.4.3.4: Butterfly catastrophe model (Hardy, 1996a)

superiority of either of the catastrophe models or the multidimensional anxiety theory model.

1.5 Explaining the anxiety-performance relationship

Despite the advances in anxiety-performance relationship and the potential of the catastrophe models in explaining this it is important to remember that these are models and therefore offer no explanation for such patterns of performance. However, two explanations emerging from test anxiety literature have been proposed and tentatively applied to sport. Specifically, these are; Eysenck's (1979, 1982) processing efficiency theory and Masters' (1992) conscious processing hypothesis. The first to be considered is Eysencks' (1979, 1982) theory.

1.5.2 Processing efficiency theory; Eysenck (1979, 1982)

Eysenck (1979, 1982) proposed that a combination of cognitive and motivational variables underlie the effects of anxiety upon performance. Moreover, Eysenck (1979) suggested that;

> the extent to which anxiety either facilitates/ impairs performance is determined by the extent to which high anxious subjects compensate for reduced processing efficiency by enhanced effort. (p.365).

Eysenck (1979) proposed that the anxious individual attempts to compensate for performance decrements produced by task-irrelevant processing (e.g. worry) by increasing attentional resources. The result of this may be that performance is maintained but at a greater subjective cost to the system than under low anxiety. This represents a reduction in what Eysenck terms 'processing effectiveness', whilst 'performance efficiency' is unaffected. However, if an anxious individual believes that the probability of successful task performance is very low, then anxiety will lead to a low investment of effort in the task and therefore 'performance efficiency' is reduced. This important element of processing efficiency theory must not go unnoticed. Eysenck (1982) draws upon Revelle and Michaels' (1976) theory concerning the subjective probability of task success effect on motivation. They proposed the following:

> Moderately difficult problems of situations (with probabilities of success ranging between .5 to .1) should be extremely motivating ('When the going gets tough the tough get going'). On the other hand, very difficult or impossible tasks (probabilities of success less than .1) should lead to extremely low levels of motivation ('Wise people do not beat their heads against brick walls).

Of course, as Eysenck (1982) identifies, the weakness of many investigations is due to them measuring only performance efficiency. Under high and low anxiety this can only be used as a direct measurement of processing effectiveness provided that the assumption is made that effort is comparable under conditions of low and high anxiety. As previous research has found (Calvo & Ramos, 1989; Calvo, Alamo & Ramos, 1990; Dornic, 1980) effort expenditure is typically greater under high anxiety, therefore supporting Eysenck's (1982) concern that performance effectiveness as a function of anxiety does not accurately reflect the effects of anxiety on performance. Very little research has considered the processing efficiency theory as an explanation for anxiety effects on competitive sport performance. However, Weinberg and Hunt (1976) found that in a simple throwing task, high-anxious subjects were using more energy than necessary and expending it over a greater period of time than were low anxious subjects. The findings were therefore consistent with processing efficiency theory, particularly considering Eason (1959) and Eason and White's (1960, 1961) findings that extraneous muscle activity was a reflection of effort. More recently, Hardy and Jackson (1996) demonstrated that highly anxious climbers maintained or even improved their climbing performance by investing more effort, both physically and cognitively. Furthermore, Hardy (1990) suggested that effort may play an important role in explaining performance catastrophes, and that it may be a reflection of effort expenditure. Thus, the implications and limited investigations examining the impact of processing efficiency theory on competitive sport performance indicate that it fits comfortably with catastrophe models. Specifically, under high cognitive anxiety, performance will improve with increasing physiological arousal, (due to the compensatory mechanism of effort) until the performer perceives that the probability of success is so low that effort will be withdrawn, and thus performance will drop catastrophically. Further investigations are required to examine the role of effort within the anxiety-performance relationship, and more specifically, to identify whether it is a reflection of physiological arousal.

1.5.3 Conscious processing hypothesis; Masters (1992)

According to Baumeister (1984) performers in competitive situations are highly motivated to do well and thus have a tendency to focus on the process of performing rather than 'just letting it happen' (Gallwey, 1974). Hardy, Jones and Gould (1996) crudely explain this notion;

> performers who are anxious may waste valuable resources trying to tell themselves what to do, instead of simply trusting themselves to get on with the job of doing it. (p.186)

Therefore, performers will attempt to consciously monitor their performance in order to ensure success. By doing so, expert performers are likely to interfere with their natural automatic processing of information. Similarly Keele (1973), who examined piano players, found that their performance declined when they focused their attention on the process of playing. In addition, Langer and Imber (1979) demonstrated that typists' consciously monitoring their finger movements produced degraded performance.

Underpinning such a notion are skill acquisition theories (e.g. Schmidt, 1982). Essentially, attempts to consciously control performance may be caused by performers regressing to their explicit knowledge base, that is earlier stages of learning. Support for this was initially provided by Masters (1992) who examined the influence of implicit and explicit learning on a golf putting task. Results revealed that those learning the skill with explicit procedures was degraded when under stress; whilst those acquiring the skill under implicit procedures produced maintained performance. Similarly, Hardy, Mullen and Jones (1996) found that two implicit learning groups continued to improve their performance under stress, whilst the explicit learning group did not. Whilst the results of the two studies are not conclusive, they certainly provide scope for future research, particularly in terms of their links with catastrophe models. In terms of catastrophe models, it may be that whilst performance is improving under high cognitive anxiety and intermediate physiological arousal, the performer is maintaining implicit procedures and letting the performance just happen (Gallwey, 1974); when the anxiety and arousal reach a certain point, the performer regresses to conscious processing, physiological arousal increases and performance drops dramatically.

1.6 Limitations of the anxiety-performance relationship literature

Although the models and theories proposed in the preceding introduction provide potential for advancing our understanding of the anxiety-performance relationship, each of these has its limitations. It appears that the catastrophe models provide the best description of the relationship, specifically, the pattern of performance under different levels of cognitive anxiety and physiological arousal. However, the catastrophe models provide *only* descriptions of what happens to performance when the performer is cognitively anxious, and thus fail to consider why performance drops dramatically. Furthermore, the cusp catastrophe is limited, in that it only considers cognitive anxiety and physiological arousal. Given the wealth of literature providing evidence for the predictive power of self-confidence over performance, this variable cannot be ignored. Therefore, the butterfly catastrophe model offers a lot of potential for describing performance catastrophes. However, further research is necessary to determine exactly which variables should be included within the model.

As previously discussed, the current advances with the interactive models suggest that theoretical explanations are essential in explaining why the variables influence performance in such a way. Given the two theories proposed, it may be that the two work in tandem, that is, the notion that increased effort (Eysenck, 1982) leads to conscious processing and regression to explicit knowledge gained in the learning of the skill (Masters, 1992), therefore resulting in catastrophic drops in performance. Such theories require further attention, specifically to link such theories together in terms of competitive sport.

1.7 The current research programme

This thesis therefore examines the anxiety-performance relationship using the catastrophe models as a framework. It is proposed that support will be found for, not only the cusp catastrophe, but also the higher dimension model, the butterfly catastrophe, specifically, for the variables which should be included within it. By using a variety of different research methodologies, it is predicted that facilitative anxiety and catastrophic performances will emerge through both the quantitative and qualitative methodologies in the examination of high level sports performance. It is also proposed that results will provide some support for theoretical explanations of the interaction and pattern of variables within the anxiety-performance relationships.

The structure of the thesis comprises three related sections. The first section (chapter 2) examines the interactive nature of the anxiety sub-components, in addition to the directional interpretations of anxiety. One implication of this study was the need for a more practical, expedient measure of anxiety reflecting the advances in the conceptualisation of anxiety. Thus the second study (chapter 3) explored modified versions of the mental readiness form (original MRF; Murphy, Greenspan, Jowdy & Tammen; 1989; modified versions by Krane, 1994). The second section of the thesis explored the influence of effort and probability of success of achieving goals within the anxiety-performance relationship. Chapter four was designed to utilise the short self-report scale, however, the poor concurrent validity of the version led to a redirection of the thesis. The third section (chapters 5 to 10) employed a qualitative methodology to explore the catastrophic performance from the beginning of the performance through to the coping strategies employed to overcome the catastrophe. More specifically, the purpose of this section of the thesis was to allow in-depth examination of the catastrophic experience by enabling the emergence of factors within the anxiety-performance relationship, both those which have previously been identified and those which have not, in an attempt to better explain such performances. Chapter 11 presents a summarising discussion drawing the results of the studies within the present research programme together, in addition to the theoretical and methodological issues which arose. Finally, conclusions are drawn with regard to the implications of this research programme and suggestions for future research.

CHAPTER 2.

The interactive effects of intensity and direction of cognitive and somatic anxiety, and self-confidence upon performance [1]

2.1 Interactive and facilitative anxiety effects

The recent publication of texts on the specialised topic of stress (Jones & Hardy, 1990a) and anxiety (Martens, et al., 1990) reflects the considerable amount of research attention devoted to this area in recent years. These attempts to gain a better understanding of the anxiety-performance relationship have centred largely on the examination of competitive state anxiety. Research in sport has mirrored that of both clinical and test anxiety literature in which the anxiety response has been separated into cognitive and somatic sub-components (Davidson & Schwartz, 1976; Liebert & Morris, 1967). The current multidimensional approach to competitive state anxiety emerged through the work of Martens et al. (1990), and their development of the CSAI-2; which measures cognitive anxiety, somatic anxiety and self-confidence. Although some research provides support for multidimensional anxiety theory predictions (Gould, et al., 1984; Martens et al., 1990), other research findings have been contrary to the predictions (Caruso, et al., 1990; Parfitt, Jones & Hardy, 1990). Such tenuous support emphasises the importance of providing further empirical tests of multidimensional anxiety theory and other theories which may better explain the anxiety-performance relationship; for example, the cusp catastrophe model (Fazey & Hardy, 1988).

Hardy (1990) identified a fundamental problem with multidimensional anxiety theory in that it attempts to explain a 4-dimensional relationship between cognitive anxiety, somatic anxiety, self-confidence and performance in a series of

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[1] The study comprising chapter two of the thesis is published; Edwards, T., & Hardy, L., (1996). The interactive effects of intensity and direction of cognitive and somatic anxiety, and self-confidence upon performance. Journal of Sport and Exercise Psychology, 18, 296-312.
The author would like to thank Lynne Evans for her invaluable help with data collections and to the netball players for their co-operation.

2-dimensional relationships. Thus, the theory assumes that the effects of the sub-components are additive rather than interactive. Indeed, test anxiety research (Deffenbacher, 1977; Doctor & Altman, 1969; Liebert & Morris, 1967) has also revealed interactive effects among worry, emotionality and performance. Fazey and Hardy (1988) attempted to clarify the interactive relationship among cognitive anxiety, physiological arousal and performance by proposing a cusp catastrophe model of anxiety and performance. Fazey and Hardy's model differs from multidimensional anxiety theory by proposing that cognitive anxiety can have either a facilitating or debilitating effect upon performance depending upon the level of physiological arousal that is being experienced by the performer. More specifically, the cusp catastrophe model proposes that when physiological arousal is high, increases in cognitive anxiety have a debilitating effect upon performance; but when physiological arousal is low, increases in cognitive anxiety have a facilitating effect. Physiological arousal is used in preference to somatic anxiety because it may exert either a direct or an indirect influence upon performance (see Hardy, 1990; Hardy, et al., 1994 for a more detailed explanation). Although research has provided some support for the model's predictions (Hardy & Parfitt, 1991; Hardy, et al., 1994; Krane, Joyce, & Rafeld 1994), further empirical tests of the model are essential.

Several researchers (e.g. Burton, 1988; Jones & Swain, 1992; Parfitt, et al., 1990) have recently highlighted the limited conceptualisation of the state anxiety response. Current state anxiety inventories measure only the intensity of the anxiety symptoms; neglecting how the performer interprets these symptoms in terms of their facilitative or debilitative effects upon performance (i.e. directional perceptions of anxiety). As long ago as 1960, Alpert and Haber distinguished between facilitative and debilitative test anxiety and constructed the Anxiety Achievement Test (a trait anxiety inventory) which was found to be a stronger predictor of academic performance than a conventional debilitative trait anxiety scale. In addition, other researchers (e.g. Munz et al., 1975; Hudesman & Weisner, 1978; Wine, 1980) have demonstrated the importance of distinguishing between facilitative and debilitative anxiety.

Research within the sport literature has also indicated the possible facilitative effects of anxiety on performance (Mahoney & Avener, 1977). Following such findings, Jones and colleagues (Jones & Swain, 1992; Parfitt, et al., 1990) proposed that future research should examine performers' interpretations of their anxiety symptoms in terms of their likely effects upon performance. Jones and associates (Jones, Hanton & Swain, 1994; Jones & Swain, 1992; Jones et al., 1993; Swain & Jones, 1996) have conducted a series of investigations to explore the potential influence of directional perceptions of anxiety on the anxiety-performance relationship. Results have consistently revealed that cognitive anxiety can have a facilitative effect upon performance. Specifically, cognitive anxiety symptoms were perceived to be more facilitative and less debilitative in athletes producing good performances than in those producing poor performances.

The use of between-subject designs in anxiety research has received criticism (e.g. Sonstroem & Bernardo, 1982) because between subject analyses fail to recognise that identical levels of anxiety may have a different influence on performance for different people. Sonstroem and Bernardo (1982) demonstrated consistent relationships when variations around the individual's own norm levels of state anxiety were examined. Swain and Jones (1996) utilised this intra-individual approach, in a longitudinal basketball study. Polynomial trend analyses revealed that directional perceptions of anxiety sub-components accounted for significantly more performance variance than the intensity of anxiety sub-components.

Research (e.g. Burton, 1988; Mahoney & Avener, 1977) has also indicated that self-confidence is an important predictor of performance that is at least partially independent of cognitive anxiety (Burrows, Cox & Simpson, 1977; Thayer 1978; Hardy & Whitehead, 1984; Martens et al., 1990). Early literature (e.g. Borkovec, 1978; Eysenck, 1978) viewed cognitive anxiety and self-confidence as reflecting opposite ends of the same continuum. However, Martens et al's. (1990) original exploratory factor analysis of the CSAI-2 revealed orthogonal cognitive anxiety and self-confidence factors, which they argued should therefore be regarded as being relatively independent of each other. Indeed, Hardy and Jones (1990) suggested that self-confidence may in some way protect against possible negative anxiety effects by moderating the anxiety-performance relationship. Previous research has identified moderate negative relationships between cognitive anxiety intensity and self-confidence, and somatic anxiety intensity and self-confidence (Burton, 1988; Gould, Petlichkoff, Simons & Vevera, 1987). Jones et al. (1993) also identified that self-confidence was significantly and positively correlated with directional perceptions of cognitive and somatic anxiety scores.

Hardy (1990) put forward a 5-dimensional 'butterfly' catastrophe model which, in essence proposed that self-confidence moderates the effects of physiological arousal and cognitive anxiety intensity upon performance. Very little research has examined the predictive power of this model on performance by changing the way performers interpret these symptoms. However, Hardy (1996a) used Guastello's (1982) method of dynamic differences to test both the cusp and a restricted butterfly catastrophe model, against models derived from multidimensional anxiety theory (both with and without self-confidence included). The findings of this investigation indicated that the addition of self-confidence significantly increased the proportion of variance accounted for by the multidimensional anxiety model. The inclusion of self-confidence in the butterfly catastrophe model did not improve the overall predictive power of the model, although it did improve the beta coefficients, therefore improving the structure of the model.

The major purposes of the present study were therefore: to examine the relative influence that directional perceptions and intensity of anxiety symptoms have upon performance; and to examine the interactive effects of the anxiety intensity sub-components upon performance, as proposed by Fazey's and Hardy(1988) cusp catastrophe model. The hypotheses were that:

1. directional interpretations of the intensity of anxiety symptoms would account for significantly more variance in performance than the intensity of anxiety symptoms ;
2. self-confidence intensity would predict the directional interpretation of cognitive and somatic anxiety symptoms;

3. high cognitive anxiety would have a facilitative effect upon performance under low physiological arousal conditions, but a debilitative effect upon performance under high physiological arousal.

2.2 Method

2.2.1 Participants

The participant pool consisted of six female netball teams (N= 45). Two of these teams were competing in both the Universities Athletic Union (UAU) tournament, and a regional league (South Glamorgan League). Both leagues are of a very high standard, with many teams boasting international players. The remaining four teams were competing only in the South Glamorgan League. Participants ages ranged from 18 to 31 (M = 21.8; SD = 2.36). All participants were volunteers who had given their written informed consent to take part in the study which would require them to complete a questionnaire prior to six matches and also complete performance evaluation forms after each match. All subjects contacted were willing to participate and completed all the questionnaires each time they played.

2.3 Measures

Three measures were employed in the present investigation; a modified version of the Competitive State Anxiety Inventory-2 (CSAI-2), a physiological arousal measure (heart rate), and a subjective self-assessment of performance.

2.3.1 Modified version of the competitive state anxiety inventory-2.

The original CSAI-2 (Martens et al., 1990) was used to measure three sub-components of anxiety; specifically, cognitive anxiety, somatic anxiety and self-confidence. A high degree of internal consistency for the subscales has been demonstrated in several studies (Martens et al., 1990) with alpha coefficients ranging from 0.79 to 0.90. In addition, construct validity of the CSAI-2 as a measure of competitive state anxiety has received support via a systematic progression of research studies reported in Martens et al. (1990). The scale is comprised of 27 items with 9 items in each of the three subscales. Participants are asked to rate the intensity of their anxiety symptoms on a four point likert scale (where 1= not at all and 4= very much so).

The CSAI-2 measures anxiety sub-components on an "intensity" scale, assessing only the level of anxiety the performer is experiencing. The directional interpretation of anxiety symptoms as facilitating and debilitating must also be considered. Jones and Swain (1992) modified the CSAI-2 by requiring participants to rate the degree to which they experience the intensity of each symptom as either facilitating or debilitating to their performance. This directional interpretation scale ranges from +3 ('very positive') to -3 ('very negative'), thus the possible direction scores on each sub-scale ranged from +27 to -27. Jones and Swain's (1992) CSAI-2 was further modified for the present investigation. Specifically, instructions were slightly reworded to improve their clarity. The instructions asked the performers to respond to the questionnaire according to how they felt at that moment about the upcoming match. They included an anti-social desirability set which emphasised that there were no right or wrong answers and that they should answer honestly (see appendix 1a).

2.3.2 Physiological arousal.

Physiological arousal was measured via resting heart rate, using a 30 sec pulse count recorded at the wrist and doubled to obtain a 'beats per minute' score (as used by Beuter and Duda, 1985).

2.3.3 Subjective performance evaluation.

Each player was asked to evaluate their own performance on a 10 point likert scale (where 1= played much worse than usual to 10 = played much better than usual) in response to the following statement: "in relation to your average/usual performance rate how you performed in today's game".

2.4 Procedure

The experiment employed a repeated measures design over a netball season. The different matches represented situations that were hypothesised to induce varying degrees of anxiety. Matches ranged from first round matches to finals in knock-out competitions, as well as league matches against teams of varying standards. Forty five minutes prior to the start and immediately after players had changed into their match kit, heart rate was taken. The modified CSAI-2's were then completed after which players began their warm-up. The performance self-assessment forms were completed after the players had showered and changed. All questionnaires were administered by the experimenter or a trained associate. Confidential treatment of the participants' responses was guaranteed. When all the data collections had been completed the players and coaches were debriefed and thanked for their participation in the investigation.

2.5 Results

Prior to analysis all data were standardised within participants to control for individual differences in response sensitivity and netball ability (c.f., Sonstroem and Bernardo, 1982). This procedure used each participant's modified CSAI-2 subscale scores (i.e. intensity and direction of cognitive and somatic anxiety, and self-confidence), physiological arousal and their self-assessment ratings of performance for each of their six matches. Standard scores were then calculated within participants prior to the data being collapsed across participants in order to negate between-subject response variation. However, Hardy (1996a) has identified that the use of intra-individual standardisation violates one of the assumptions of the tests of significance in regression analysis, namely, that each pair of data points is independent. Hardy therefore suggested that the error degrees of freedom be adjusted in order to provide a more conservative test of significance. This adjustment was based on a comparison with repeated measures analysis of variance. Therefore, in the present study, having 45 participants each with an average of 5.6 data points, the degrees of freedom which were used for the error term in all regression analysis tests of significance was calculated as 202 [(k-1)(n-1) where k represents the number of repeated measures and n= the number of participants].

Correlational analysis and hierarchical regression analyses were used to examine the first hypothesis; namely, that directional interpretations of anxiety symptoms would account for significantly more variance in performance than anxiety intensity. Correlations were examined initially to identify zero order relationships among the variables. Although significant relationships were found, the magnitude of these was relatively low (see Table 2.5.1).

Table 2.5.1: Intercorrelations of CSAI-2 sub-scale intensity and direction scores and performance

	2	3	4	5	6	7	8
1. Physiological Arousal	.14 *	.14 *	-.08	-.14 *	-.03	-.11 *	.03
2. Cognitive Anxiety I		.47 **	-.37 **	-.19 *	-.20 **	-.29 **	.10
3. Somatic Anxiety I			-.50 **	.17 *	-.48 **	-.44 **	.31 **
4. Self-Confidence I				.28 **	.31 **	.62 **	-.17 *
5. Cognitive Anxiety D					.20 **	.36 **	-.11 *
6. Somatic Anxiety D						.46 **	-.21 **
7. Self-Confidence D							.15 *
8. Self assessment of Performance							

Note: 256 observations for each correlation, with two tailed significance tests.

* $p < 0.05$ ** $p < 0.01$

I = intensity; D = direction

Somatic anxiety intensity was the anxiety variable most strongly related to self-assessed performance (r =.31; p<.001), with higher somatic anxiety being associated with better performance.

Hierarchical regression analyses were conducted to examine the relative influence of intensity of anxiety symptoms and directional interpretations upon performance (see Table 2.5.2).

Table 2.5.2: Summary of moderated hierarchical regression analysis of anxiety sub-components predicting performance

Predictor	F Model	Beta	R	R^2
Cognitive Anxiety I		.08	.10	.01
Cognitive Anxiety D		-.08	.13	.02
Cognitive Anxiety ID	1.65	-.04	.14	.02
Somatic Anxiety I		.28 *	.31	.10
Somatic Anxiety D		-.08	.32	.10
Somatic Anxiety ID	9.29 *	.02	.32	.10

Note. I = intensity; D = direction; ID = intensity x direction

* $p < 0.01$

Anxiety intensity variables were entered first into the regression equation, followed by directional interpretation variables. Results indicated that direction did not significantly add to the variance in performance that had been accounted for by intensity (R^2_{change} =0.01; $F(1,202)=2.01$, ns and R^2_{change} =0.00; $F(1,202)=1.22$, ns for cognitive and somatic anxiety, respectively). When cognitive anxiety direction was entered into the equation first, it did not account for a significant proportion of the variance in performance (R^2_{change} = 0.01, $F(1,202)=2.84$, ns). However, when somatic anxiety direction was entered first, it accounted for 4% of variance in performance (R^2_{change} = 0.04, $F(1,202)=11.29$, p <.001), and the addition of somatic anxiety intensity significantly increased the proportion of variance in performance accounted for by the direction variable (R^2_{change} = 0.06, $F(1,202)=15.89$, p <.001). The results therefore provided no support for the hypothesis that directional interpretations of anxiety would account for more variance in netball performance than the intensity of the anxiety symptoms.

Following this analysis, the cross-product of intensity and direction was entered into the equation. This analysis was requested by a reviewer to try and address concerns that the directional subscales of the modified CSAI-2 are at least partially confounded by the intensity of the symptoms. More specifically, since performers are asked to rate their directional interpretation of the intensity of the symptom experienced, it could be that performers interpret intensely experienced anxiety symptoms negatively and mildly experienced anxiety symptoms more positively. The moderated hierarchical analysis including the intensity by direction variable was used to address the following question; is the effect of directional interpretations upon performance different for performers with highly intense anxiety symptoms compared with performers with low intensity anxiety symptoms? Results indicated that cognitive anxiety (intensity, direction and the intensity x direction cross-product) accounted for only 1.9% of the variance in performance ($F(2,202)=1.65$, ns.), whilst somatic anxiety intensity and direction together with the cross-product (intensity x direction) accounted for 10% of the variance in performance ($F(2,202)=9.29$, $p<.001$). However, the addition of the intensity by direction variable did not contribute significantly to performance variance over and above that already accounted for by intensity and direction ($R^2_{change}=0.00$; $F(2,202)=0.43$, ns and $R^2_{change}=0.00$; $F(2,202)=0.11$, ns, for cognitive and somatic anxiety, respectively) and therefore did not provide support for hypothesis.

Correlation analysis was also used to test the second hypothesis that self-confidence intensity would predict the directional interpretation of anxiety symptoms. Results indicated that self-confidence intensity was significantly related to the direction of cognitive and somatic anxiety ($r = .28$ and $r = .31$; $p<.001$, respectively). That is, as self-confidence increased athletes perceived their anxiety to be more facilitative to their performance. Therefore, the second hypothesis was supported. However, self-confidence was also significantly inversely related to the intensity of cognitive anxiety and inversely related to somatic anxiety intensity ($r = -.37$ and $r = -.50$; $p<.001$, respectively); thus, the greater a player's self-confidence, the lower the intensity of their anxiety symptoms. Similar intercorrelations between anxiety sub-component intensity scores have been found in previous research (see for example, the meta-analysis conducted by Martens et al., 1990). Means and standard deviations for the present investigation were similar to those found in the original CSAI-2 work by Martens et al., (1990; e.g. cognitive anxiety intensity $M=20.05$; $SD=5.77$ and $M=18.4$, $SD=5.99$ for the present investigation and Martens et al.'s work, respectively).

The third hypothesis examined the interactive effects of cognitive anxiety intensity and physiological arousal upon performance. Participants were separated into the following four groups using median splits on cognitive anxiety intensity and physiological arousal:

i) those high in both cognitive anxiety and physiological arousal;
ii) those high in cognitive anxiety and low in physiological arousal;
iii) those low in cognitive anxiety and high in physiological arousal; and
iv) those low in both cognitive anxiety and physiological arousal.

Separate t-tests confirmed the median splits; that is, significant differences existed ($p<.001$) for cognitive anxiety between the high and low cognitive anxiety intensity groups, and for physiological arousal between the high and low physiological arousal groups. A two factor (Cognitive Anxiety intensity x Physiological Arousal) analysis of variance was then performed with the self-assessed performance scores as the dependent variable. Results revealed that the cognitive anxiety by physiological arousal interaction was significant ($F(1,237)=4.74$, $p<.05$). More specifically, Tukey's tests revealed that when netballers experienced high physiological arousal, those with low cognitive anxiety performed better than those with higher cognitive anxiety, $M = .17$ ($SD = .93$) and $M = -.05$, ($SD = .88$), respectively. However, when they experienced low physiological arousal those netballers with high cognitive anxiety performed better than those with low cognitive anxiety, $M = .16$, ($SD = .97$) and $M = -.15$, ($SD = .89$), respectively (see figure 2.5.1).

Neither the main effect for cognitive anxiety, nor the main effect for physiological arousal were significant. Support was therefore found for the third hypothesis; that is, high cognitive anxiety can have either a facilitative or debilitative effect upon performance, depending upon the level of physiological arousal.

In addition to conducting analyses to test the stated hypotheses, surface fitting procedures were also conducted to allow for comparisons with other research (c.f., Hardy, 1996a). Multidimensional anxiety theory makes three specific predictions regarding the intensity of anxiety symptoms: a negative linear relationship should exist between cognitive anxiety and performance; a quadratic (inverted U) shaped relationship should exist between somatic anxiety and performance; and a positive linear relationship should exist between self-confidence and performance. From a statistical modelling perspective, multidimensional anxiety theory therefore proposes that it should be possible to predict performance using a prediction equation of the form:

$$y = a + b\,(\text{cognitive anxiety}) + c\,(\text{somatic anxiety}) + d\,(\text{somatic anxiety})^2 + e\,(\text{self confidence});$$

where the coefficients b and d are negative, and e is positive. A hierarchical multiple regression procedure was used to test this hypothesis. In line with Hardy's (1996a) recommendation, the variables were entered in the order cognitive anxiety, somatic anxiety, somatic anxiety^2 and self-confidence. This order was chosen because of the multidimensional anxiety theory prediction that cognitive anxiety should account for more variance in performance than somatic anxiety or self-confidence (Burton, 1988; Martens et al., 1990). The results of these analyses are shown in Table 2.5.3.

Table 2.5.3: Summary of curvilinear regression analyses for the multidimensional anxiety model of performance

Predictor	F Model	Beta	R	R^2
cognitive anxiety		-.07	.10	.01
somatic anxiety		.34*	.31	.10
somatic anxiety^2		-.10	.33	.11
self-confidence	7.54*	-.05	.33	.11

* $p < 0.01$

The multidimensional anxiety theory model accounted for 11% ($p<.001$) of the variance in performance. Contrary to multidimensional anxiety theory predictions, cognitive anxiety did not account for the largest proportion of variance in self-assessed performance. The only variable to make a unique significant contribution to self-assessed performance was the linear component of somatic anxiety intensity (beta =.34, $p<.001$). Therefore, only modest support was provided for multidimensional anxiety theory by the test.

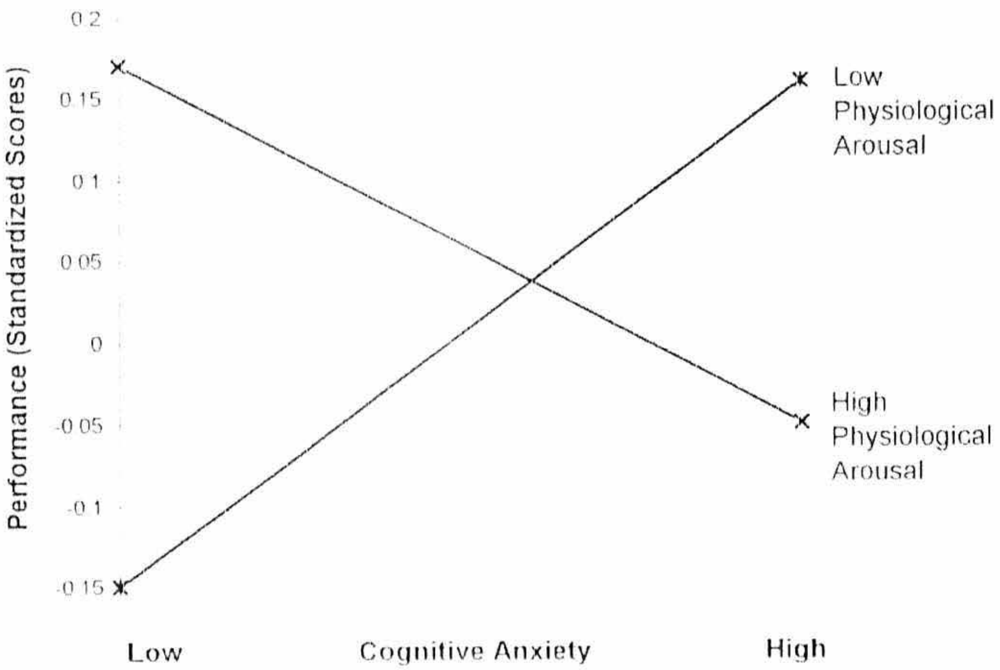

Fig 2.5.2: Cognitive anxiety and physiological arousal interaction

2.6 Discussion

Although it is important to recognise both the methodological and conceptual advances that have been made in the area of competitive state anxiety, it is also evident that several aspects of recent research require more rigorous examination. Two of these more important issues have been considered in the present paper: the directional perceptions of anxiety sub-components; and the interactive influence of anxiety sub-components upon performance.

Findings from the study offered little support for the hypothesised relationships between directional perceptions of anxiety and performance, as direction explained no further variance in performance over and above that accounted for by intensity alone. These results are contrary to those obtained in previous studies; for example, Jones et al. (1993) found that gymnasts who performed well on the balance beam perceived their cognitive anxiety to be more facilitative than those who performed less well. Swain and Jones (1996) also conducted a longitudinal basketball study which used intra-subject standardisation procedures prior to analysis. This again provided strong support for the direction dimension; however, Swain and Jones' study followed only one team across a season; whereas the present study followed a number of teams across a season. A cautionary note is worth considering at this point, which was also recognised by Swain and Jones (1996); that is, the interpretation scale for the CSAI-2 has not been fully validated, and thus investigations utilising this scale can only be considered exploratory until validity has been established. The present findings may, therefore, reflect a potential flaw with the validity of the scale. Furthermore, with the addition of the interpretation scale, the length of the inventory is doubled, and therefore requires more detailed instructions to be provided for participants. Such additions make the questionnaire rather arduous to complete and particularly so close to competition.

A further explanation of the results could be attributed to the participant population in this study. Primarily male athletes have dominated the participant pools used for previous investigations. Differential findings between such studies and the present all female study may, therefore, be a reflection of gender differences. Indeed, Jones, Swain and Cale,

(1991) found gender differences in the temporal patterning and antecedents of anxiety and self-confidence. Furthermore, although the Jones et al. (1993) gymnast study involved all females, the age range was considerably lower (age range of 14 to 16) than those in the present netball study (age range of 18 to 31). The present participants were also predominantly Welsh, whilst in previous studies participants have usually been English or American. The results could therefore be due to cultural differences. In other disciplines within sport psychology cultural differences have emerged, for example, participation motives differed among children from different cultures (Canadians, Fry, McClements & Sefton, 1981; Americans, Klint & Weiss, 1987; Australians, Wankel & Kriesel, 1985; Israelis, Weingarten, Furst, Tenenbaum & Schaefer, 1984; and English, White & Coakely, 1986). Furthermore, research on attribution theory has recognised the importance of cultural differences, for example, Duda (1986) found that perceptions of success and failure were differentially influenced by both culture and gender. Given such findings, Duda and Allison (1989) suggested that the nature of the attribution process and attributions made is culturally dependent. Taken together, it would appear that the anxiety-performance relationship may vary as a function of culture, in addition to gender differences previously found (Jones et al., 1991).

Although the facilitative influence of anxiety upon performance did not emerge directly through the interpretation scale of the modified CSAI-2, indirect evidence of facilitative effects was provided by the anxiety intensity correlations with performance. Additionally, the findings from the two factor ANOVA revealed an interaction between the anxiety intensity sub-components which suggested that cognitive anxiety may sometimes enhance performance and sometimes impair it. This finding lends some support to the catastrophe model prediction that an interaction exists between cognitive anxiety and physiological arousal. That is, the model proposes that under high physiological arousal increases in cognitive anxiety will be detrimental to performance; whilst under low physiological arousal, increases in cognitive anxiety will have a facilitative influence on performance (Hardy, 1996b). The present investigation demonstrated that higher levels of cognitive anxiety had a detrimental effect upon netballers' performances when they were physiologically aroused, but had a beneficial effect when they were not physiologically aroused. Taken together, these results indicate that cognitive anxiety intensity can sometimes exert a beneficial effect upon performance, depending on the level of physiological arousal (Hardy & Parfitt, 1991; Hardy, et al., 1994). The interactive effect found in the present study is consistent with some results found in competitive sport anxiety literature, as well as in test anxiety literature, in which interactive effects emerged among worry, emotionality and performance (Deffenbacher, 1977; Doctor & Altman, 1969; Morris & Liebert, 1969). Deffenbacher (1977) found a complex relationship among worry and emotionality (as measured by Liebert & Morris' Worry-Emotionality Inventory, 1967) and performance on the Miller Analogies Test. Results demonstrated that with participants experiencing low worry (cognitive anxiety), emotionality was unrelated to performance; however under high worry, high emotionality was debilitative to performance. This interactionist approach seems to be one way forward in trying to understand the anxiety-performance relationship.

At least two explanations have been offered for the finding that performance can sometimes improve under higher levels of anxiety (e.g. Carver & Scheier, 1986, 1988; Eysenck, 1979, 1982). Carver and Scheier (1986) proposed that in some circumstances anxiety has an energising and focusing effect on the person experiencing it. They suggest that providing the individual has a favourable expectancy of success, and the ability to cope, they will respond to anxiety and arousal with renewed effort. Similarly, Eysenck's (1982) Processing Efficiency Theory suggests that anxious performers will invest additional effort in the task provided they still perceive themselves to have at least a moderate probability of success. More specifically, Eysenck (1982) proposed that anxiety reduces the working memory capacity due to task irrelevant cognitive anxiety/ worry, and consequently impairs processing efficiency. However, this reduction in processing efficiency can be countered by an increase in effort, allowing performance to 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 either exert a positive or negative effect upon performance depending upon the attentional (working memory) demands of the task and the perceived probability of success. This explanation would fit quite well with results from the present investigation. That is, under high cognitive anxiety and low physiological arousal, performance was maintained, which, according to Processing Efficiency Theory, could be due to the compensatory mechanism of effort. However, as physiological arousal increased and the probability of success decreased, the demands of the task (increasing cognitive anxiety) possibly began to outweigh the effort, and so performance deteriorated.

Carver and Scheier (1986, 1988) proposed a similar control model of anxiety and performance which emphasised the role of self-confidence in the facilitation of performance by anxiety. The present results supported the hypothesis that as self-confidence increased, netballers perceived their anxiety to be more facilitative to performance. Hardy (1990) suggested that self-confidence may protect against the potentially debilitative effects of anxiety. Furthermore, Hardy (1996) found that the addition of self-confidence to a multidimensional anxiety model significantly increased the proportion of variance accounted for by this model; and although the inclusion of self-confidence in a restricted butterfly catastrophe model did not improve the overall predictive power of the model, it did improve the structure of the model as indicated by significant beta weights. The findings of the present study, together with those of Hardy (1996), suggest that self-confidence may be an important predictor of performance over and above cognitive and somatic anxiety intensity scores. However, the present study also found self-confidence intensity to be negatively related to the intensity of cognitive and somatic anxiety symptoms. Consequently, it could be this relationship which led confident netballers to interpret their anxiety symptoms in a positive light; that is to say, they interpret their anxiety symptoms positively because they did not experience any anxiety.

A number of methodological limitations can be identified in the present study. As previously mentioned, the interpretation scale of the CSAI-2 has not been fully validated and thus this study should be viewed with caution due to its somewhat exploratory nature. Furthermore, the additions make the questionnaire rather arduous to complete particularly so close to competition. Research in this area is currently characterised by a failure to predict large percentages of performance variance. Measuring anxiety levels (intensity and direction) during performance is likely to produce much better predictions, although the practical problems associated with such measures are all too obvious. A major challenge confronting researchers therefore, is to develop methods of examining competitive state anxiety actually during performance. Possibilities include psychophysiological measures and short self-report measures; for example, the various versions of the Mental Readiness Form (Edwards & Hardy, 1995; Hardy, 1996a; Murphy, Greenspan, Jowdy, & Tammen, 1989; Krane, 1994) could offer some potential.

Not only is it important to develop practical, minimally intrusive measures of the competitive state anxiety response, but equally important is the development of meaningful performance measures. Indeed, Gould and colleagues observed that a number of studies have compared absolute performance outcome scores (e.g. win/loss) that are rather global in nature, without taking into account, for example, players' positions or the performances of team-mates. Such measures may well confound the sensitive relationship that exists between anxiety and performance due to the lack of precision with which performance has been assessed. The present study, therefore hoped to overcome this flaw by utilising a subjective self-assessment of performance. In the past, performance has generally been measured as a summary construct. However, it has recently been suggested (Hagtvet & Ren Min, 1992) that the relationship between anxiety and performance may vary across time, so that it should therefore be measured as a process construct. Hagtvet and Ren Min (1992) suggested that the study of performance as an on going process across time is a promising area for future research and theory development. Consequently, the development of reliable, ecologically valid and sensitive performance measures is recommended. A performance measure which offers some potential is that developed by Sonstroem & Bernardo (1982) to provide a composite of overall playing performance in basketball. The measure includes, shot percentage, total points, rebounds, assists, steals, personal fouls and turnovers. This performance measure has been successfully utilised by Swain & Jones (1996) and could be adapted to measure performance in other sports.

Based on the findings and implications of the present study several suggestions for future research can be discussed. From an applied perspective, it is important to recognise that high levels of anxiety are not necessarily debilitating to performance. For those who are experiencing debilitative anxiety, a cognitive restructuring technique involving the relabelling of anxiety symptoms from negative to positive (c.f. Apter, 1982, Kerr, 1990) may be more effective than attempting to reduce the intensity of the symptoms through various relaxation strategies. Equally, emphasis should not be taken away from reactivation or 'psych up' strategies, as these might be more appropriate for those athletes who perform better under higher levels of cognitive anxiety and physiological arousal, as was evident with some of the netballers in the present study. Furthermore, given the interactions among the anxiety sub-components, it would seem apparent that multimodal stress management strategies (see Burton, 1990) might be more beneficial than the unidimensional strategies proposed by the matching hypothesis (Davidson & Schwartz, 1976). Deffenbacher (1984) suggested that, due to interactions existing among anxiety sub-components and performance, interventions should include both relaxation and cognitive restructuring strategies. This is mirrored in the catastrophe model suggestion that one way to regain the upper performance surface would be to physically relax, cognitively restructure and then reactivate once the upper performance surface has been regained (Hardy, 1996a).

From a theoretical perspective, it is evident that further research which focuses upon the interactive effects of the anxiety sub-components would be beneficial. The addition of self-control and self-confidence in Hardy's (1996b) butterfly catastrophe model may also provide us with a better understanding of the interactive influence of such individual difference variables upon performance. As Hardy and Jones (1990) have suggested, self-confidence may inoculate the performer against the debilitative effects of anxiety upon performance. Additionally, individual difference variables, such as sex and cultural effects, need to be more fully considered.

CHAPTER 3.

Further Dimensions of Anxiety: Validating a Short Self-Report Scale [1].

3.1 Measuring anxiety

Competitive state anxiety research has progressed considerably from the unidimensional conceptualisation of anxiety toward both multidimensional (Martens et al., 1990) and interactive (Fazey & Hardy, 1988) approaches. This progression has largely mirrored that of clinical and test anxiety literature; for example, test anxiety researchers (e.g. Liebert & Morris, 1967) identified worry and emotionality as two sub-components of the anxiety response. This finding was reflected in competitive state anxiety research through work on multidimensional anxiety theory (Martens et al., 1990), in which the anxiety response was comprised cognitive anxiety (the worry component) and somatic anxiety (the emotionality component). The Competitive State Anxiety Inventory-2 (CSAI-2), developed within the multidimensional framework proposed by Martens et al. (1990), was designed to measure the intensity with which athletes experience anxiety symptoms. However, investigations utilising this inventory have provided only equivocal support for hypothesised relationships (Gould et al., 1984; Parfitt et al., 1990), leading researchers to develop alternative models and theories which might better describe and explain the complex competitive anxiety-performance relationship.

Attempts to account for such tenuous support include the work of Hardy and colleagues (e.g. Fazey & Hardy, 1988; Hardy, 1990; Hardy, 1996a & b; Parfitt & Hardy, 1991) who identified inherent problems with multidimensional anxiety theory and its predictions. More specifically, multidimensional anxiety theory predicts that cognitive anxiety has only a debilitative influence upon performance. Additionally, it attempts to explain a four-dimensional relationship between cognitive anxiety, somatic anxiety, self-confidence and

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[1] The study comprising chapter three of the thesis is published; Edwards, T., Hardy, L., (1995). Further dimensions of anxiety: Validating a short self-report scale. Journal of Applied Sport Psychology, 7S, 59.

performance, in a series of two-dimensional relationships, thereby assuming that the effects of each anxiety component have an additive (rather than interactive) influence upon performance. Fazey and Hardy (1988) attempted to overcome these limitations by proposing the cusp catastrophe model of anxiety and performance, which describes an interactive relationship between cognitive anxiety, physiological arousal and performance. Essentially, the cusp catastrophe model suggests that cognitive anxiety can have either a facilitative or debilitative influence upon performance depending upon the level of physiological arousal that is being experienced by the performer (see p. 10 for a more detailed explanation of the use of physiological arousal rather than somatic anxiety). Such proposals are not new in the test anxiety literature, as researchers had earlier identified both a facilitative influence of worry (cognitive anxiety) upon performance (e.g. Alpert & Haber, 1960; Carver & Scheier, 1986), and an interactive influence of worry and emotionality (Deffenbacher, 1977). Test anxiety research over 30 years ago (Alpert & Haber, 1960) demonstrated that the Anxiety Achievement Test (a facilitative and debilitative trait anxiety measure) was a better predictor of performance than conventional debilitative anxiety measures. However, the competitive state anxiety literature in sport has, to a large extent, overlooked these strong findings from test anxiety literature. The limited empirical investigations that have examined facilitative anxiety and interactive influences between the sub-components within the catastrophe models have been generally (but not unequivocally) supportive of them (Edwards & Hardy, 1996; Hardy & Parfitt, 1991; Hardy et al., 1994; Krane et al., 1994). Thus further empirical tests of this model, and indeed higher dimension models (such as the butterfly catastrophe model, Hardy, 1990) are essential.

In addition to providing support for both facilitative anxiety effects and other models, it is important for researchers to look beyond simply describing the anxiety-performance relationship, by examining explanations for the occurrence of these relationships. However, further examination has been hindered not only by the limited conceptualisation of the competitive state anxiety response, but also the implications this has for the instruments used to measure the response. Following recent developments in the conceptualisation of anxiety, preliminary steps to overcome these limitations have included modifications to the CSAI-2.

Specifically, Jones and Swain's (1992) modified CSAI-2 comprised the original intensity scale, and two further scales; a frequency scale and a directional interpretation scale. The first of these scales assesses the frequency with which the athlete is experiencing the intensity of the anxiety symptom reported; whilst the direction scale requires the athlete to indicate whether he/ she perceives both the intensity and frequency of their symptom to be either facilitative or debilitative to his/ her performance. A series of investigations by Jones and colleagues (e.g. Jones et al., 1993; Swain & Jones, 1993) have provided initial support for the validity of the modified scale. A further investigation (Jones & Hanton, 1996) involved the preliminary examination of the face validity of the direction scale. The investigation involved administering both the modified CSAI-2 and an adjective labelling list, which recorded both positive and negative emotional states. Results revealed that the facilitated performers (based on modified CSAI-2 responses) reported experiencing a greater number of positive emotional states and a smaller number of negative states than the debilitated performers, demonstrating the ability of the direction scale to distinguish between those performers experiencing facilitative and debilitative performance states. Obviously more investigations testing the psychometric properties of this inventory are required.

Despite these necessary extensions, the modified CSAI-2 is not without its problems. With the addition of the frequency and direction scales, the CSAI-2 becomes rather arduous to complete, (with 81 items taking approx. 20 minutes to complete), and it has the potential to distract athletes when being completed within an hour of a competitive event. From an applied perspective, a simple self-report scale would be an invaluable tool to help further understand an athletes' competitive anxiety response, particularly in terms of providing appropriate intervention strategies. For example, a scale revealing that an athlete's good performances occur when he/she is experiencing high levels of cognitive anxiety and moderate physiological arousal would suggest that 'psych up' strategies might be the most appropriate, in contrast to an athlete who performs at their best when they are experiencing low levels of both cognitive anxiety and physiological arousal. Theoretically, although we have progressed in our understanding of the anxiety-performance relationship, more research is required in terms of explaining what occurs and, methodologically, such research would obviously be facilitated by employing a less intrusive, more expedient measure of the competitive state anxiety response.

Murphy et al., (1989) developed a much more practical measurement tool; the Mental Readiness Form (MRF), the purpose of which was to tap anxiety responses closer to and possibly even during a competitive event, as it takes only a few seconds to complete. The form consists of three bipolar items (rated on a continuous scale; from *worried-calm; tense-relaxed; confident-scared*) which correspond with the CSAI-2 subscales. Significant relationships between the MRF items and the corresponding CSAI-2 subscales, ranged from .59 to .63 ($p < .05$), demonstrating moderate concurrent validity. Murphy et al. (1989) concluded that: "the preliminary results suggest that the MRF may be a useful instrument for assessing competitive state anxiety in situations which prevent the administration of the CSAI-2" (p.82). Krane (1994) extended this investigation by examining three versions of the MRF, namely; the MRF, the MRF-Likert, and the MRF-3; each yielded similar relationships. The MRF-Likert differs from the original as the performers' response is recorded on an 11-point likert scale. The MRF-3 was developed due to concerns that the anchor terms on the original were not true bipolar opposites and so used the following monopolar anchors: *worried-not worried; tense-not tense; and confident-not confident.* Results revealed that whilst significant moderate relationships emerged between the corresponding subscales of each of the three MRFs and the CSAI-2, the three versions yielded similar relationships with the CSAI-2. For example, correlations between cognitive anxiety and self-confidence were .55 in Martens et al.'s, (1990) study and .63 (females) and .68 (males) in Krane's (1994) study, and were all significant at the $p<.001$ level.

Given the recent advances in the conceptualisation of the competitive anxiety response (alluded to earlier), the three versions of the MRF are limited by measuring only the intensity of the anxiety symptom. Consequently, the purpose of the present study was to examine the validity of modified monopolar (MRF-3) and modified bipolar (MRF-Likert) versions of the MRF (MRF-M and MRF-B, respectively) which included both frequency and direction measures of the anxiety symptoms. In addition to examining concurrent validity, the study was also concerned with possible gender differences, which have been identified in previous investigations (Jones & Cale, 1989; Jones et al., 1991). An order effect was also anticipated whereby a stronger relationship might emerge between the sub-components of the questionnaires when the modified CSAI-2 was completed prior to the MRF-M/B rather than when the MRF-M/B was completed first. This later effect was anticipated because completing the longer questionnaire first has the potential to prime participants for the MRF items.

3.2 Method

3.2.1 Participants

The participant pool (N= 335) consisted of a variety of competitive university sport participants from British universities (see Table 3.2.1). All participants were competing in one of the following events; the Universities Athletic Union (UAU) tournament in 1995 or 1996, or in the British Universities Sports Association (BUSA) Home Nations Festival in 1996. All participants were volunteers who gave their informed verbal consent to take part in a study which required them to complete two questionnaires prior to a competitive event.

3.2.2 Measures

Three measures were employed in the present investigation; the modified version of the Competitive State Anxiety Inventory-2 (CSAI-2), and two modified versions of the MRF (MRF-M and MRF-B).

Table 3.2.1: Distribution of participants by sport.

Sport	Males	Females
Badminton	7	8
Basketball	12	37
Cross-country	7	1
Football	27	31
Hockey	11	14
Indoor cricket	31	0
Indoor hockey	9	0
Netball	0	26
Rugby	48	15
Squash	11	1
Swimming	7	3
Tennis	5	8
Trampolining	1	8
Volleyball	0	7

3.2.3 Modified version of the competitive state anxiety inventory-2

The original CSAI-2 (Martens et al., 1990) was developed to measure three precompetitive components of anxiety; cognitive anxiety, somatic anxiety and self-confidence. A high degree of internal consistency for the subscales has been demonstrated in several studies (Martens et al, 1990) with alpha coefficients ranging from 0.79 to 0.90. In addition, construct validity of the CSAI-2 as a measure of competitive state anxiety has received support via a systematic progression of research studies reported in Martens et al. (1990). The scale is comprised of 27 items with 9 items in each of the three subscales. Participants report how they feel immediately prior to competition on a four point likert scale (where 1= not at all and 4= very much so).

The CSAI-2 measures anxiety symptoms on an "intensity" scale, assessing the level of the symptom the performer is experiencing. However, the frequency with which the performer is experiencing these symptoms; and the extent to which the performer perceives the intensity and frequency of the symptoms to be facilitative or debilitative to their performance must also be considered (Jones & Swain, 1992; Jones et al., 1993; Swain & Jones, 1993). Jones and Swain's (1992) modified version of the CSAI-2 includes these additional dimensions of frequency and directional interpretation. The frequency scale ranges from 1 (never) to 7 (all the time), thus the possible frequency of intrusions for each subscale ranges from 7 to 63. Participants also rate whether the degree to which they are experiencing the intensity and frequency of each symptom is either facilitative or debilitative to their performance. The directional interpretation scale ranges from +3 ('very positive') to -3 ('very negative'), thus the possible direction scores on each subscale range from +27 to -27. Edwards and Hardy's (1996) slightly modified version of Jones and Swain's (1992) modified CSAI-2 was administered in the present investigation . Specifically, the instructions for completion were slightly reworded to improve their clarity. The instructions asked the performers to respond to the questionnaire according to how they felt at that moment about the upcoming event. They included an anti-social desirability set which emphasised that there were no right or wrong answers and that participants should answer honestly (see appendix 1a).

3.2.4 Mental readiness form

Each of the three MRF items were designed to correspond with the CSAI-2 subscales; cognitive anxiety, somatic anxiety and self-confidence. Specifically, the following anchor words correspond to the anxiety subscales on the CSAI-2: *worried-calm* corresponds with the cognitive anxiety subscale; *tense-relaxed* with the somatic anxiety subscale; and *confident-scared* with the self-confidence subscale. The bipolar anchor words are separated by a continuous ten centimetre line on which the participants mark a spot corresponding to how they feel *right now* in response to their thoughts and feelings in terms of the above anchor words. Based upon the previous findings the present investigation utilised the MRF-M (appendix 2a) and MRF-B (appendix 2b); that is, the modified versions of the MRF-3 and the MRF- Likert, respectively. The forms were modified to include the two additional anxiety dimensions; frequency and direction. The modified forms required the athlete to record the intensity with which they are experiencing a symptom; followed by the frequency with which they are currently experiencing this symptom; and finally, whether they perceive the intensity and frequency of the anxiety symptom to have a facilitative or debilitative effect upon their performance, each on a 10 point Likert scale. Thus, the modified MRFs were comprised 9 items; intensity, frequency and interpretation for each of the anxiety subscales (cognitive anxiety, somatic anxiety and self-confidence).

3.2.5 Procedure

The study employed a between-subjects design in which half of the participants completed the MRF-M and the modified CSAI-2, whilst the other half completed the MRF-B and the modified CSAI-2. Within those two halves, participants completed the questionnaires in a balanced format; that is, in Order One, half of the participants completed the modified MRF-M or MRF-B followed by the modified CSAI-2, whilst in Order Two, the remaining participants completed the modified CSAI-2 first. The questionnaires were completed between 45 minutes and one hour prior to the start of the competition, and took approximately 20 minutes to complete. This time-frame allowed participants to complete the questionnaires prior to their preparation and warm-up routines, to ensure minimal distraction. Once the data collections had been completed the players and coaches were debriefed and thanked for their participation in the investigation. Confidential treatment of the participants' responses was guaranteed.

3.3 Results

The primary purpose of the study was to assess the concurrent validity of the two versions of the MRF. Prior to this analysis being performed, the hypothesised gender and order effects were examined. Order one refers to participants who completed either of the MRFs prior to the modified CSAI-2; whilst order two refers to those participants who completed the modified CSAI-2 prior to either of the MRFs. The eight sets of data, comprising groups; MRF-M data, orders one and two for males, and orders one and two for females, and MRF-B data also comprising orders one and two for males, and orders one and two for females, were analysed to determine whether or not it was appropriate to collapse data across gender and order. As gender differences have been identified in previous research (Jones & Cale, 1989; Jones et al., 1991; Martens et al., 1990), a series of t-tests were performed to identify any significant differences in anxiety responses between male and female participants. Significant differences emerged on the several of anxiety sub-scales and dimensions, and therefore male and female data were treated separately in the remaining analyses. Examples of the significant differences from the CSAI-2 results include cognitive anxiety intensity; t= -.2.49, p<.01; self-confidence intensity; t= 6.56, p< .001 and self-confidence interpretation; t= 3.25, p< .01. Examples of the significant differences among the MRFs include cognitive anxiety intensity; t= 2.48, p<.01, cognitive anxiety interpretation; t=-2.95, p<.01 and self-confidence frequency; t= 2.00, p<.05.

Pearson product-moment correlations were computed between order one and two of the modified MRF-M and MRF-B items (both male and female groups) and the corresponding modified CSAI-2 subscales. Tests of significance for correlation coefficients were then calculated, to identify whether significant differences emerged in the relationships between the respective questionnaire sub-components among participants completing either the MRF-M / MRF- B first or the CSAI-2 first. Although significant differences emerged (p<.05) in only three of the subscales, the data for orders one and order two were also treated separately. The three subscales in which significant differences emerged were the MRF-M and MRF-B questionnaires between order one and order two, and in order one between the MRF-M and MRF-B questionnaires. Specifically, the calculated t values for each of these were greater than the critical values (from Fisher & Yates', 1957 statistical tables) in which the results fall out of the region of acceptance (the null hypothesis region), and therefore the alternative hypothesis is accepted indicating that significant differences emerged. Significant differences emerged between: order one and two for females completing the MRF-M questionnaire ($t_{.05(98)}$ = 1.98 < critical value of 2.47); order one and two for females completing the MRF-B questionnaire ($t_{.05(46)}$ = 2.01 < critical value of 2.35); and MRF-M and MRF-B for females completing the questionnaires in order one ($t_{.05(61)}$ = 2.00 < critical value of 2.66).

Consequently, with gender and order effects emerging from the preliminary analyses eight sets of data (as described above) were analysed for concurrent validity with the modified CSAI-2 subscales (cognitive anxiety, somatic anxiety and self-confidence) and dimensions (intensity, frequency and direction). The relationships between the respective subscales and dimensions of the two inventories (modified CSAI-2 and MRF-M/ B) were examined, in addition to the intercorrelations among subscales and dimensions within the modified CSAI-2. Results of MRF-M data will be discussed first, followed by MRF-B results.

3.3.1 MRF-M

Pearson product-moment correlations were computed between the respective subscales and dimensions of the MRF-M and CSAI-2. Results revealed both negative and positive, non-significant relationships and significant moderate relationships between the MRF-M items and the corresponding CSAI-2 subscales ($r = .08$, ns, to $r = .67$, $p<.001$; see Table 3.3.1)

Examination of the order effect among female participants revealed five positive moderate to strong relationships (ranging from $r = -.36$ $p<.01$ to $r = -.65$, $p<.001$) when the CSAI-2 was completed prior to the MRF-M. In contrast, females completing the MRF-M first revealed only two positive moderate significant relationships ($r = -.43$ and $r = -.47$, $p<.01$). Cognitive anxiety intensity, for example, was more significantly related to its corresponding MRF-M item when the CSAI-2 had been completed first (order 2), than when the MRF-M had been completed first. This suggests that completing the CSAI-2 first has a potential influence upon MRF-M responses, producing slightly stronger positive relationships, in the cognitive anxiety and self-confidence subscales and dimensions. Fifty-five percent of the subscales and dimensions in order two produced low to moderate significant relationships, indicating only moderate concurrent validity.

Table 3.3.1.: Intercorrelations of MRF-M items and CSAI-2 subscales and dimensions

	MALES ORDER 1 (N=47)	MALES ORDER 2 (N=61)	FEMALES ORDER 1 (N=42)	FEMALES ORDER 2 (N=65)
INTENSITY				
Cognitive anxiety	-.36*	-.58***	-.47**	-.62***
Somatic anxiety	.42**	.18	.29	.33**
Self-confidence	-.37*	-.27*	-.24	-.42***
FREQUENCY				
Cognitive anxiety	-.31*	-.33*	-.15	-.36**
Somatic anxiety	.29	.22	.29	.52***
Self-confidence	-.24	-.28*	-.10	-.16
DIRECTION				
Cognitive anxiety	-.39**	-.39**	-.08	-.57***
Somatic anxiety	.11	.39**	-.12	.11
Self-confidence	-.67***	-.45**	-.43**	-.65***

*$p<.05$. **$p<.01$. ***$p<.001$

Among male participants, order one and order two revealed similar relationships between corresponding inventory subscales and dimensions. Several significant relationships emerged both between the subscales and dimensions when the MRF-M was completed prior to the CSAI-2 (ranging from r = -.36, $p<.01$ to r = -.67, $p<.001$), and when the CSAI-2 was completed first (ranging from r = -.27, $p<.01$ to r = -.58, $p<.001$). However, all of these relationships were rather weak.

Results for both male and female participants were anticipated to reveal positive relationships, however, somatic anxiety intensity and frequency demonstrated unexpected negative relationships. Essentially, participants were reporting their somatic anxiety as tense on one inventory yet as relaxed on the other inventory.

3.3.2 MRF-B

Similar results to those of the MRF-M data emerged in the correlations between the CSAI-2 and the MRF-B items among female participants, however different results emerged with males (see Table 3.3.2).

Table 3.3.2: Intercorrelations of MRF-B items and CSAI-2 subscales and dimensions

	MALES ORDER 1 (N=32)	MALES ORDER 2 (N=36)	FEMALES ORDER 1 (N=25)	FEMALES ORDER 2 (N=27)
INTENSITY				
Cognitive anxiety	-.61***	-.31	-.15	-.70***
Somatic anxiety	.15	.12	.39	.36
Self-confidence	-.37*	-.22	-.31	-.19
FREQUENCY				
Cognitive anxiety	-.33	-.27	-.00	-.64***
Somatic anxiety	.14	-.09	.07	.13
Self-confidence	-.12	-.37*	-.66***	.28
DIRECTION				
Cognitive anxiety	-.17	.02	-.24	-.47*
Somatic anxiety	.48**	.08	.31	.36
Self-confidence	-.44*	-.26	-.52**	-.50**

*$p<.05$. **$p<.01$. ***$p<.001$

Female participants in order two, again demonstrated several significant moderate to strong correlations between the respective inventory subscales and dimensions (ranging from r = -.47, $p<.01$, to r = -.70, $p<.001$), compared to only two significant relationships in order 1 (r = -.52, $p<.01$, and r = -.66, $p<.001$). Interestingly, when the CSAI-2 was completed first, slightly stronger significant positive relationships emerged between the inventories for all cognitive anxiety dimensions, whereas no significant relationships emerged for those components when the MRF-B was completed first. Responses of the male participants were the opposite, that is, when the MRF-B was completed first more significant positive relationships emerged between the respective inventory subscales and dimensions (ranging from r = -.37, $p<.01$ to r = -.61, $p<.001$) than when the CSAI-2 was completed first. Only one significant relationship emerged in order two (self-confidence frequency; r = -.37, $p<.05$). Similar results emerged with the MRF-B data as with the MRF-M data, that is somatic anxiety correlations were negative. However, 92% of these correlations were not significant.

3.3.3 Psychometric properties of the modified CSAI-2

Internal consistency of the modified CSAI-2 was examined for each group of participants (Table 3.3.3). For those participants completing the MRF-M, internal consistency for the CSAI-2 subscales were high (alpha =.73 to. 89, and alpha =.67 to .88; for males and females, respectively), and were similar to those found by Martens et al., (1990). However, alpha coefficients for participants completing the MRF-B demonstrated lower internal consistency. The marginally more consistent findings emerged in order two for females (alpha =.75 to .91) and order one for males (alpha =.73 to .88). Three variables from the groups with lower internal consistency, also demonstrated particularly low alpha coefficients; male participants' cognitive anxiety intensity in order two (alpha =.49); and female participants' cognitive and somatic anxiety frequency in order one (alpha = .55 and .56, respectively). The low internal consistency among the subscales and dimensions indicate that they should be treated with caution.

Table 3.3.3: Internal consistency of modified CSAI-2

	MRF-M				MRF-B			
Subscale/ dimension	**Order 1 Males**	**Order 2 Males**	**Order 1 Females**	**Order 2 Females**	**Order 1 Males**	**Order 2 Males**	**Order 1 Females**	**Order 2 Females**
INTENSITY								
Cognitive anxiety	.81	.76	.81	.85	.77	.49	.69	.80
Somatic anxiety	.88	.81	.85	.84	.85	.80	.90	.85
Self-confidence	.87	.86	.86	.86	.73	.84	.83	.86
FREQUENCY								
Cognitive anxiety	.85	.81	.82	.87	.87	.81	.55	.81
Somatic anxiety	.84	.83	.81	.77	.83	.84	.56	.80
Self-confidence	.78	.81	.67	.83	.77	.82	.83	.87
DIRECTION								
Cognitive anxiety	.83	.73	.74	.85	.83	.69	.65	.79
Somatic anxiety	.83	.84	.71	.88	.88	.64	.80	.75
Self-confidence	.89	.86	.86	.87	.87	.82	.88	.91

Modified CSAI-2 intercorrelations were very similar across all groups; that is regardless of gender, order of completion or MRF version completed, and therefore only selected examples from all groups completing the MRF-M will be given (for greater detail and MFR-B results, refer to appendix 2c). Many of the subscales and dimensions were significantly correlated. The intensity of anxiety symptoms revealed moderate positive significant relationships. Directional perceptions of the frequency and intensity of anxiety symptoms also produced several moderate significant positive relationships (e.g. MRF-M, order one, males; self-confidence frequency and interpretation, $r = .58$, $p<.001$). Of the frequency subscales, only cognitive and somatic anxiety revealed significant relationships (e.g. MRF-M, order one, females, $r = .65$, $p < .001$). Within the anxiety subscales, intensity and frequency of cognitive anxiety (e.g. MRF-M, order two, females, $r = .83$, $p < .001$) and somatic anxiety (e.g. MRF-M, order two, males; $r = .57$, $p < .001$) produced moderate to strong significant positive relationships, whilst, as expected (see Jones et al., 1993) all self-confidence components were interrelated ($r = .47$, $p < .01$ to $r = .85$, $p < .001$). Intercorrelations within previous research have been varied. However, the present findings for intensity correlations were similar to those found by Martens et al., (1990; e.g. cognitive anxiety with self-confidence, $r = .55$, $p < .01$).

Means and standard deviations of the eight groups were examined and compared to previous findings. The present results differ from the original CSAI-2 research and the limited empirical investigations on the modified CSAI-2 to date (e.g. Martens et al., 1990; Jones et al., 1993; Swain & Jones, 1993). For example, females demonstrated slightly higher cognitive and somatic anxiety intensity scores, and lower self-confidence intensity scores than those reported by Martens et al., (1990; e.g. cognitive anxiety intensity in the present investigation $M = 23.14$, $SD = 5.66$ and Martens et al.'s $M = 18.40$, $SD = 5.99$). Similar patterns emerged with the male participants' results for intensity and frequency. Interpretation scores could not be compared to any previous findings, due to previous studies either not examining this dimension or not reporting such results.

The intercorrelations among the intensity subscales were similar to those found in previous research (e.g. Martens et al., 1990) as results revealed moderate to strong relationships between the anxiety intensity subscales. This is to be expected as it is recognised that although each subscale is relatively independent and taps a conceptually distinct component, the subscales cannot be completely independent of one another particularly as the presence of one symptom of anxiety is often indicative of the presence of the other (Martens et al., 1990), particularly in stressful situations (as in the cusp catastrophe, see Hardy, 1990).

3.5 Discussion

Despite the growing body of research examining the anxiety response in terms of the intensity, frequency and directional interpretation of anxiety symptoms, it is evident that the instruments used to measure the construct are limited. This important issue has been addressed as the primary purpose of the present investigation. Specifically, the present investigation represents an extension of both Murphy and colleagues' (1989) and Krane's (1994) work developing a short self-report anxiety scale. The extension involved the inclusion of the two additional dimensions of anxiety which have recently emerged in the competitive state anxiety literature (e.g. Jones & Swain, 1992). The purpose of the paper was therefore to investigate the concurrent validity of modified MRFs; by examining the relationship of their anxiety subscales (cognitive and somatic anxiety, and self-confidence) and dimensions (intensity, frequency and directional interpretation) with the corresponding modified CSAI-2 subscales and dimensions.

As is clearly evident, the findings from the present investigation offer only weak support for the modified MRFs. Despite several significant relationships emerging, the inconsistent patterns of relationships between the corresponding subscales and dimensions indicate that the results were inconclusive. Essentially, the results demonstrate that performers were unable to accurately record their anxiety response on the short self-report scales. However, despite the overall lack of support, it may be worth identifying those subscales and dimensions which appear to have some potential in their current form; in addition to those which clearly do not have potential. Female participants reporting the intensity of their cognitive anxiety symptoms on the CSAI-2s followed by the MRFs demonstrated significant positive relationships between the corresponding inventories (.49 and .38, $p<.001$; CSAI-2 with the MRF-B and with the MRF-M, respectively). Thus, these findings offer some support for both of the cognitive anxiety anchor terms (*worried-not* and *worried-calm*). Additionally, results suggest that with training, similar to Hardy's (1996a) study, the MRF-M and B subscales from the present study may accurately measure the intensity of cognitive anxiety (in females). Similarly, cognitive anxiety intensity with male participants offered some potential for further use; with the MRF-M showing greater consistency across the frequency and direction dimensions (intensity, .58, p= <.001, frequency, .33 and direction, .33, p<.01) .

In contrast, subscales from the present study which should be treated with caution are somatic anxiety intensity and self-confidence intensity on both MRF versions. Indeed, no significant relationships emerged with the corresponding CSAI-2 subscales. Self-confidence intensity also demonstrated low relationships between the inventories, ranging between r = -.27 and r = -.37, p=05. It is also worth considering that the lack of concurrent validity for the intensity dimension will clearly have implications for the other dimensions. Furthermore, if participants cannot distinguish between the anchors for cognitive and somatic anxiety intensity, the frequency and interpretation of these subscales will be equally inconclusive.

Given the weak concurrent validity, the present findings somewhat contradict previous encouraging results found by Murphy et al., (1989) and Krane (1994). Several explanations may be suggested for both the poor concurrent validity, and the present results contradicting those of the previous investigations. The results from the present investigation could be due to the addition of the frequency and interpretation dimensions. Frequency and interpretation scales for the CSAI-2 have not been fully validated (Swain & Jones, 1993), and thus investigations utilising these scales can only be considered exploratory until further studies have established its validity. The addition of these dimensions triples the length and complexity for completion, with the consequent potential for confusion. Further, as indicated by the internal consistency findings of the present investigation, the two added dimensions in the modified CSAI-2 may alter the psychometric properties and structure of the inventory. In the original development of the CSAI-2, three factors emerged (cognitive anxiety, somatic anxiety and self-confidence); the inclusion of the frequency and direction dimensions could possibly influence this factor structure. For example, the factor analysis could potentially produce more factors, or the frequency and direction dimensions could load on the intensity subscales. Indeed, as Jones et al., (1993) suggested self-confidence should be closely related to the direction dimension, and thus has the potential to load on the self-confidence subscale. Therefore, the factor structure of the modified CSAI-2 needs to be closely examined.

A second possible explanation for the lack of concurrent validity could simply be inappropriate anchor terms on the modified MRFs. Findings demonstrated that the overall relationship between the MRF-M and CSAI-2 were marginally stronger that the MRF-B, offering limited support for Krane's (1994) proposal that truly bipolar anchors should be diametrically opposed. For those athletes completing the inventories in the present investigation, the terms *worried*, *tense* and *confident* are either not completely representative of the CSAI-2 subscales, or are not distinctly different from one another, given the low magnitude and significance of the correlations. Results for the somatic anxiety subscale were particularly poor with both the modified MRF scales, indicating that either a lack of understanding of the anchors *(tense* and *relaxed)*, or of the CSAI-2 items. Similarly, the anchor words for the self-confidence sub-component demonstrated little potential, *confident* and *scared* may not be easily understood by the performers, or alternatively they may not associate them with the CSAI-2 subscales. Results therefore indicate that for the short self-report scales to more accurately record these symptoms different anchors may need to be developed. Possible suggestions for the somatic anxiety sub-scale anchors include; *physically nervous-physically relaxed*; whilst suggestions for the confidence subscale include; *confident-unsure* or *confident-doubtful*. In addition to inappropriate anchors, three one-item subscales will clearly not provide us with as accurate a measure of anxiety and confidence as the three nine-item subscales from the more psychometrically sound CSAI-2. However, given the marginally stronger (or less weak!) findings when the CSAI-2 was completed first, combined with the findings from Hardy's (1996a) single-item integer scales, it may be suggested that the scale will accurately assess anxiety providing participants are trained to assess and report their anxiety levels.

A third possible explanation could be due to the instructions. The performer could interpret the frequency and direction of their anxiety symptoms as requiring a trait response. For example, a performer may rate the intensity of his/ her cognitive anxiety as it feels right now, but because the instructions do not clarify that the response required for frequency and direction of this symptom is how they feel 'right now', the performer may respond in terms of how the symptom 'normally' makes them feel and therefore the response is in trait terms. Thus, modifying the instructions to clarify that all items should be rated as to how the performer feels 'right now' would resolve this problem.

A further reason for the different results could be due to gender and order effects in Kranes' (1994) studies. Possible confounding in Krane's (1994) study was the CSAI-2 being completed first by all participants, thus the inventories were not balanced. Thus, the primer effect found in the present investigation may have existed and consequently influenced the results. Furthermore, one of Krane's (1994) studies produced no gender differences, thus the data were collapsed across gender, possibly influencing the results, and making comparisons more tenuous.

A method of training golfers to report their anxiety levels has been successfully utilised by Hardy (1996a). Participants attended two training sessions, during which they were taught the basic concepts underlying cognitive anxiety, somatic anxiety, and self-confidence and were taught how to accurately assess the levels at which they were experiencing these anxiety symptoms, on 27 point integer scales. Utilising intra-individual analyses, validity coefficients revealed strong relationships between the CSAI-2 subscales and the corresponding integer self-report scales (.75, .76, and .83, for cognitive anxiety, somatic anxiety and self-confidence, respectively). Such results offer a more reliable methodology, that is, an educational phase in which to teach performers to accurately report their anxiety symptomatology. Additionally, this offers an alternative measure of anxiety symptoms, which could be extended to include the frequency and direction of anxiety symptoms. Obviously more research needs to examine this alternative approach.

Although advances in the conceptualisation of anxiety have led to the development of a more encompassing instrument (modified CSAI-2), it is evident that a less intrusive, more expedient, practical tool is required. Based upon the current developments in the short self-report scales, more research is necessary, in order to either; a) improve the current scales already developed, such as adding to those subscales identified as having potential, or b) to develop a better, more reliable measure of the competitive state anxiety response. Although it is also important to remember that nine items will not provide us with as accurate a measure of anxiety and confidence as the more psychometrically sound CSAI-2, the modified version of the CSAI-2 is not without its problems and therefore should be treated with caution, until more extensive investigation has been conducted into its psychometric properties. However, as identified earlier shorter scales could be used when athletes are trained to accurately report their anxiety levels on such short self-report scales (e.g. Hardy's, 1996a, integer scale).

CHAPTER 4.

A failed study and a change in direction of the thesis.

4.1 Introduction

The recent advances in competitive state anxiety research have provided some support for the interactive catastrophe models of anxiety and performance (cusp catastrophe and butterfly catastrophe, see Hardy, 1996a). However, there are only a limited number of empirical studies published which test and support its predictions (Edwards & Hardy, 1996; Hardy, 1996; Hardy, et al., 1994; Krane, Joyce & Rafeld, 1994). The catastrophe models were applied to sport to overcome fundamental flaws found among previous models of anxiety and performance, in particular the inverted-U hypothesis (Yerkes & Dodson, 1908) and multidimensional anxiety theory (Martens et al., 1990). Specifically, multidimensional anxiety assumes that anxiety has only a negative linear relationship with performance. Additionally, it explains a 4-dimensional relationship among cognitive anxiety, somatic anxiety, self-confidence and performance in a series of 2-dimensional relationships, thus assuming that the effects are additive rather than interactive. Such assumptions clearly neglect the test and clinical anxiety literature which has examined both facilitative anxiety effects (Alpert & Haber, 1960; Munz et al., 1975; Hudesman & Weisner, 1978; Wine, 1980) and interactive anxiety effects (Deffenbacher, 1977; Doctor & Altman, 1969; Liebert & Morris, 1967).

Despite the advances in knowledge which have arisen from the models describing the anxiety-performance relationship, researchers need to identify theories which are able to explain why such performance patterns emerge. Hardy (1990) suggested that effort may play an important role in explaining performance catastrophes. He proposed several possibilities, including the notion that physiological arousal may indeed be simply a reflection of effort expenditure (Eysenck, 1979, 1982). Indeed, according to Eysenck (1979) "the extent to which anxiety either facilitates or impairs performance is determined by the extent to which high-anxiety subjects compensate for reduced processing effectiveness by enhanced effort" (p.365). In addition, Eysenck (1979, 1982) proposed that the difference between current aspirations and previous levels of performance is greater in high anxious performers. According to Eysenck (1979), this goal discrepancy should enhance motivation and effort in high anxious performers provided that there is at least a moderate subjective probability of success (i.e. moderate self-confidence). Additionally, he proposed that if the task was perceived to be very difficult or impossible then the greater goal discrepancy would lead to reduced motivation. He cited two proverbs supporting these two motivational effects, which were quoted in Revelle and Michaels (1976); "the tough get going when the going gets tough" and "wise men do not beat their heads against brick walls".

The strongest support for the catastrophe models are those examining the hysteresis hypothesis. Specifically, Hardy and Parfitt (1991) and Hardy et al., (1994) revealed significant three-factor interactions between cognitive anxiety, physiological arousal and the direction of change of physiological arousal upon performance. Both studies manipulated physiological arousal by exercise and thus it has been suggested that physiological arousal may be a reflection of effort (c.f. Hardy, 1990). It is predicted that manipulating physiological arousal (effort) by increasing and decreasing goal difficulty would produce similar results. Such proposals can be clearly linked with processing efficiency theory in which the largest discrepancy between present aspirations and past levels of performance may reflect the critical moment of the performance catastrophe. Processing efficiency theory suggests that cognitively anxious performers who perceive a least a moderate probability of success will invest considerable effort (reflected in increasing heart rate) and subsequently performance will be maintained or even enhanced. However, once the probability of success is low (goal perceived as unrealistic and therefore goal discrepancy large), effort will be withdrawn resulting in a catastrophic fall in performance. Following this drop, physiological arousal and/ or cognitive anxiety would have to be considerably reduced before performers perceive themselves able to cope enough to justify the extra effort to regain the upper performance surface.

Hardy (1990) therefore suggested that more empirical investigations be conducted to examine what happens to performers' effort on a task/ skill at critical points. Thus, the purpose of the present investigation was to examine the role of effort and probability of success at different goal difficulty levels, as proposed by Eysenck (1982). Such proposals are consistent with Revelle and Michaels (1976) suggestion that motivation is affected by the subjective probability of success and moderately difficult goals would be motivating (Erez & Zidon, 1984). Further, Hardy, Maiden and Sherry (1984) examined the effects of anxiety in relation to goal acceptance and goal difficulty, and revealed that high cognitive anxiety had a negative effect on both goal acceptance and optimum goal difficulty. Highly anxious subjects rejected goals at levels they had accepted under no-threat conditions. Therefore, further support is evident for the proposal of effort reflecting physiological arousal, which may be manipulated by goal difficulty.

Specific hypotheses were:

1. Under high cognitive anxiety hysteresis would occur, that is, performance would take a different path when goal difficulty increased compared to that taken when goal difficulty decreased.
2. Increasing goal difficulty was predicted to result in a catastrophic decline in performance when cognitive anxiety was high. A similar catastrophic drop was not expected under low cognitive anxiety conditions.
3. Ratings of effort expenditure were predicted to parallel physiological arousal.
4. Subjective probability of success was predicted to increase with decreasing goal difficulty, and decrease with increasing goal difficulty. Further it was predicted that low probability of success would therefore result in a catastrophic decline, whilst high probability of success would maintain (or improve) good performance.

4.2 Methodology: a brief overview

Participants were 16 adolescent males (M= 15, SD= 3.49) from two tennis clubs in North Wales. Prior to the experimental conditions individual pre-tests were conducted to establish the goal difficulty levels for each individual player and to familiarise the players with the use of heart rate monitors and with the questions. The task was a shortened version of the Avery-Richardson Tennis Service Test (ARTST; see Avery, Richardson & Jackson, 1979). The original test was designed to provide a realistic, quick and objective measure of the tennis serve, with the potential for prediction of the skill under match conditions when combined with accompanying norms for male and female players. The highest points total achieved from the six sets of four serves (in the present investigation) was taken as the participants' maximum and his goals for the criterion task were set with reference to this. During the pre-test the experimenter explained the distinctions between the questions they were to be asked, specifically; how the task made them feel in terms of their physical symptoms (i.e. butterflies, sweaty palms), their cognitions (thoughts of worry, concerns about not performing well), their confidence, and perceived expectations of success and following the task their effort expenditure. The distinctions between the anxiety sub-components were explained in terms of the items on the CSAI-2 and MRF-Likert. The difference between cognitive and somatic anxiety was clearly emphasised. The MRF-Likert was selected due to the lack of strong significant positive correlations in any of the versions in the previous study and the slightly stronger findings of Krane's (1994) study utilising the MRF-Likert. Furthermore, it was assumed that educating the performers of the discrete differences between the anxiety subscales would overcome any lack of understanding of the anchors used (as explained in the previous chapter).

For the experimental conditions participants were randomly assigned to one of the two groups and were balanced both in condition and direction of goal difficulty. Ten sets of four serves (5 with goal difficulty increasing, 5 with goal difficulty decreasing) were played with goal difficulty either increasing or decreasing first, and ranging from 40% to 140% in 25% increments. Cognitive anxiety was manipulated via instructional sets, based upon those which have been successfully utilised in both test and sport anxiety experiments (Calvo, 1985; Hardy et al., 1994; Hardy, Mullen & Jones, 1996). The high anxiety condition (ego-threatening instructions, see appendix) comprised; a serving competition for which prizes were awarded, serves completed in groups of 4, the competition was videoed, photographs were taken, and results to be posted at the two clubs. In contrast, the neutral condition informed participants that this was a practice session completed individually, and the scores of which would be added to our database for the tennis serving task.

4.4 Results

Prior to the main analyses being conducted t-tests were used to confirm that the cognitive anxiety manipulation had been successful. However, no significant differences emerged between experimental conditions on cognitive anxiety, or any of the other variables; that is, the MRF subscales (somatic anxiety and self-confidence), goal difficulty, heart rate, effort, probability of success in achieving goal or on performance. No main effects emerged for goal difficulty as well as cognitive anxiety and therefore, it was inappropriate to pursue further analysis, given that the primary purpose of the present study was to examine hysteresis, that is, the performance taking a different path when goal difficulty is increasing compared to that taken when goal difficulty is decreasing, only under high cognitive anxiety.

4.5 Possible limitations

Due to the lack of significant differences on any of the variables, the experiment was examined for potential design flaws or other limitations which may have negated the cognitive anxiety manipulation. A possible flaw could be the use of the MRF (Krane, 1994). Indeed, results from the previous investigation (chapter 3), suggest that this form should be treated with caution. Despite participants being given detailed explanations to facilitate their understanding of the separate components of anxiety, the purpose of which was to enable them to distinguish between the anxiety subscales they were unable to accurately report their anxiety state during the pre-test (as suggested in the previous study) and therefore further possible causes have to be sought. This perhaps highlights the inappropriate anchors, as suggested in the previous chapter. A further possible cause of the poor results could be that they are a reflection of the age group of the sample. The MRF versions (Krane, 1994) have only been successfully used with college-aged sample with a mean ages of 19.35 and 20.10 (range of 17-29) compared to the mean age (M=15) of the present sample.

The failure of the cognitive anxiety manipulation itself demonstrates that the high anxiety condition was not anxiety-inducing enough or, indeed the neutral (low anxiety) condition was too anxiety-inducing. Suggestions for inducing greater levels of anxiety include having an audience present. An audience which included parents, coaches and peers may be the most effective in simulating high pressure situations. An alternative suggestion would be to have a top recognised tennis player judging the serves (similar to Hardy et al.'s, 1996, design).

A further potential limitation could be due to the task involved in the current study. The tasks completed in previous manipulations (Calvo, 1985; Hardy et al., 1994; Hardy et al., 1996) were not as technically complex as the tennis serve, e.g. a golf putt. Additionally, the task used to assess the serve was a very crude test, in which a ball landing an inch outside of the designated area would score no points, in contrast to 6 points inside the area. The power of the serve could be more accurately measured, however, this has its faults, given that it does not account for spin. Alternatively, a scoring system focusing on degree of error (see Hardy et al., 1996) would be more accurate, although methodologically complex.

4.6 Change in direction of thesis

Given these poor results, the lack of manipulation effects and the subsequent speculation regarding limitations it was decided to slightly alter the direction of the thesis. Based upon the rationale underpinning the present investigation, alternative approaches were considered in order to examine the proposed anxiety-performance relationship explanations. It has been suggested that quantitative designs utilising standardised inventories may fail to provide the great contextual insight necessary for examining catastrophic performances (Hardy et al., 1996). Indeed, the failure of the quantitative approach to unearth the underlying processes of the anxiety-performance relationship via the current inventories suggests that, a different approach be taken, such as qualitative analyses. Essentially, it is suggested that qualitative methodologies are employed when variables cannot be tapped through existing questionnaires (Patton, 1990). A goal of such investigations is to obtain rich, in-depth and detailed information from an "insider's" perspective, one that stresses the context of the situation in which the experience takes place. Therefore, in order to assess the roles of the variables discussed in the present study (anxiety sub-components, probability of success at a goal, and effort expenditure), in addition to seeking additional anxiety-related variables not previously identified in the research literature, which might influence performance, it was decided to employ the qualitative methodology in the next study.

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CHAPTER 5.

An in-depth analysis of catastrophic performances and the associated thoughts, feelings and emotions: I. Introduction to the project

5.1.1 Introduction to the project

This chapter introduces a series of chapters designed to reveal the wealth of information which emerged from in-depth interviews with elite performers who had experienced a catastrophic performance. The interviews covered the whole competitive event; that is, from the time leading up to the dramatic drop in performance to the coping strategies employed to overcome it. Thus, each chapter highlights the results of one phase of the catastrophic experience; the pre-catastrophe phase, the catastrophe phase, the post-catastrophe phase and the coping phase. The results of the hierarchical content analysis are briefly discussed, identifying how these results relate to previous findings and the proposed models and theories. The fourth chapter in the qualitative series (chapter 9) draws the three phases of the catastrophe experience together to discuss the bigger picture; providing support for those theories and models which best explain the results. It draws upon the unique nature of the study by presenting more detailed exposure of two of the athletes interviewed, one of whom recovered from his catastrophic performance and the other whom did not. This chapter also discusses the practical implications of the qualitative study, methodological considerations and directions for future research. The final chapter of the qualitative data (chapter 10) examines the coping attempts of the performers.

The purpose of the present chapter is to provide an overview of the study and the methodology, thus providing underlying coherency to the series. Firstly, the theoretical underpinnings directing the development of the study are outlined; specifically, the more recent models describing the nature of the anxiety-performance relationship together with the theories which have the potential to provide explanations for these models. The methodological framework of the project is explained, including the interview development, data preparation and data analysis. Finally, methodological considerations pertinent to the employment of qualitative methodologies are examined. The following chapters are presented in chronological order; the pre-catastrophe phase, catastrophe phase, post-catastrophe phase, the general discussion of the performance and coping strategies. 'Catastrophic performance' in the present study referred to a performance which had taken a sudden and dramatic drop, which does not happen often (as in choking).

5.1.2 Introduction to the literature

Competitive state anxiety research in sport has relied, to a large extent, on Martens and colleagues' (Martens, Burton, Vealey, Bump & Smith, 1990) multidimensional anxiety theory. However, the predictions of the theory have received only equivocal support (e.g. Caruso, Dzewaltowski, Gill & McElroy, 1990; Karteroliotis & Gill, 1987). Only one investigation has provided support for all three of the predictions (Burton, 1988). In addition to this somewhat tenuous support, the proportion of performance variance typically explained by the theory is rather low. Not surprisingly, therefore, researchers have begun investigating potential reasons for the lack of predictive power of multidimensional anxiety theory, in addition to searching for alternative explanations or descriptions of the anxiety-performance relationship. Gould & Krane (1992) actually called for qualitative research to provide a more detailed and clearer perspective on the athlete's emotions and cognitions, particularly within the stress and performance domain. Hardy and colleagues (Fazey & Hardy, 1988; Hardy, 1990, 1996) have identified specific flaws with multidimensional anxiety theory, and thus proposed an application of Thom's (1975) cusp catastrophe model to sport performance. The flaws they highlighted included: (a) the prediction that cognitive anxiety has only a negative linear relationship with performance; and (b) the fact that the theory is used to explain a four-dimensional relationship in a series of two-dimensional relationships. The research outlined below considers findings from both sport psychology and other domains of psychology which provide fundamental support for questioning whether multidimensional anxiety theory's usefulness as a guiding principle for research and intervention is outweighed by the criticisms which can now be levelled at it (cf. Hardy, 1996).

Examination of the test anxiety research literature provides strong support for facilitative anxiety effects. Indeed, over thirty-five years ago researchers (Alpert & Haber, 1960) distinguished between facilitative and debilitative test anxiety, a finding which has re-emerged throughout test anxiety literature (e.g. Carver & Scheier, 1986; Eysenck, 1982; Hudesman & Weisner, 1978; Munz, Costello & Korabek, 1975). Despite such findings, research on competitive state anxiety in sport has maintained that cognitive anxiety has only a negative effect on performance (e.g. Martens et al., 1990); it is only recently that researchers have begun to examine the potentially facilitative influence that anxiety can have on performance through two closely linked lines of research.

One line of research, the proposal of the cusp catastrophe model, emerged from findings within test and clinical anxiety. Specifically, the cusp catastrophe model predicts that cognitive anxiety can sometimes facilitate performance and sometimes debilitate it depending upon the levels of cognitive anxiety and physiological arousal experienced (see Hardy, 1990, for greater detail). Deffenbacher (1977) also found interactive effects among worry and emotionality; when worry was low, emotionality was unrelated to academic performance; whilst under high worry, high emotionality was debilitative to academic performance. More recently, similar findings have emerged within competitive sport anxiety research (Edwards & Hardy, 1996; Woodman, Albinson & Hardy, 1997) thus providing support for the cusp catastrophe model prediction of interactive effects of cognitive anxiety and physiological arousal.

The third important prediction of the catastrophe model, hysteresis, has been directly tested in two investigations, involving basketball players and crown green bowlers (Hardy & Parfitt, 1991; Hardy, Parfitt & Pates, 1994). Essentially, hysteresis is predicted to occur under high cognitive anxiety levels, but not under low cognitive anxiety. Results indicated that under high cognitive anxiety conditions, performance followed a different path when physiological arousal was increasing than the path it followed when physiological arousal was decreasing, thus supporting the catastrophe model predictions. However, as the findings are limited to a few investigations it is clear that more research is required.

The second line of research examining facilitative and debilitative effects of anxiety upon performance emerged through interviews with athletes (Jones & Swain, 1992) which revealed the existence of further dimensions of anxiety over and above the intensity of the symptoms. Based upon these findings, a modified version of the CSAI-2 was developed to examine the further dimension of directional perceptions of anxiety symptoms. A series of investigations have now been conducted utilising the modified inventory (due to limited space, see Jones' review, 1995) which have provided consistent support for both facilitative and debilitative effects of the different anxiety sub-components upon performance.

Clearly, it is important not only to provide additional evidence regarding the catastrophe model, but also, to further explore the facilitative-debilitative anxiety effects. More specifically, we are interested in: when cognitive anxiety exerts a beneficial effect on performance; the precise form that performance decrements take, that is, whether they are truly catastrophic; the pattern of recovery, if indeed recovery is possible; the examination of higher dimensional catastrophe models, which may include self-confidence and/ or the perception of control; and, finally, to explore in more depth the psychological processes and explanations underlying performance catastrophes.

The following models describing the anxiety-performance relationship were considered; the cusp catastrophe model (Fazey & Hardy, 1988) and the butterfly catastrophe model (Hardy, 1990). Several explanations can be identified which may help to explain catastrophic drops in performance: Eysenck's (1979, 1982) processing efficiency theory; Master's (1992) conscious processing hypothesis, which is closely related to the 'trying too hard' concept proposed by Naatenen (1973); and Carver & Scheier's (1986) control-process model. The selection of these models and theories was based upon the existing literature (see Hardy, 1996, for greater detail) and from earlier research presented in the preceding chapters of the current thesis and hence not described again here. Very little research has attempted to directly link any of these theories to catastrophes in competitive sport performances, and therefore the primary purpose of the present investigation was to explore such potential explanations of catastrophic performances, both inductively in the hierarchical content analysis and deductively in the theory fitting analysis. A second purpose was to examine the precise nature of performance catastrophes and perhaps reveal the influence of other variables which have not have been previously identified. A final purpose was to explore pre-competition CSAI-2 scores for three different performances, one of which was the catastrophic performance, to compare to the qualitative data.

5.2 Methodology

5.2.1 Participants

The sample consisted of eight elite male athletes who had experienced a catastrophic performance whilst competing in a variety of sports; basketball, canoe slalom, gymnastics, powerlifting, sailing and swimming. The athletes were aged between 19 and 28 (M=24.63, SD= 2.92). At the time of their catastrophic performance the competitive experience of the athletes ranged from 7.5 to 21 years (M=14.06, SD= 5.57), which included competing at levels from a world ranked number one to a top US collegiate athlete. Based upon the gender difference findings within the anxiety-performance literature (e.g. Jones, Swain & Cale, 1991) a single-sex design was utilised. At the time of the interviews three of the athletes were no longer competing in their respective sports.

5.2.2 Design

A qualitative methodology was selected for this investigation in order to unearth some of the unique information which elite performers may possess concerning large performance drops. The qualitative process identifies that, "The challenge is to make sense of massive amounts of data, reduce the volume of information, identify significant patterns and construct a framework for communicating the essence of what the data reveal" (p.372, Patton, 1990).

5.3 Measures

5.3.1 Interview Guide

Interview guides facilitate the collection of qualitative data, standardise the progression through the experiences of the participants (Patton, 1980) and allow for replication. The present interview guide format was modelled on that developed in the Gould et al. (1993) sources of stress study. Following a pilot interview it was decided that the interview was too intensive and took too long to conduct in one meeting, therefore it was separated into two meetings. The advantages of having two meetings included; having a member check and having more time to enhance rapport and establish trust (Lincoln & Guba, 1985). The purpose of the member check is to ensure the interviewer has completely understood the experience explained by the participant. The member checking involved the interviewer reading a summary of the first interview to the participant at the beginning of the second meeting, after which the participant provided feedback on the accuracy of the summary. If the interviewer had misunderstood something the participant said, it was discussed and the appropriate alterations made to the summary.

The interview guide (see appendix 4a) comprised eight sections. The first three sections were conducted during interview one, whilst the remainder, that is the more specific structured questions, were conducted during interview two:

I. demographic information;

II. retrospective modified CSAI-2s for best and normal competitive performances;

III. general open-ended familiarisation questions on the performance drop, (how, when and where it occurred), followed by the modified CSAI-2 referring to this experience;

IV. summary from interview one, followed by a member check to confirm the information. Specific questions were then asked regarding performers' experiences prior to the performance drop (thoughts, feelings, emotions etc.);

V. specific questions regarding athletes' experiences from the actual drop in performance;

VI. specific questions regarding athletes' experiences after the performance drop began, including coping attempts and recovery;

VII. specific questions regarding other similar performance decrements which the athletes may have experienced.

5.3.2 Modified version of the competitive state anxiety inventory-2

The original CSAI-2 (Martens et al., 1990) was developed to measure three pre-competitive components of anxiety; cognitive anxiety, somatic anxiety and self-confidence. A high degree of internal consistency for the subscales has been demonstrated in several studies (Martens et al, 1990) with alpha coefficients ranging from 0.79 to 0.90. The scale consists of 27 items with 9 items in each of the three subscales.

The CSAI-2 measures anxiety symptoms on an "intensity" scale, assessing the level of the symptom the performer is experiencing on a four point Likert-type scale (from 1= not at all and 4= very much so). However, the frequency with which the performer is experiencing these symptoms; and the extent to which the performer perceives the intensity and frequency of the symptoms to be facilitative or debilitative to their performance must also be considered (Jones & Swain, 1992; Jones, Swain, & Hardy, 1993; Swain and Jones, 1993). Jones and Swain's (1992) modified version of the CSAI-2 included these additional dimensions of frequency and directional interpretation. The frequency scale ranges from 1 (never) to 7 (all the time), thus the possible score for frequency of intrusions ranges from 7 to 63 for each subscale. Finally, participants rate whether the degree to which the intensity and frequency of each symptom they are experiencing is either facilitative or debilitative to their performance. The directional interpretation scale ranges from +3 ('very positive') to -3 ('very negative'), thus the possible direction scores on each subscale range from +27 to -27. Jones and Swain's (1992) modified CSAI-2 was further modified for the present investigation. Specifically, the instructions were reworded to improve their clarity. Additionally, the instructions asked the athletes to respond to the items in terms of their recollection of thoughts and feelings prior to three separate performances; a 'normal' performance, an 'optimal' performance and the 'catastrophic' performance. They included an anti-social desirability set which emphasised that there were no right or wrong answers and that participants should answer as honestly as they could (see appendix 1a).

5.4.1 Pilot interviews

Pilot interviews were conducted to ensure the interview guide was consistent in its sequencing and phrasing of questions, and achieved its aims to enhance rapport, comfort, recall and elicit truly open-ended responses as required (Patton, 1990). In addition, the pilot interviewed formed part of the training for the interviewer. The first pilot interview included all of the eight sections outlined above in a single interview. The interview was video-taped (with the participant's consent) and critiqued by three experts in qualitative research (with the interviewer present). The major conclusion was to separate the interview into two meetings at the natural break between the general open-ended questions and the more specific questions within the interview. The first meeting required a general recollection of the performance, which was included to familiarise the participants with the focus of the study and with the interviewer. The second meeting occurred between two and seven days following the first interview, to allow participants time to recollect their catastrophic performance. Following the critique, the interview guide was restructured and a second pilot interview was conducted, video-taped and again critiqued by the experts to ensure that the new format was more appropriate.

5.5.1 Procedure

All athletes were contacted by phone or in person. They were informed of the nature of the investigation and asked if they felt they had experienced a catastrophic performance drop within the past year. A catastrophic performance was defined as a performance which had begun in a *normal* fashion but had dropped considerably rather rapidly. The time-frame of within a year, was selected in order that the participants could accurately recall their thoughts, feelings and emotions. Those performers who had experienced a catastrophic drop in their performance confirmed that this was an infrequent occurrence, to ensure that they were not regular 'chokers' (as this was not the focus of the investigation). Additionally, the interviewer ensured that the performers were comfortable talking about their catastrophic performance. It was stressed that participation was voluntary and that all data would be strictly confidential. Times were scheduled for the two interviews and participants were either given or mailed a sheet outlining what they would be asked to recall, in order to familiarise them with the content of the interviews.

Interviews occurred at a place convenient to the athlete, either at their training venue or their homes, to ensure a familiar environment. Each athlete was asked an identical sequence of questions which appeared in the interview guide (as outlined above). Specific clarification and elaboration probes enabled the athletes to expand on their response (Patton, 1990), in order to provide the interviewer with complete in-depth understanding of the meaning of all their responses. Follow-up additional probes differed slightly amongst the athletes, depending upon the athletes' responses. When the interviewer was unclear about a comment clarification probes were utilised which asked participants to repeat or clarify their comment. All contact with the athletes was by the author.

Following the interviews, athletes were thanked for sharing what in most cases was a distressing experience. All athletes felt they benefited or gained something from the interviews. They indicated that it had heightened their awareness of the important factors which they felt were contributors to their catastrophic performance. They also felt it had helped them to highlight potential strategies that they could learn in order to cope with such a performance drop should one happen in the future or, better still, learn skills which could prevent such a drop occurring. Indeed, two of the athletes are currently working on such strategies with their respective sport psychology consultants.

The interview process was successful in eliciting detailed and rich responses, and as Scanlan et al., (1989) succinctly phrased it; "We do not feel that we 'tested' these individuals or that they were 'subjects' in our study. Rather, we collaborated with them to better understand issues that were important to us. They provided the in-depth, rich information, we listened." (p.63)

5.6.1 Data Preparation and Analysis

Both deductive and inductive approaches were employed in the development of the interview guide and the data analysis. The inductive approach allows themes and categories to emerge from the data, whilst the deductive approach uses a predetermined set of themes and categories to organise the data (Patton, 1980). The interview guide was developed from a theoretical framework, as described earlier, and thus represented a deductive approach.

The investigators imposed deductive reasoning on the data, by separating the interview into sections; pre-catastrophe experiences, during catastrophe experiences, post-catastrophe experiences, and coping strategies. This was conducted because the associated cognitive and physiological/somatic responses of the catastrophe experience are thought to vary before, during and after catastrophic drops in performance (Hardy, 1990), and separating the data into these time frames allowed us to examine emerging differences.

Quotes which represented the thoughts, feelings and experiences at each stage of the performance were extracted from the transcripts and used as the raw data for the analysis. Hierarchical content analysis employed inductive procedures to organise the quotes into interpretable and meaningful themes and categories. The following procedure outlines the stages of the hierarchical content analysis:

1. All tape recorded interviews were transcribed verbatim, producing 150 pages of text.
2. Two investigators, one of whom was the interviewer, read and reread the transcripts to become familiar with each athlete's interview and listened to the taped interviews, where appropriate, to gain additional insight that the printed word could not provide, such as tone of voice, pauses, use of sarcasm, etc.

3. Idiographic profiles (1 page summaries) were written by both investigators on each of the athletes. Each profile was then discussed extensively until consensus was reached and a single profile developed.
4. In addition to the idiographic profiles, and based upon inductive analysis, each investigator highlighted raw data quotes. Each quote was a "statement made by the subject which was self-definable and self-delimiting in the expression of a single, recognisable aspect of the subject's experience" (Cloonan, 1971, p.117). The quotes became the raw data or the basic unit of analysis (cf. Scanlan, Stein & Ravizza, 1989) for the content analysis. The quotes were categorised (Lincoln & Guba, 1985) by bringing together those quotes representing a distinct idea or concept that characterised the athlete's response. These categories are referred to as the raw data themes. During this stage consensus between the two investigators had to be reached. Any disagreement between the two investigators required a review of the transcript to settle the dispute. This validation process resulted in a list of agreed raw data themes from all participants for each section of the interview. To facilitate further analysis of these themes, each raw data theme was written on a separate index card.
5. For each phase of the catastrophe experience, the raw data themes were inductively analysed allowing common themes/patterns of greater generality to emerge. This process involved the clustering of themes according to the similarity of their meaning. Clustering involves constant comparison of each theme with all other themes to unite themes with similar meanings and separate those with different meanings (Glasser & Strauss, 1967). The higher level themes were labelled 'first dimension'; 'second dimension'; and 'third dimension', in order of increasing generality. The highest level, referred to as 'general dimensions', therefore represented common themes of the greatest generality between which no further links emerged. As with the idiographic profiles and raw data theme generation, consensus was reached on all higher order themes.
6. After no further higher order themes emerged, the investigators reviewed the emergent patterns to ensure that the descriptors made intuitive sense and could be easily understood. The raw data themes comprising each general dimension were then reread to ensure that they fitted coherently into the broader category. Again consensus was reached throughout.

7. An additional experienced investigator provided a further reliability check (Scanlan, Ravizza & Stein, 1989). This third researcher coded 20% of the raw data quotes from one section of the interview, into raw data themes; matched all the second dimension themes to their third dimension themes, and matched all the third dimensions to the general dimension themes. Reliability levels were 100%, that is all 37 of the raw quotes, were correctly coded; 100% of third dimension to general dimension themes were correctly coded; and 87% of second to third dimensions were correctly coded.

8. A member check (as described earlier) provided a further reliability check of each participant's first interview. The consensus-validation procedures were used to remove any potential analyst bias (see Scanlan et al., 1989). At any stage when a theme could not be logically clustered with any other theme it was carried straight through to the next dimension.

5.7.1 Deductive model and theory examination

A list of questions (see appendix 5b) was generated distinguishing the fundamental differences of each of the models and theories proposed in the current investigation. Based on the transcripts and the understanding gained from the qualitative process, these questions were then answered relative to each athlete. The responses for each question were coded yes, no and maybe, and for the overall model the responses were coded provides support, does not provide support, provides some support. The model/ theory offering the best fit for each athlete's experiences is discussed in the general discussion for the qualitative study.

CHAPTER 6.

An in-depth analysis of catastrophe performances and the associated thoughts, feelings and emotions: II. The pre-catastrophe phase [1]

6.1 Results of the hierarchical content analysis

This was the largest section of the data comprising 584 raw quotations. From these quotes and 438 subsequent raw data themes related to the pre-competitive phase of the catastrophic performance, 94 first dimensions, 33 second dimensions and 10 third dimensions emerged which formed five general dimensions (see fig 6.1). The general dimension with the largest number of quotes is discussed first, followed in descending order (in terms of the number of quotations contained within them) by the remaining dimensions. For each of these dimensions, the general dimension is introduced first followed by the third and second dimensions. Examples of quotations from selected first dimensions are also presented.

6.2 Confidence

The general dimension 'confidence' comprised two third dimensions, confidence and positive feelings, which included quotes (N=188) from all of the athletes. The dimension was formed by several aspects of confidence, such as confident of ability, and winning; in addition to positive feelings due to feeling physically good and feeling good about the upcoming performance. The second and third dimensions from which the 'confidence' general dimension emerged are presented in figure 6.2.

Second dimensions	Third dimensions	General dimensions
feeling good about performance positive feelings positive physical feelings feeling good normal feelings feeling physically ok	positive feelings	confidence
lack of worries confidence in own ability over confidence confidence about winning confidence	confidence	
nervous feelings of social evaluation self-doubts negative feelings	anxiety	cognitive anxiety
expecting tough event event importance awareness of thoughts thoughts of main opponents	thoughts and feelings about the event	
performance strategies attempting to use strategies goals thoughts of winning thinking about the outcome	goals and strategies	goals
inappropriate strategies	inappropriate strategies	
feelings of control mentally prepared focused	self-control	readiness
motivated wanting to get on with it	ready to perform	
somatic anxiety		unease
unusual feelings unusual situation	unusual feelings and situation	

Figure 6.1.: General and third dimensions of the pre-catastrophe phase.

Second dimension	Third dimension	General dimension
lack of worries confidence about winning confidence in own ability over confidence confidence	confidence	confidence
feeling good about performance positive feelings feeling good feeling physically ok positive physical feelings normal feelings	positive feelings	

Figure 6.2: Hierarchical structure of the general dimension 'confidence'.

6.2.1 Positive feelings

First dimension	Second dimension	Third dimension
things going fine felt in a groove	feeling good about performance	positive feelings
positive because of good recent performances positive feelings of preparation good warm-up positive thoughts	positive feelings	
feeling physically good felt relaxed felt strong	positive physical feelings	
feeling good positive excitement	feeling good	
normal feelings		
feeling ok felt physically ok	feeling physically ok	

Fig 6.2.1: Hierarchical structure of the third dimension 'positive feelings'.

The third dimension 'positive feelings' emerged from six second and 14 first dimensions. The dimension comprised positive feelings towards the upcoming performance, preparation, warm-up and physical feelings. 'Positive feelings' (N=113) were experienced by all of the eight athletes (fig 6.2.1).

6.2.1.1 Feeling good about performance

Raw themes	First dimensions	Second dimensions
everything was going right just running along nicely in lead & very comfortable doing fine & only a couple of pieces to go signs that I as going pretty well everything was no problem started off just fine everything going good felt everything going right no trouble with anything thought it was going promisingly everything going well, boat running well after good 1st piece, relieved to have made up the gap everything was in place now putting myself in good position to be able to qualify 1st 125m, didn't feel I had to concentrate too hard	things going fine	feeling good about performance
just one of those days felt good about myself I got into a groove in flow realised, god, I'm on felt on it was going good ideal performance state	felt in a groove	

Fig 6.2.1.1: Hierarchical structure of the second dimension ' feeling good about performance'.

Twenty-four quotes, made by seven of the athletes, similar to "Everything was going well, yes, the boat was running well" and "I was out in front and very comfortable" formed the raw data themes within the first dimension, 'things going fine'. Eleven additional quotes suggested that things were actually going better than just 'fine' and were 'in a groove'; for example, "I just realised, god, I'm on". The second dimension, 'feeling good about performance', emerged from 35 quotes and two first dimensions, 'things going fine' and 'felt in a groove'; and were experienced by all of the athletes (fig 6.2.1.1).

6.2.1.2 Positive feelings

Raw themes	First dimensions	Second dimensions
my times were looking really good raced really well in qualifying winning qualifying run, big buzz, self-belief winning qualifying run, inspirational good summer of training feeling confident, because of the way I was sailing initially felt good having won qualifying run usually what I can do at home would win the WC	positive because of good recent performances	positive feelings
I'd been doing everything right given it so much thought just to sail the way I know I can belief, trained bloody hard for it pictured possible eventualities	positive feelings of preparation	
making shots in warm-up fairly good warm-up couldn't miss during warm-up end of warm-up, I was fine with myself felt ok in warm-up general pre-comp warm-up very good, which calmed me down	good warm-up	
very positive attitudes still felt I could come back great to have these frequent thoughts thoughts & feelings had positive effect felt untouchable	positive thoughts	

Fig 6.2.1.2: Hierarchical structure of the second dimension 'positive feelings'.

This second dimension comprised 28 quotes (by seven of the athletes) and four first order dimensions. "But, the way I was sailing I was certainly up there feeling confident" represents the quotes within the raw data themes from which the first dimension 'positive because of good recent performances' emerged. "I put in psychological work prior to the race, during the race, ... so that side of things were, also, from a completely logical point of view, I trained bloody hard for it" and "the general warm-up before the competition was really good", were quotes contributing to the raw data themes from which emerged the first dimensions 'positive feelings of preparation' and 'good warm-up', respectively. 'Positive thoughts' combined with the two aforementioned first dimensions to form the second dimension, 'positive feelings' (fig 6.2.1.2). Seven of the eight athletes experienced these feelings.

6.2.1.3 Positive physical feelings

Fourteen quotes from five athletes comprised the second dimension 'positive physical feelings'. "So I just felt on, like all my body and everything just felt fine" characterises the first dimension 'physically feeling good'. This dimension clustered with 'felt relaxed' and 'felt strong' to form the second dimension 'positive physical feelings', to which five athletes contributed 14 quotes (fig 6.2.1.3).

Raw themes	First dimensions	Second dimensions
didn't feel much physical stress feeling good physically heart beating fast, as normal, felt good	feeling physically good	positive physical feelings
very relaxed kept relaxed knowing I'd beaten opponents before not tense no anxious feelings in arms and hands	felt relaxed	
felt very powerful felt very strong	felt strong	

Fig 6.2.1.3: Hierarchical structure of the second dimension 'positive physical feelings'.

6.2.1.4 Feeling good

Fourteen quotes similar to "I thought I should win today, judging by who's in it, you know, and that I'd beaten before, and how training had been going" comprised the first dimension 'feeling good'. This combined with 'positive excitement' to form the second dimension 'feeling good' (fig 6.2.1.4). Fifty percent of the athletes interviewed produced the 18 quotes comprising the second dimension 'feeling good'.

Raw themes	First dimensions	Second dimensions
felt good for Worlds felt good because training had gone well & beaten opponents before felt really good felt pretty good felt fine, not always good more than happy with how it was going (went infront) feeling high feeling down inside my heart (good) it just gave me a high	feeling good	feeling good
left start line excited felt over-excited, positive just wanted to play	positive excitement	

Fig 6.2.1.4: Hierarchical structure of the second dimension 'feeling good'.

6.2.1.5 Normal feelings

Raw themes	First dimensions	Second dimensions
normal competition motivation fairly tense, not much more than normal felt very normal once on water, more at ease/normal normal thoughts usual self-thinking, 2 more to go	normal feelings	

Fig 6.2.2.6: Hierarchical structure of the second dimension 'normal feelings'.

"Once on the water, on the water warming-up, you know you basically get to a level that's familiar" is characteristic of the quotes within this dimension (fig 6.2.1.5).

6.2.1.6 Feeling physically okay

"I'd had some physical problems and limitations and they weren't bothering me" is characteristic of the three quotes within the first dimension 'felt physically okay'. This clustered with five quotes from the first dimension 'feeling okay'. The emerging second dimension was named 'feeling physically okay' and comprised eight quotes from 50% of the athletes (fig 6.2.1.6).

Raw themes	First dimensions	Second dimensions
didn't feel tired or stiff after 1st 4 felt ok (morning of comp) felt fine felt really good	feeling okay	feeling physically okay
physical problems not worrying me felt had sufficient time to rest	felt physically okay	

Fig 6.2.1.6: Hierarchical structure of the second dimension 'feeling physically okay'.

6.2.2 Confidence

Seventy-three quotes, eleven first dimensions and five second dimensions clustered to form the third dimension 'confidence' (fig 6.2.2). All of the eight athletes experienced feelings of confidence prior to their catastrophic performance.

First dimension	Second dimension	Third dimension
no concerns about performance not worrying about other opponents no worries	lack of worries	confidence
confident about winning expectations of winning	confidence about winning	
confident in own ability & performance ability to compete at least on equal terms	confidence in own ability	
over-confidence not having to put too much effort in started getting sloppy	over-confidence	
felt confident	confidence	

Fig 6.2.2: Hierarchical structure of the third dimension 'confidence'

6.2.2.1 Lack of worries

Raw themes	First dimensions	Second dimensions
no concerns about being in touch with thoughts & game plan wasn't worried about it at all not concerned about who could beat me, only semi-concerned who'd be in top 8 no doubt I could swim well not concerned with performance	no concerns about performance	lack of worries
I knew they were out of gas not thinking about other opponents not worried about other swimmers being ahead	not worrying about other opponents	
not too nervous when came to race didn't feel any pressure didn't have a care in the world not worried about competition	no worries	

Fig 6.2.2.1: Hierarchical structure of the second dimension 'lack of worries'

Five raw themes were derived from quotes, such as, "I had absolutely no doubt in my mind that I could swim well" and "so I wasn't worried about it at all". These raw themes clustered to form the first dimension named, 'no concerns about performance'. Two further first dimensions emerging from the themes were 'not worrying about other opponents' and 'no worries'. The three first dimensions formed the second dimension 'lack of worries' which represented 15 quotes from six of the athletes (fig 6.2.2.1).

6.2.2.2 Confidence in own ability

"..I felt very confident about taking that shot" is an example of the 19 quotes, by five athletes, comprising the themes within the first dimension, 'confident in own ability and performance'. Subsequently 'confidence in own ability' emerged from two first dimensions, 'confident in own ability and performance' and 'ability to compete at least on equal terms' (fig 6.2.2.2).

Raw themes	First dimensions	Second dimensions
confident it was going to be fine very confident about taking shot confidence in my own ability felt quite confident with myself confident in getting ball confident with no problems I know I can do it just thought I could do it good training session 3 days before, yes, I can do this truly believed I was good enough to win WCs felt pretty confident about going through routine felt I could block in a good run	confident in own ability & performance	confidence in own ability
they were tough, but so was I opposition will do well, but they won't beat me felt good because shown myself I was as good as opposition confident could compete against top GB gymnasts properly	ability to compete at least on equal terms	

Fig 6.2.2.2: Hierarchical structure of the second dimension 'confidence in own ability'.

6.2.2.3 Over-confidence

This category represented quotes which suggested that the athletes felt they might have been 'over-confident', for example "I got a little bit too cocky". Other quotes similar to "... just like I was not putting forth any effort" clustered to form the first dimension, 'not having to put too much effort in'. Eighteen quotes from five athletes provided the raw data for three first dimensions. Subsequently the second dimension 'over-confidence' emerged (fig 6.2.2.3).

Raw Themes	First dimensions	Second dimensions
overstepping my boundaries bordering on confidence & arrogance got a little bit too cocky	over-confidence	over-confidence
physical demands not too great knew could do it easily felt game would be easy not putting forth any effort not too demanding to get through to next trial not having to try very hard	not having to put too much effort in	
started getting sloppy started relaxing must have relaxed a bit too much less effort than should have done	started getting sloppy	

Fig 6.2.2.3: Hierarchical structure of the second dimension 'over-confidence'.

6.2.2.4 Confident about winning

Fifteen quotes from five of the athletes provided the raw data for this second dimension. Eight quotes, similar to, "I'm confident of winning because I'm confident of going through my routine" clustered into five raw data themes which comprised the 'confident about winning' first dimension. The quote "... from the start of the day, because I'm like, I'm going to win today, even before I'd even got to the gym" was similar to 6 quotes which clustered to form the first dimension 'expectations of winning'. The second dimension, 'confident about winning' emerged from these two first dimensions (fig 6.2.2.4).

Raw themes	First dimensions	Second dimensions
confident of winning because confident of going through routines confident should win the comp confident could/should beat the main rival confidence in beating opponents confident could make up margin trailing by	confident about winning	confident about winning
I was there to win before arrived at gym, I'm going to win today expected to beat opponents at bottom of conference expected to win, based on previous game expecting to win seeded one	expectations of winning	

Fig 6.2.2.4: Hierarchical structure of the second dimension 'confident about winning'.

6.2.2.5 Confidence

Ten quotes comprised the first dimension 'felt confident', and this dimension was subsequently carried through to the second dimension as 'confidence'. "I think I felt quite confident at the start" epitomises the quotes made by 50% of the athletes in this dimension (fig 6.2.2.5).

Raw themes	First dimension	Second dimension
felt quite confident at start no self-doubts confidence was good felt really confident felt very confident no doubt about confidence	felt confident	confidence

Fig 6.2.2.5: Hierarchical structure of the second dimension 'confidence'.

6.3 Cognitive anxiety

The general dimension 'cognitive anxiety' represented various levels of worry, in terms of thoughts, nervousness, self-doubts and event importance. 'Cognitive anxiety' emerging from the two third dimensions 'anxiety' and 'thoughts and feelings about the event', comprised 174 quotes produced from all eight athletes (fig 6.3).

Second dimensions	Third dimensions	General dimension
nervous feelings of social evaluation self-doubts negative feelings	anxiety	cognitive anxiety
expecting tough event event importance awareness of thoughts thoughts of main opponents	thoughts & feelings about the event	

Fig 6.3: Hierarchical structure of the general dimension 'cognitive anxiety'.

6.3.1 Anxiety

First dimension	Second dimension	Third dimension
nervous unusually nervous feeling pressure fear of performing	nervous	anxiety
wanting to prove myself in limelight	feelings of social evaluation	
worries doubts about winning less confident than normal	self-doubts	
frustrated felt alone lack of motivation general concerns poor planning	negative feelings	

Fig 6.3.1: Hierarchical structure of third dimension 'anxiety'.

The third dimension 'anxiety' comprised 103 quotes, 14 first and four second dimensions, as presented in Figure 6.3.1. 'Anxiety' represented the thoughts and concerns the athletes had about the upcoming event and the second dimensions clearly reflect this; 'nervous', 'feelings of social evaluation', 'self-doubts', and 'negative feelings'. Seven of the eight athletes experienced these thoughts and feelings.

6.3.1.1 Nervous

Raw themes	First dimension	Second dimension
more nervous than excited felt really nervous nervous nervous about being last boat down nervous, happy, then relieved quite nervous a little bit nervous	nervous	nervous
odd feelings nervous & calm, could cope with nervous, but didn't know why when got there, more nervous & scared than home comps noticeably more nervous than normal scared not to perform well (unusually)	unusually nervous	
could easily blow the Regatta, increased pressure felt bit pressurised almost wished hadn't won qualifying, because would be last boat out on 1st run carrying more on my shoulders pressure not to disappoint others	feeling pressure	
I really didn't want to be out there dreading first lift	fear of performing	

Fig 6.3.1.1: Hierarchical structure of second dimension 'nervous'.

This second dimension comprised 33 quotes (from 5 athletes) and 21 raw data themes which clustered into four first dimensions. The raw data themes included feelings of pressure, nervousness, and fears of performing. "... it was going to be the climax of the World Championships and there was me, going to be the final person off. And for a period of time, for occasions then these thoughts would come into my mind and stir anxiety within me, and it made me feel a little bit nervous" and "because I was more nervous than excited" are examples of the 15 quotes from which the first dimension 'nervous' emerged. Other quotes, for example; "But, er, I was noticeably more nervous than other times", "It's more pressure not to disappoint people" and "I really didn't want to be out there", represent quotes from raw data themes clustering into the three remaining first dimensions, 'unusually nervous', 'feeling pressure', and 'fear of performing', respectively (fig 6.3.1.1).

6.3.1.2 Feelings of social evaluation

Raw themes	First dimension	Second dimension
I wanted to shine infront of everybody believed it was my best chance to prove myself to show I was on par with the best GB gymnasts, do well & not look bad to show I wasn't a junior trying to be a senior make sure they had good reason to take me seriously prove to everyone I was good enough to win WC saw it as an opportunity to show off & say look this is what I can do showing selectors I'm ready for Commonwealth Games impressing parents, not main priority it was my time wanted to play for myself & shine	wanting to prove myself	feelings of social evaluation
all team focusing on me everyone's attention on me in limelight felt responsibility of being sole British competitor	in limelight	

Fig 6.3.1.2: Hierarchical structure of second dimension 'feelings of social evaluation'.

Twenty quotes from five athletes comprised the raw data for the two first dimensions forming the second dimension 'feelings of social evaluation'. "I wanted to shine infront of everybody" and "I wanted to show I wasn't a junior trying to be a senior" represent the first dimension 'wanting to prove myself'. The first dimension, 'in the limelight' is characterised by "it felt a bit, being pushed out into the limelight". The second dimension 'feelings of social evaluation' emerged from these two first dimensions (fig 6.3.1.2).

6.3.1.3 Self-doubts

Twenty-six quotes from three athletes and three first dimensions comprised the second dimension 'self-doubts' (fig 6.3.1.3). "I would say that I wasn't mentally ready" and "But I think more than anything I didn't think I could win" represent the two first dimensions 'worries' and 'doubts about winning', respectively.

Raw themes	First dimensions	Second dimensions
why can't it be right when I try not mentally ready but I didn't feel good at start of comp excited in a bad way not totally comfortable trying to forget last race thinking about last race rationalising performance in pen-ultimate race	worries	self-doubts
did my last warm-up and didn't think I was going to win didn't think I was ready even doubted myself then 10 mins before I knew I wouldn't win looked at opponent, knew he was going to win part of me saying I could win, but another part, you're not going to do this mentally didn't think I could win thoughts of failure	doubts about winning	
not as confident as normal	less confident than normal	

Fig 6.3.1.3: Hierarchical structure of second dimension 'self-doubts'.

6.3.1.4 Negative feelings

This second dimension emerged from five first dimensions and 24 raw quotes contributed by three of the athletes (fig 6.3.1.4). The dimension represents debilitating feelings of frustration, motivation and poor planning. Two quotes are characteristic of two of the first dimensions 'frustrated' and 'poor planning'; "I got real frustrated" and "I didn't have no plans, I mean I'm used to going in there and just doing it and getting through and this is the longest I've ever had to wait".

Raw themes	First dimensions	Second dimensions
damn, here I go again got real frustrated walking to venue flustered already mad frustrated	frustrated	negative feelings
wanted to tell feelings to someone wanted to tell someone I was nervous & shaky lonely didn't have nobody really	felt alone	
motivation dwindled, in long prep time motivation at comp, not real good	lack of motivation	
concerned about scoring system concerned with coaches worries	general concerns	
didn't think it would bother me, but it did (walking to venue) didn't have plans for eventualities long time to wait, longer than normal wanted to eat and drink as normal	poor planning	

Fig 6.3.1.4: Hierarchical structure of second dimension 'negative feelings'.

6.3.2 Thoughts and feelings about the event

Seventy-one quotes from all of the athletes provided the raw data for this third dimension. The raw themes clustered to form 12 first and four second dimensions, from which emerged the third dimension 'thoughts and feelings about the event' (fig 6.3.2). All eight athletes contributed quotes to this dimension.

First dimension	Second dimension	Third dimension
tough opponents exceptional performance required high effort required expected it to be demanding	expecting tough event	thoughts & feelings about the event
very important event playing down importance of event	event importance	
more thoughts than normal thinking about how I felt changing thoughts	awareness of thoughts	
concerned about main rivals preoccupied with main opponent wanting to beat main opponent	thoughts of main opponents	

Fig 6.3.2: Hierarchical structure of the third dimension 'thoughts and feelings about the event'.

6.3.2.1 Expecting tough event

Nineteen raw quotes by seven of the athletes clustered into themes within four dimensions from which emerged the second dimension 'expecting tough event'. Quotes from seven of the athletes included "I knew I had to do pretty exceptional to get in the medals" from the first dimension, 'exceptional performance required' and "... so I did actually feel that they may be certainly tougher than me" from the first dimension, 'tough opponents'. 'High effort required' and 'expected it to be demanding' were the remaining first dimensions (fig 6.3.2.1).

Raw themes	First dimensions	Second dimensions
knew opponent was real good number of strong opponents opponents tougher than I would be two tough competitors, knew they wouldn't throw it away aware of tough opposition couldn't say I'll beat them easily main rival up for competition, good competitor very good to beat main rival	tough opponents	expecting tough event
knew had to be exceptional to medal to achieve goal would have to sail exceptionally well knew I'd have to perform better	exceptional performance required	
enough effort until catastrophe occurred thinking full effort on high bar & then everything's fine high effort perceived sufficient effort	high effort required	
expected it to be demanding expected a hard race knew he'd have to work very hard	expected it to be demanding	

Fig 6.3.2.1: Hierarchical structure of the second dimension 'expecting tough event'.

6.3.2.2 Event importance

"A normal competition doesn't seem to have as much riding on it" and "I play down the importance of the event" represent quotes from the two first dimensions 'very important event' and 'playing down event importance', respectively. Seventeen quotes from 6 of the athletes provided the raw data for the two first dimensions which clustered to form 'event importance' (fig 6.3.2.2).

Raw themes	First dimensions	Second dimensions
more important than normal performances competition was very important important race more important than best performance of year became more important when started doing well became more important than anything not normal thoughts because normal comp doesn't have as much riding on it	very important event	event importance
telling myself it's just a normal day keeping relaxed plays down importance play down importance of event keeping it all in perspective familiar surroundings of home club just another day not very important	playing down importance of event	

Fig 6.3.2.2: Hierarchical structure of the second dimension 'event importance'.

6.3.2.3 Awareness of thoughts

"I stayed in the room and rested more, which might not have been the best thing to do because I thought about it more" represents the four quotes generating the first dimension 'more thoughts than normal'. The remaining two first dimensions contributing to the second dimension 'awareness of thoughts' were 'thinking about how I felt' and 'changing thoughts'. The second dimension comprised eight quotes form 5 athletes (fig 6.3.2.3).

Raw themes	First dimensions	Second dimensions
thought about it more thoughts more than normal possible consequences of outcome, more than normal	more thoughts than normal	awareness of thoughts
kept thinking why do I feel that way thinking about how I felt	thinking about how I felt	
occasional gritty, stirring emotions/thoughts mood before really changeable	changing thoughts	

Fig 6.3.2.3. Hierarchical structure of the second dimension 'awareness of thoughts'.

6.3.2.4 Thoughts of main opponent

Fifty percent of the athletes produced the 27 raw quotes in this second dimension. The quotes reflected the concerns the performers were having regarding their main opponent. "I wanted to make sure that I didn't just beat him, but beat him badly" characterises the quotes within the first dimension 'wanted to beat main opponent'. 'Concerned about main rivals' comprised eight quotes similar to "I remember concentrating so much on the guy to my left, cause he was the one that was really pushing me, or was the one trying to keep up". These two first dimensions clustered with 'preoccupied with main opponent' to form the second dimension 'thoughts of main opponent' (fig 6.3.2.4).

Raw themes	First dimensions	Second dimensions
worried about his enjoyment concern was to make opponent work harder watching opponents, hoping they'd fall off knew it was between myself & main rival opponent doesn't deserve to win just watching that guy	concerned about main rivals	thoughts of main opponents
worried about main rival unusually preoccupied with others looked at opponent, he was ready immediately I got more uptight, knowing he was going didn't want to let them know I was tired	preoccupied with main opponent	
goal, not just to win, but to stay ahead of this one opponent wanted to beat him for personal reasons wanted to beat him badly wanted to make him hurt wanted to make him hurt on top of losing	wanting to beat main opponent	

Fig 6.3.2.4: Hierarchical structure of the second dimension, 'thoughts of main opponents'.

6.4 Goals

'Goals' emerged as the general dimension from the two third dimensions 'goals' and 'inappropriate strategies', as presented in Figure 6.4. The dimension included 112 quotes from all athletes, which subsequently clustered into 24 first dimensions, six second dimensions and two third dimensions. The dimension included pre-set goals for the competitive event, in addition to strategies for reaching these goals and thoughts of the outcome.

Second dimensions	Third dimensions	General dimension
performance strategies attempting to use strategies thinking about the outcome thoughts of winning goals	goals & strategies	goals
inappropriate strategies		

Fig 6.4: Hierarchical structure of the general dimension 'goals'.

6.4.1 Goals and Strategies

The third dimension 'goals and strategies' comprised 91 quotes, 19 first and five second dimensions (fig 6.4.1). All eight athletes' quotations comprised the raw data within this section. Quotes within this dimension were specifically related to the goals the performers had set and the strategies they employed to achieve them.

First themes	Second dimensions	Third dimension
performance strategies focusing on what I had to do intention to follow plan normal pre-performance routine	performance strategies	goals & strategies
trying to implement strategies trying to keep relaxed trying to keep pressure off myself trying to remain focused trying to be positive	attempting to use strategies	
opportunity to medal outcome focused expectation of top 4 place aware of consequences of mistakes	thinking about the outcome	
desire to win thinking about winning opportunity to win	thoughts of winning	
goal to win performance goals wanting to make a good start	goals	

Fig 6.4.1: Hierarchical structure of the third dimension 'goals and strategies'.

6.4.1.1 Performance strategies

Nine quotes involved strategies related to performance, such as; "I'm concentrating on getting off the turn a little bit quicker and then I've got to jump again", from which the first dimension 'performance strategies' emerged. Other quotes (N=8) similar to, "But I would say that really my, for the large part, my mind is focused on the process, what I've got to do" clustered to create the first dimension 'focusing on what I had to do'. The two remaining first dimensions 'intention to follow plan' and 'normal pre-performance routine' included quotes such as, "So if you're feeling this good, and he's behind then chances are pretty good that you'll carry out the plan" and "I do the same things every time I get ready for competition", respectively. Emerging from these four first dimensions was 'performance strategies' which comprised 29 quotes from all of the athletes (fig 6.4.1.1).

Raw themes	First dimensions	Second dimension
fighting with everything I had only concerned with picking up small amount e.g. 1m concentrating on getting off the turn tried to make it flow watch opponents, so I know how I have to do set goals according to capabilities trying to do things I thought I should thinking about changing conditions	performance strategies	performance strategies
only the game mattered adhered to team plays just concentrating on what I had to do to stay ahead of opponent mind focused on process, what I've got to do thinking about what I needed to knew what I was going to do	focusing on what I had to do	
well rehearsed plan wanted to stick to followed what I'd planned executing normal routine goal- follow game-plan & do it right feeling that you'll carry out the plan visualising course on flat water, important strokes & where boat needs to be	intention to follow plan	
tense due to psyching up tensing, flexing, breathing hard think about being aggressive & strong when I swim visualise bull before bull fight familiar pre-routine normal pre-comp prep	normal pre-performance routine	

Fig 6.4.1.1: Hierarchical structure of the second dimension 'performance strategies'.

6.4.1.2 Attempting to use strategies

Examples of quotes within this dimension are "I was trying to think about what's going to happen, who were the other boats, based on the other races, and was trying to develop a strategy from that", "...you're having mixed feelings of trying to keep things relaxed but realising that they're important enough" and "...trying to keep as much pressure off myself as much as I can, but, having that little bit of an edge of it being a competitive situation, make it important enough to not, um, be complacent". Emerging from these quotes were the first dimensions, 'trying to implement strategies', 'trying to keep relaxed' and 'trying to keep pressure off myself', respectively. Two further first dimensions were 'trying to remain focused' and 'trying to be positive'. The second dimension 'attempting to use strategies' was comprised 25 quotes from five athletes which clustered into five first dimensions (fig 6.4.1.2).

Raw themes	First dimensions	Second dimension
thinking about what I was going to do that night trying not to think about winning trying to develop strategies set goal a little higher trying not to be as motivated thought trying harder would overcome negative feelings	trying to implement strategies	attempting to use strategies
trying to keep relaxed & important trying to do what coach said-relax & keep concentrating	trying to keep relaxed	
needed to just concentrate & not put pressure on myself try to keep pressure off myself, but not being complacent not making any pressure for myself	trying to keep pressure off myself	
trying to focus on what I needed to do enclosed myself in my own environment trying to concentrate on what next trying not to get distracted from everywhere trying to prevent any distraction	trying to remain focused	
took an assertive mental state boosting myself up trying to convince myself that I could do it tried to be up-beat & positive trying to be real positive	trying to be positive	

Fig 6.4.1.2: Hierarchical structure of the second dimension, 'attempting to use strategies'.

6.4.1.3 Thinking about the outcome

Four first dimensions emerged from 12 raw quotes by five of the athletes (fig 6.4.1.3). Some examples of the quotes are; "I was hoping that I could medal in the race", "I think I started thinking about the outcome and possible situations that might occur ... from the outcome, more so that I would do usually", "training was right enough for me to win this competition easily, or get in the top 4" and "And so I knew that in order to win, you had to paddle pretty much a mistake-free race".

Raw themes	First dimensions	Second dimension
hoping to medal in race realistic goal (to medal) after good qualifying run, still in with a chance of medaling	opportunity to medal	thinking about the outcome
started thinking about the outcome if I did well, I'd qualify for nationals	outcome focused	
knew I'd get in top 8 training was enough to win, or get in top 8 confident would get in top 4, if not win winning or coming in top 4 equally important	expectation of top 4 place	
aware of mistakes being critical (i.e. not medaling) to win, need mistake-free race I could afford one fall	aware of consequences of mistakes	

Fig 6.4.1.3: Hierarchical structure of the second dimension 'thinking about the outcome'.

6.4.1.4 Thoughts of winning

The second dimension 'thoughts of winning' emerged from three first dimensions and 14 quotes made by four of the athletes (fig 6.4.1.4). "I wanted to win that race more than anything", "I still thought I could beat him" and "there was a fair chance [of winning]", epitomise the three first dimensions of 'desire to win', 'thinking about winning' and 'opportunity to win', respectively.

Raw themes	First dimension	Second dimension
wanted to win more than my speciality wanted it so bad wanted to win that race more than anything wanted to win Regatta	desire to win	thoughts of winning
still thought I could beat him still thought I could win thinking about winning concerned about winning	thinking about winning	
fair chance of winning had a chance, anything could have happened realistic chance of winning	opportunity to win	

Fig 6.4.1.4: Hierarchical structure of the second dimension 'thoughts of winning'.

6.4.1.5 Goals

Raw themes	First dimensions	Second dimension
goal, to win, to get gold 590lbs to win, that's important went to the worlds & thought only of being World Champion to come in top 2 to qualify try to retain title	goal to win	goals
1st 2 events to get on par with main rivals goal to perform well goal to go through 6 for 6	performance goals	
ensuring a clean start aware of possibility of early mistakes don't do anything stupid at start	wanting to make a good start	

Fig 6.4.1.5: Hierarchical structure of the second dimension 'goals'.

Three of the athletes mentioned winning as a goal, for example, "To win. Just gold. To win" and thus emerged the 'goal to win' first dimension. Goals specifically related to performance, such as, "the goal was to try six routines out of six and if you went through that, then I would win the competition" were mentioned by only two athletes. The first dimension was therefore named 'performance goals'. The second dimension 'goals' comprised 11 quotes and three first dimensions and included the third first dimension 'wanting to make a good start' (fig 6.4.1.5).

6.4.2.1 Inappropriate strategies

Only three athletes' quotations (N=21) formed this second dimension which comprised 11 raw data themes and five first dimensions (fig 6.4.2.1). "I think that's just like thinking about the result of the race opposed to what I was actually doing" and "I wasn't paying attention to other members in my team....as opposed to working with your group" represent the first dimensions, 'perceived inappropriate focus' and 'not co-operating with the team'. This second dimension was carried through to the third dimension.

Raw themes	First dimensions	Second dimension
focusing on inappropriate information outcome focused rather than process	perceived inappropriate focus	inappropriate strategies
I tried to be intense tried to have game face on whole time, a mistake trying to do too much	inappropriate intensity	
not normally what I do	not adhering to normal plan	
not co-operating with team not paying attention to team members more focused on individual play trying to do things wouldn't normally do	not co-operating with team	
having fun at wrong time		

Fig 6.4.2.1: Hierarchical structure of the second dimension 'inappropriate strategies'.

6.5 Readiness

The general dimension 'readiness' comprised 64 quotes, 11 first, five second and two third dimensions. All of the athletes contributed quotes to this dimension. The dimension comprised quotes reflecting the athletes feelings of self-control, motivation and energy (fig 6.5).

Second dimensions	Third dimensions	General dimension
motivated wanting to get on with it	ready to perform	readiness
feelings of control mentally prepared focused	self-control	

Fig 6.5. Hierarchical structure of the general dimension, 'readiness'.

6.5.1 Ready to perform

The third dimension 'ready to perform' emerged from 35 quotes, five first and two second dimensions (fig 6.5.2). This dimension comprised seven of the athletes' descriptions of their readiness to perform and wanting to get started.

First dimensions	Second dimensions	Third dimension
fired up and ready to go wanting to perform well energised felt pretty motivated	motivated	ready to perform
wanting to get on with it		

Fig 6.5.1: Hierarchical structure of the third dimension 'ready to perform'.

6.5.1.1 Motivated

The second dimension 'motivated' emerged from 31 quotes and four first dimensions (fig 6.5.1.1). Seven of the athletes produced sixteen quotes which were related to the first dimension 'fired up and ready to go', for example, "By that time, I was fired up and ready to go". Other quotes such as "I wanted to do particularly well", "I was full of energy" and "there was no doubt about ... the motivation" provided the raw data themes from which the following three first dimensions emerged; 'wanting to perform well', 'energised' and 'felt pretty motivated' emerged.

Raw themes	First dimensions	Second dimension
ready to go ready for this race just ready looked fit & ready to go keen & ready to go right, I'm gonna get down this run, here we go fired up & ready to go competition day, managed to get myself up let's see if I can rise to this challenge quite enthusiastic	fired up and ready to go	motivated
hoping it would be a good piece wanted to put in a good result wanting to do well for mum & dad wanted to do particularly well	wanting to perform well	
lots of energy left full of energy	energised	
no doubt about motivation high motivation during training pretty motivated, just before I was motivated a lot pretty motivated	felt pretty motivated	

Fig 6.5.1.1: Hierarchical structure of the second dimension 'motivated'.

6.5.1.2 Wanting to get on with it

The second dimension, 'wanting to get on with it', was carried through from the first dimension and comprised only four quotes from three athletes, such as, "just wanted them to call my name out" (fig 6.5.1.2).

Raw themes	First dimensions	Second dimension
waiting for comp to start, heart quick, stomach silly, nervous, but normal let's hope they get through quickly just wanted to get on with competition, turn up, do my stuff, then go home	wanting to get on with it	________

Fig 6.5.1.2. Hierarchical structure of the second dimension 'wanting to get on with it'.

6.5.2 Self-control

The third dimension 'self-control' emerged from 29 raw quotes, six first and three second dimensions (fig 6.5.2). Two of the second dimensions were carried through from the first dimensions of the same names. All of the athletes contributed to this dimension.

First dimensions	Second dimensions	Third dimensions
control of emotions control of situation/event control of performance consequences of feeling in control	feelings of control	self- control
mentally prepared	________	
focused	________	

Fig 6.5.2: Hierarchical structure of third dimension 'self-control'.

6.5.2.1 Feelings of control

Twenty-one quotes from seven of the athletes involved different aspects of control. "I had control over them [emotions]" reflects the first dimension 'control over emotions' whilst "I felt at the beginning like I was in complete control, I dictated the pace of the race" highlights the theme of the first dimension, 'control of situation/event'. 'Control of performance' comprised quotes similar to, "I was in control of what I could do". The fourth first dimension 'consequences of feeling in control' was characterised by quotes such as, "it [control] made me feel stronger, you know, when you're in control of something and you're dictating something, it makes you feel close to invincible". The second dimension 'feelings of control' emerged from these four first dimensions (fig 6.5.2.1).

Raw themes	First dimensions	Second dimension
until penalty felt relatively in control control over emotions I was in complete control control over cutting out distractions	control of emotions	feelings of control
felt fully in control totally in control of situation felt very in control (of game) in complete control, dictated pace of race didn't feel out of control of anything	control of situation/ event	
felt pretty in control of performance in control of what I could do very much in control (of perf) felt in control over performance felt in control of performance	control of performance	
control made me feel stronger, close to invincible positive about level of control	consequences of feeling in control	

Fig 6.5.2.1: Hierarchical structure of third dimension 'feelings of control'.

6.5.2.2 Mentally prepared

"I was mentally prepared, I'd been through the whole thing" is characteristic of the first and second dimension 'mentally prepared' (fig 6.5.2.2). Four quotes from three of the athletes comprised the raw data for this dimension.

Raw themes	First dimensions	Second dimension
totally into it mentally & physically mentally prepared psychologically prepared thought I'd got my head round it	mentally prepared	

Fig 6.5.2.2. Hierarchical structure of third dimension 'mentally prepared'.

6.5.2.3 Focused

Four quotes from two athletes provided the raw data for the first dimension 'focused' and this was carried straight through to the second dimension (fig 6.5.2.3). "When I left that start line, I was just as focused ... as anything" is characteristic of the quotes within this dimension.

Raw themes	First dimensions	Second dimension
pretty engrossed in what I was doing fully focused, until mistakes quite focused left start line focused	focused	

Fig 6.5.2.3: Hierarchical structure of third dimension, 'focused'.

6.6 Unease

'Unease', the smallest general dimension within the pre-catastrophe phase comprised 43 quotes (from five athletes), eight first, three second and two third dimensions. The theme of the dimension was physical symptoms and atypical feelings and situation (fig 6.6).

Second dimensions	Third dimensions	General dimension
somatic anxiety		unease
unusual feelings unusual situation	unusual feelings & situation	

Fig 6.6: Hierarchical structure of the general dimension 'unease'.

6.6.1 Somatic anxiety

Raw theme	First dimensions	Second dimension
tense/tight neck before leaving for WC whole neck burning & tight felt tight back tight & burning felt blood pressure was real high just felt fatigued tired, like after hard workout achy feeling felt over-trained	feeling tense & fatigued	somatic anxiety
not exactly buzzing when came into race not full of energy, or pumped not excited to go not really excited	not energised	
anxiety led to tightness in stomach feeling tight led to feeling scared	feeling tight	
at first, in warm-up, didn't feel 100%	didn't feel physically ok	

Fig 6.6.1: Hierarchical structure of the third dimension 'somatic anxiety'.

This second dimension was comprised four first dimensions which emerged from 22 raw data quotes by three athletes. The raw data represented various physical symptoms. Fourteen quotes, interestingly made by only one athlete, comprised the 'feeling tense and fatigued' first dimension ; "when I was eating breakfast, my neck felt tight, you know, I felt that tension, that tight feeling in my neck, and that was before I even left to go over" and " felt like my blood pressure was real high". The eight remaining quotes, such as "But I wasn't exactly buzzing when I came into the race, so that probably didn't help" and "...er in the warm-up I felt at first not really 100%", clustered into three first dimensions; 'not energised', 'feeling tight' and 'didn't feel physically okay'. These four first dimensions clustered to form the second dimension 'somatic anxiety' which was then carried through to the third dimension (fig 6.6.1).

6.6.2. Unusual feelings and situation

The third dimension 'unusual feelings and situation' emerged from 21 raw quotes from three athletes, which clustered together to form four first dimensions and two second dimensions (fig 6.6.2).

First dimensions	Second dimensions	Third dimension
unusual feelings body felt unusually good	unusual feelings	unusual feelings & situation
felt different from normal situation unusual situation	unusual situation	

Fig 6.6.2.: Hierarchical structure of the third dimension 'unusual feelings and situation'.

6.6.2.1 Unusual feelings

The second dimension 'unusual feelings' comprised 13 quotes (from three athletes) and two first dimensions (fig 6.6.2.1). Eleven of the quotes, such as, "...well, with the other British guys not being there, it seemed a little more alien, you know what I mean. That definitely struck me" and "it was out of my game, not what I normally do" clustered into the first dimension 'unusual feelings'. This dimension combined with 'body felt unusually good' to form the 'unusual feelings' second dimension.

Raw themes	First dimensions	Second dimension
unusual situation & feeling indescribable feelings abnormal feelings (self) abnormal feelings toward game that wasn't as easy as normal felt like a different person feeling happier than normal it was out of my game seemed more alien	unusual feelings	unusual feelings
body felt unusually good none of usual aches & pains	body felt unusually good	

Fig 6.6.2.1: Hierarchical structure of the second dimension 'unusual feelings'.

6.6.2.2 Unusual Situation

The second dimension 'unusual situation' was comprised eight raw data quotes and two first dimensions, 'felt different to normal' and 'unusual situation' (fig 6.6.2.2). Only two athletes contributed quotes to this dimension.

Raw themes	First dimensions	Second dimensions
felt noticeably different in final felt kind of out there on my own unsure how important should be feeling, not normal being only Briton allowed more time to put in effort surprised about whole thing	felt different from normal situation	unusual situation
totally new situation situation was quite strange not familiar with my team	unusual situation	

Fig 6.6.2.2: Hierarchical structure of the second dimension 'unusual situation'.

6.7 Discussion

The present investigation involved structured interviews with athletes who felt they had experienced an uncharacteristic catastrophic drop in their performance during a competitive event within the last year. The purpose was to examine the whole event; thoughts, feelings and emotions of the athletes prior to, during and following the performance drop, in addition to their subsequent coping attempts. The structured interviews allowed the investigators to tap these aspects. Additionally, it provided an opportunity for the athletes to identify further factors they felt were important. The major findings of the hierarchical content analysis are discussed with respect to previous findings. The general dimension comprised the largest number of quotes is discussed first, followed in descending order (in terms of the number of raw quotations) by the remaining dimensions. The dimensions are examined deductively, that is from the general dimension to the third and second dimensions. Examples of quotations from selected first dimensions are also presented. Methodological considerations, practical implications and future research directions are identified and examined in the final chapter of the qualitative series (chapter 9).

The pre-catastrophe phase produced five general dimensions, the two largest of which were confidence and cognitive anxiety, highlighted in the following two quotations, respectively;

> I was thinking I had a very positive attitude ... and I took a very tough shot. Up to that point I didn't have any self-doubts about myself or my performance in that game. I felt very confident about talking that shot. ... I was concerned about winning, but I just wanted everybody to take a look at me.

and,

> but nobody beat me [in qualifying event] and at the end of it all there was me sat at the top of the leader board, knowing that on the next but one day I was going to be sat there with everybody watching me ... that stirred sort of fairly, initially, stirred a fairly anxiety provoking reaction in me.

The concurrent emergence of these two largest general dimensions, confidence and cognitive anxiety (both comprising quotes from all of the eight athletes) suggests that the two factors are independent. However, this finding is contrary to the argument presented by several researchers that self-confidence and cognitive anxiety represent opposite ends a bipolar factor (Bandura, 1977, Borkovec, 1978; Martens et al., 1990). Rather, the findings provide support for those researchers who have identified that these two variables are relatively orthogonal factors which may exert independent effects on the anxiety-performance relationship (Burrows et al., 1977; Hardy, 1990; 1996). Furthermore, the fifth general dimension, 'unease' was comprised somatic anxiety, unusual feelings, and unusual situations. These findings mirror the three dimensions emerging from Martens et al.'s (1990) factor analysis conducted in the original development of the CSAI-2; cognitive anxiety, somatic anxiety and self-confidence.

The emergence of the cognitive anxiety dimension during the pre-catastrophe phase when performance was at a relatively high level is consistent with a growing body of research not only within competitive sport anxiety literature (e.g. Edwards & Hardy, 1996; Jones & Swain, 1992; Jones, Swain & Hardy, 1993), but also in cognitive psychology (Carver & Scheier, 1986; Eysenck, 1982), in which anxiety has been found to have both facilitative and debilitative influences upon performance. Two quotations highlight this difference. One athlete's quotation clearly indicates an interaction of cognitive and somatic anxiety, which he interprets as positive:

> Even in the smaller competitions I get nervous ... and then in the bigger ones [like this event] I get more nervous and more butterflies and sweaty hands and yes I prefer to be like that. ... I almost think of it as being positive that I'm so nervous, because in competitions that I'm not nervous I, my mind's not really up for it.

Whilst another athlete describes how his anxiety, in terms of an interaction of physiological and cognitive symptoms, was debilitative:

> I just felt like my neck was real tight, my back was real tight, I felt like my blood pressure was real high, not like I was excited but I was dreading the first lift... I know

> I was excited in a bad way, ... what if I miss this, because I was more nervous than excited. I remember being really nervous.

The emergence of these factors in the present investigation are therefore consistent with the prediction of the catastrophe model, specifically, that cognitive anxiety can be facilitative and debilitative depending upon the level of physiological arousal (and self-confidence and the proposed perceptions of control in the butterfly model, Hardy, 1990).

Several dimensions within the cognitive anxiety general dimension have not been explored in terms of catastrophic performances in the research literature, for example, thoughts about the main opponents, event importance, feelings of pressure and awareness of thoughts. Thoughts of main opponents was identified by four of the athletes interviewed, for example:

> I remember concentrating so much on the guy to my left, cause he was the one that was pushing me, or he was the one trying to keep up ... but I was concentrating so much on beating him that I think it distracted me and I was trying to distract him, so it really backfired and I got very frustrated.

Another athlete explained how it was unusual for him to become preoccupied with a main rival, "I remember looking over there [at main rival] and I knew he was going to win, and I don't ever look at trophies, I don't ever look at other people and I did then."

Event importance was also considered by six athletes, and is consistent with Martens, Vealey and Burton's multidimensional anxiety theory as one of the antecedents of anxiety. One athlete simply stated "it was more important to me than my best performance of the year", whilst another simply said "I've trained all my life to be World Champion".

A further dimension which five of the performers identified was awareness of thoughts. One quotation highlights these thoughts:

> It wasn't working. Just in what state I was in, I just didn't feel right so the actual, you know, trying to concentrate on the feeling, not actually being receptive to it. Distracted, or concentrating on that too much, and then missed the shifts ...

> concentrating so much on getting back into being focused that obviously distracted me.

The notion of trying so hard to do something that the performer becomes preoccupied with explicit rules and conscious processing is consistent with research by Naatenen (1973), the work of Gallwey (1974), and of Masters (1992). The conscious processing hypothesis (Masters, 1992) suggests that when cognitively anxious, performers are likely to regress to the explicit rules for producing the skills, and performance will deteriorate. Later chapters will indicate whether this occurred with any of the athletes interviewed, or indeed the athlete above.

A first dimension, feeling pressure, which represented four athletes quotations, is a further factor which has not been considered within the anxiety-performance relationship. A closer look at one athlete's description highlights these feelings and the impact they may have:

> ... as I got closer to the race, then I started to feel a bit tight, you know, once I was on the water paddling around a bit, started to feel a bit more at ease. But, er, I was noticeably more nervous than normal ... I seemed to be carrying more on my shoulders ... I guess I put pressure on myself to prove something.

Further emerging dimensions included feelings regarding expectations of a tough and demanding event and tough opposition which required high effort. According to processing efficiency theory (Eysenck, 1982) anxious individuals demonstrate a greater discrepancy between current aspirations and perceived ability and will therefore invest additional effort in the task if they perceive themselves to have at least a moderate probability of success (i.e. are confident of achievement). The additional effort acts as a compensatory mechanism enabling performance to be maintained or even enhanced, by overcoming the task-irrelevant cognitive anxiety which would otherwise impair performance. The increased energetical cost may be reflected in higher physiological arousal or somatic anxiety (Frankenhauser & Johansson, 1976). At some point the energetical cost outweighs resources, probability of success falls and the performer will withdraw effort resulting in performance suddenly deteriorating. The present investigation is consistent with the motivational explanation, that is, the athletes were investing considerable effort, possibly because of the elevated cognitive and somatic anxiety, thus enabling performance to be maintained.

A closer look at the lower dimensions forming the 'confidence' dimension demonstrates a comfortable fit with Bandura's (1977) self-efficacy theory. More specifically, five athletes identified the theme, 'positive because of good recent performances', which is one of the primary sources of self-confidence (Bandura, 1977). Indeed, Hardy, Jones & Gould (1996) suggested that "self-confidence may be one of the most powerful qualities that elite performers possess, and is certainly more powerful than anxiety and arousal management skills" (p. 153). The catastrophe model (Hardy & Fazey, 1988) proposes that under high cognitive anxiety and increasing physiological arousal, performance will continue to improve up to a certain point after which a dramatic drop in performance occurs. Therefore, it would be natural for performers to be feeling good and positive regarding their performance during this stage of their event and/or preparation. Indeed, findings indicate that despite experiencing elevated cognitive and somatic anxiety, athletes were initially able to maintain their performance. Such findings are consistent with the butterfly catastrophe model, in which it is proposed that self-confidence moderates the interactive effects of cognitive anxiety and physiological arousal (of which somatic anxiety is an indirect response), enabling cognitively anxious performers to tolerate higher levels of physiological arousal before experiencing drops in performance (Hardy & Jones, 1990). One quotation clearly demonstrates how self-confidence appeared to moderate any potentially negative cognitive anxiety and physiological influences on performance:

> I mean, I had doubts - that everyone else has, like what happens if I fall off again. But as I say, I was confident that I could, confident that I could do it - and do it well. ... it's just your heart rate goes up and you feel your chest pounding.

These findings are also consistent with processing efficiency theory (Eysenck, 1982) in which the role of self-confidence is to motivate the performer to utilise the compensatory mechanism of effort to overcome anxious feelings, in order to maintain or even enhance the level of performance. However, once the performer feels the probability of success is too low, that is their confidence is lower, they will withdraw effort and performance will drop.

The goal dimension revealed that only 50% of the athletes interviewed used specific goals. Goal setting researchers (Beggs, 1990; Weinberg, 1993, review) advocate the use of specific and measurable goals, which should not be based upon social comparisons. However, these principles did not emerge in the goals or aims of the athletes interviewed. Interestingly, three athletes referred to 'winning' as their goal; two of whom also employed rather vague or ambiguous performance goals, for example 'to perform well'. Furthermore, in the present investigation, this potentially detrimental situation may have been accentuated by the salient thoughts of winning and/or thoughts about the outcome, reported by those three athletes and one other. For example, "I was thinking the whole time, this will be very good to beat this guy" and

> I started thinking about the outcome, and the possible situations that might, you know, that might occur from the outcome, more so than I would usually. ... Yes, you're thinking about the result, rather than the actual process.

Although recent research suggests that whilst athletes would be unlikely to become elite without setting outcome goals, it is important that they do not "become so preoccupied with winning that it interferes with those things that [they] need to do in order to realise that objective" (Kingston & Hardy, 1994, p.148). Without self-referenced goals, process or performance in nature, it is suggested that the outcome goals may not be realised (Kingston & Hardy, 1994).

Finally, 'readiness' emerged as a general dimension in the pre-catastrophe phase. This finding reflects previous research (Jones, 1995; Jones, Swain & Cale, 1990, 1991) in which perceived readiness was found to be one of the main predictors of self-confidence in male athletes. Thus, in addition to the emergence of the confidence dimension, the athletes began their performances with all the important variables for a good performance. The emergence of the third dimension, self-control (identified by all athletes) mirrors Hardy & Jones' (1990) interviews with six elite athletes, who emphasised the importance of 'being in control' both of themselves and the environment. A quotation from one athlete clearly emphasises the strength of the feelings of complete control, "I felt very in control. I didn't think anyone could have stopped me, no matter what I did, I was going to get the ball". Not only has it been proposed that self-control mediates the effects of stress (Fisher, 1984; Hardy, 1990), but a number of researchers (Carver & Scheier, 1988; Hardy & Jones, 1990; Gould, Eklund & Jackson, 1992, a & b, 1993) have also suggested that the perception of control may be a crucial indicator of when performers will disengage and thus experience decrements in performance. Additionally, Hardy (1990) proposed that self-control was the more appropriate butterfly factor within the butterfly catastrophe model. However, despite what appears to be considerable evidence for the role of the perceptions of control within the anxiety-performance relationship, only a limited number of investigations have been conducted to examine its' influence within models of anxiety and performance. Preliminary investigations by Jones and colleagues (Jones, 1995; Jones & Hanton, 1994) have adapted the test anxiety model proposed by Carver and Scheier (1981, 1986) to accommodate predictions for competitive sport anxiety.

Carver and Scheier (1981, 1986) proposed that human behaviour is regulated in a system of feedback control in which individuals continually establish goals for themselves that they use as reference points. The researchers therefore assume that behaviour is goal-directed. Through their research, Carver and Scheier (1981, 1986) identified that anxiety affects the execution of this self-regulated behaviour when discrepancies arise between competing reference values. According to their model, the factor determining whether the anxiety has a facilitating or debilitating effect is the person's expectancy of being able to cope with their anxiety. If the individual feels in control, he/she will have positive expectancies of being able to cope and of goal attainment and is therefore likely to respond with increased focus on the task, i.e. renewed effort, enhanced persistence and even performance. Conversely, those who perceive an inability to control themselves or their environment, will doubt their ability to cope and have negative expectancies of goal-achievement and will consequently experience debilitative anxiety and withdraw effort from the task. The model is not dissimilar, (if perhaps slightly more vague, in terms of its' underpinning theoretical explanations), to Eysencks' (1982) Processing Efficiency theory, in which the key components are anxiety, effort (the compensatory factor) and probability of success.

Essentially, Jones (1995) adapted Carver and Scheier's (1988) model by applying it to sport performers in competitive situations. Similarly, Jones used the conceptualisation of control as the cognitive appraisal of the degree of control the performer felt able to exert over both the environment and themselves. Thus, if performers perceive they can exert control over themselves and the environment, they will have positive expectancies of being able to cope and achieve their goal, and are thus predicted to interpret their anxiety symptoms as facilitative to performance; whilst those who perceive that they are unable to exert control will have negative expectations regarding their ability to cope and goal attainment, and are predicted to interpret their symptoms as debilitative. Although in its' early stages, this model has received initial empirical support (Jones & Hanton, 1996). Given the findings from the present investigation and those examined, further investigations of Carver and Scheier's model in a sporting context would be useful.

Results from the present investigation revealed that cognitive anxiety, somatic anxiety, self-confidence and readiness (which included the self-control dimension) were all present. The results are also consistent with the notion that, despite elevated levels of cognitive and somatic anxiety, self-confidence and self-control may have mediated the influence of these on performance, enabling performance to be maintained, and this sits comfortably with the proposed butterfly catastrophe model (Hardy, 1990). Examining the pattern of the control dimension throughout the experience will provide further evidence for these predictions and this will therefore be addressed in chapter 9.

CHAPTER 7.

An in-depth analysis of catastrophic performances and the associated thoughts, feelings and emotions: III. The catastrophic drop in performance phase

7.1 Results of the hierarchical content analysis

Catastrophe parameters comprised 290 raw quotations from which emerged 246 raw data themes, 78 first dimensions, 28 second dimensions, 11 third dimensions and five general dimensions. The general dimension that comprised the largest number of quotes is discussed first, followed in descending order (in terms of number of raw quotations contained in them) by the remaining general dimensions. For each general dimension, that general dimension is introduced first, followed by the third and second dimensions contributing to it. Examples of quotations from selected first dimensions are also provided. Figure 7.1 illustrates the hierarchical content from the second dimensions to the general dimensions.

7.2 Evaluating performance

Twenty-four first, ten second and three third dimensions emerged from 103 quotes, made by all of the athletes. 'Evaluating performance' captured the theme of this general dimension (fig 7.2). Quotes within the dimension reflected emotions towards the catastrophic drop in performance in terms of evaluating every aspect of the performance, including the potential causes and strategies for dealing with it.

Second dimensions	Third dimensions	General dimensions
evaluative state with performance angry & frustrated with performance resigned to poor performance thinking about outcome things not going well increased self-awareness	evaluating performance	evaluating performance
strategies to improve performance failed strategies	strategies	
internal attributions (for poor performance) realisation of inappropriate decisions	attributions	
lack of control lack of sharpness lack of rhythm performance didn't feel normal	lacking appropriate feelings	unusual thoughts & feelings
unusual thoughts surprised/ puzzled	unusual thoughts	
reduced confidence mentally nervous physically nervous	lack of confidence	
noticeable drop in performance performance hit rock bottom drop occurred suddenly	sudden, substantial drop in performance	drop in performance
performance continued to deteriorate		
lack of appropriate focus inappropriate effort just wanted to get out of situation	inappropriate focus	
performance began well		positive feelings
belief in recovery		

Fig 7.1: Hierarchical structure of the catastrophe phase of the performance.

Second dimensions	Third dimensions	General dimension
resigned to poor performance evaluative state angry & frustrated with performance things not going well increased self-awareness thinking about outcome	evaluating performance	evaluating performance
failed strategies strategies to improve performance	strategies	
internal attributions (for poor performance) realisation of inappropriate decisions	attributions	

Fig 7.2: Hierarchical structure of the general dimension 'evaluating performance'.

7.2.1 Evaluating performance

First dimensions	Second dimensions	Third dimension
realised can't do anything about it resigned to continued poor performance realised no chance of good performance	resigned to poor performance	evaluating performance
evaluating consequences of mistakes over-analytical	evaluative state	
frustrated mad/angry at myself increased disappointment	angry & frustrated with performance	
not going well not going as well as would have liked not going fast enough (during race) aware that things were going wrong	things not going well	
increased self- awareness		
realised not going to win still trying to win	thinking about outcome	

Fig 7.2.1: Hierarchical structure of the third dimension 'evaluating performance'.

Fifteen first dimensions clustered into six second dimensions, from which emerged the largest third dimension. This was comprised 69 quotes from seven of the eight athletes interviewed (fig 7.2.1). The third dimension was named 'evaluating performance'.

7.2.1.1 Resigned to poor performance

Seven of the athletes produced 17 quotes indicating a resignation to their dramatic drop in performance. "I just couldn't recover, no matter what I tried", "I knew I wasn't going to get it [final lift]", and "... and then within half a second, it suddenly registered that I wasn't going to achieve what I'd dreamed that I could achieve", represent quotes from each of the three first dimensions; 'realised can't do anything about it', 'resigned to continued poor performance', and 'realised no chance of good performance', respectively. The second dimension 'resigned to poor performance' emerged from the three first dimensions (fig 7.2.1.1).

Raw themes	First dimensions	Second dimension
just couldn't recover, no matter what I tried knew I couldn't do any better couldn't fight to stay on, tried, but couldn't knew I couldn't do anything about it realising I just couldn't do anything	realised can't do anything about it	resigned to poor performance
didn't think I was going to get through that part of routine I'm going to fall off again knew wasn't going to make final lift	resigned to continued poor performance	
penalty combined with doubts, like a big wound penalty, a big cap- bang within half a second realised that was it touched it, & really knew then it was over switch off, then realise that's it realisation it's not gonna happen this run	realised no chance of good performance	

Fig 7.2.1.1: Hierarchical structure of the second dimension 'resigned to poor performance'.

7.2.1.2 Evaluative state

Nine quotes from six athletes indicated that performers regressed to an evaluative state during their drop in performance. "I hit a pole, after half a second it suddenly dawned on me what I'd done and for the next few seconds my mind was evaluating what that meant" is an example from the cluster of quotes within the first dimension 'evaluating consequences of mistakes'. In addition, two athletes indicated that they were 'over-analytical' of their performance. The two first dimensions presented here formed the second dimension, 'evaluative state' (fig 7.2.1.2).

Raw themes	First dimensions	Second dimension
if I miss 590lbs I'm not going to win penalty & accumulation, that's pretty much it I can't make another mistake after 2nd fall, don't worry, just go through, can't fall off again didn't try move again, because event too important evaluating consequences	evaluating consequences of mistakes	evaluative state
slipped into evaluative state trying not to get too analytical, too involved	over-analytical	

Fig 7.2.1.2: Hierarchical structure of the second dimension 'evaluative state'.

7.2.1.3 Angry and frustrated with poor performance

"I was getting so frustrated that I couldn't breath properly" is characteristic of the 10 quotes within the first dimension, 'frustrated'. This first dimension clustered together with 'mad/angry at myself' and 'increased disappointment' to form the second dimension 'angry and frustrated with performance' (fig 7.2.1.3). Seventeen quotes were made by five of the athletes.

Raw themes	First dimensions	Second dimension
feeling flustered more & more frustrated completely distracted, confused & frustrated a lot of frustration & anger felt like screaming so frustrated felt like not finishing so frustrated couldn't breath properly	frustrated	angry & frustrated with performance
I was angry, before getting back on felt like getting in other lane & getting opponent mad at myself	mad/angry at myself	
minimal disappointment to a bit more, doubled 2nd touch duplicated emotions, bucket of water on the fire	increased disappointment	

Fig 7.2.1.3: Hierarchical structure of the second dimension 'angry and frustrated with performance'.

7.2.1.4 **Things not going well**

Raw themes	First dimensions	Second dimension
never going well immediately knew it wasn't going as well as hoped didn't go so well	not going well	things not going well
didn't go as I'd hoped for 1st minute not as quick as had hoped not how I'd like it to be	not going as well as would have liked	
should be going faster but wasn't not faster enough	not going fast enough (during race)	
aware time not brilliant after 2nd miss, there's a problem here it's like you know it's not going well knew my time would be down just wasn't working I wasn't executing knew something was wrong	aware that things were going wrong	

Fig 7.2.1.4: Hierarchical structure of the second dimension 'things not going well'.

Twenty-one quotes from four of the athletes provided the raw data for this second dimension (fig 7.2.1.4). The quotes clustered to form four first dimensions. The theme of one of the four first dimensions 'aware that things weren't going well' is captured in the following quote, "well, it's like, you know it's not going well".

7.2.1.5 Increased self-awareness

Five athletes contributed seven quotes to this second dimension. The first dimension 'increased self-awareness' emerged from seven quotes similar to, "but I was aware that I was trying" and "...you become very aware of what's going on around you". The first dimension was carried through to the second dimension (fig 7.2.1.5).

Raw themes	First dimensions	Second dimension
aware of little mistakes aware of recognising things incorrectly aware of mental state aware that I was trying paying attention to hands, hips & shoulders even had time in mind to think about what I'm doing next become very aware of what's going on around you	increased self-awareness	

Fig 7.2.1.5: Hierarchical structure of the second dimension 'increased self-awareness'.

7.2.1.6 Thinking about the outcome

Six quotes by three athletes clustered into two first dimensions, from which emerged the second dimension 'thinking about the outcome' (fig 7.2.1.6). "After I'd taken my penalty ... I knew that I wasn't going to achieve my goal of winning on that run", is an example of the quotes from the first dimension 'realised not going to win'.

Raw themes	First dimensions	Second dimension
on missing, here it goes again, I'm not going to be WC realised wasn't going to achieve goal of winning on that run as soon as missed that lift, knew I wasn't going to win immediate realisation that wasn't going to win	realised not going to win	thinking about the outcome
aware of trying to get into a winning position I ain't coming in 2nd, I want to win	still trying to win	

Fig 7.2.1.6: Hierarchical structure of the second dimension 'thinking about the outcome'.

7.2.2 Strategies

This third dimension emerged from 14 quotes from six athletes. In this dimension athletes described how they used strategies to try and improve their performance, some of which failed (fig 7.2.2).

First dimensions	Second dimensions	Third dimension
trying to be calm tried to make up for mistakes giving it everything I had	strategies to improve performance	strategies
failed strategies		

Fig 7.2.2: Hierarchical structure of the third dimension 'strategies'.

7.2.2.1 Failed strategies

Nine quotes from five athletes referred to attempts which failed, for example, "I tried to turn it over faster, abandoning everything that I've learned over the years" and "I felt I let go earlier and missed the next one". The emerging first dimension, 'failed strategies', was carried through to the second dimension (fig 7.2.2.1).

Raw themes	First dimension	Second dimension
ended up missing another shot, it wasn't even a play tried to pull myself back on balance, couldn't tried to turn it over faster, abandoning everything I'd learned over the years hard to paddle aggressively & positively when timing is off took another bad shot let go earlier & missed next one after 1st fall, decided to go a bit earlier	failed strategies	

Fig 7.2.2.1: Hierarchical structure of the second dimension 'failed strategies'.

7.2.1.2 Strategies to improve performance

Three athletes attempted using strategies to overcome their catastrophic performance drop at this stage, for example, "I was trying to do things quite slowly and calmly as I normally would". Three first dimensions epitomise the attempts made; 'trying to be calm', 'tried to make up for mistakes' and 'giving it everything I had', which emerged from five quotations (fig 7.2.1.2).

Raw themes	First dimensions	Second dimension
trying to calm down trying to do things calm & slow as normal	trying to be calm	strategies to improve performance
trying to make up for bad shot determined to make up for it, but kept making mistakes	tried to make up for mistakes	
giving it everything I had		

Fig 7.2.1.2: Hierarchical structure of the second dimension 'strategies to improve performance'.

7.2.3 Attributions

The third dimension 'attributions' emerged from 20 quotes, five first and two second dimensions (fig 7.2.3). Fifty percent of the athletes interviewed attributed their catastrophic performance drop to internal controllable factors and inappropriate decisions.

First dimensions	Second dimensions	Third dimension
attributing mistakes to training internal attributions of failure	internal attributions (for poor performance)	attributions
making inappropriate decisions during performance started taking risks changed strategy very early	realisation of inappropriate decisions	

Fig 7.2.12: Hierarchical structure of the third dimension 'attributions'.

7.2.3.1 Internal attributions (for poor performance)

Raw themes	First dimensions	Second dimension
2 weeks behind in training, missed 2 lifts in a row missed 1st bench 4 weeks prior to WCs found myself lifting on rest days error in training more tried to compensate for missed lifts by training harder doubts lead to over-training	attributing mistakes to training	internal attributions (for poor performance)
had control over what I did, but not over doing any better just didn't have it that day problem had to be me it was pretty much just me	internal attribution of failure	

Fig 7.2.3.1: Hierarchical structure of the second dimension 'internal attributions'.

The second dimension 'internal attributions' was comprised 11 quotes (from three athletes) and two first dimensions, namely, 'attributing mistakes to training' and 'internal attribution of failure' (fig 7.2.3.1). A quote from the later highlights the theme, "I just didn't have it that day, you know, I just didn't have it".

7.2.3.2 Realisation of inappropriate decisions

Nine quotes from two athletes provided the raw data for three first dimensions, which clustered into the second dimension 'realisation of inappropriate decisions' (fig 7.2.3.2). A characteristic quote from the first dimension, 'making inappropriate choices during performance' is "I was supposed to give it to the guard and I didn't and I kind of took another bad shot, I was trying to make up for it again, by shining for that one moment, you know, for that one time I had the ball, but it wasn't a play and I ended up missing it". 'Changed strategy very early' emerged from quotes such as, "And maybe there was a time that I needed to do that, but I did it far too early in the race, and the race lasts an hour and a quarter. I think I started doing that after five minutes rather than waiting for the last, there comes a time when you start gambling, but not in the first five minutes".

Raw themes	First dimensions	Second dimension
1st 5 mins poor decisions making inappropriate plays, fouling making inappropriate individual plays at expense of team plays failed to make up for bad shot using inappropriate plays bad choice of shot	making inappropriate choices during performance	realisation of inappropriate decisions
riskier than should have been started taking risks, more risky	started taking risks	
thoughts changed after couple of minutes changed strategy after 5 mins (in 1.25 hr race)	changed strategy very early	

Fig 7.2.3.2: Hierarchical structure of the second dimension 'realisation of inappropriate decisions'.

7.3 Unusual thoughts and feelings

Eighty-four quotes from seven of the athletes clustered into 20 first, nine second and three third dimensions, which ultimately formed the general dimension 'unusual thoughts and feelings' (fig 7.3). The dimension was comprised quotes regarding thoughts and feelings which the athletes do not usually experience.

Second dimension	Third dimensions	General dimension
lack of rhythm lack of control lack of sharpness performance didn't feel normal	lacking appropriate feelings	unusual thoughts & feelings
surprised/ puzzled unusual thoughts	unusual thoughts	
physically nervous reduced confidence mentally nervous	lack of confidence	

Fig 7.3: Hierarchical structure of the general dimension 'unusual thoughts & feelings'.

7.3.1 Lack of appropriate feelings

First dimensions	Second dimensions	Third dimension
no rhythm performance not flowing timing off hesitation	lack of rhythm	lack of appropriate feelings
lack of control lack of physical control	lack of control	
lack of sharpness consequences of lack of sharpness	lack of sharpness	
aware things weren't going as normal just didn't feel right	performance didn't feel normal	

Fig 7.3.1: Hierarchical structure of the third dimension 'lack of appropriate feelings'.

The third dimension, 'lack of appropriate feelings' emerged from 42 quotes by six of the eight athletes. The quotes clustered to form 10 first and four second dimensions, 'lack of control', 'lack of sharpness', 'lack of rhythm' and 'performance didn't feel normal' (fig 7.3.1).

7.3.1.1 Lack of rhythm

Quotes within this cluster were related to lacking rhythm, for example, "And like I said, my rhythm was off, everything was off" and "... and just the timing of them all went". These quotes clustered into two of four first dimensions, 'no rhythm' and 'timing off', respectively. The remaining two first dimensions represented quotes referring to 'performance not flowing' and 'hesitation'. Six athletes made 25 quotes which comprised the raw data for the second dimension, 'lack of rhythm' (fig 7.3.1.1).

Raw themes	First dimensions	Second dimension
felt was sitting in the same spot, flailing, not going anywhere like I had holes in my hands couldn't catch/ pull the water rhythm off, everything off uncharacteristic, out of synch felt I caught all water on shoulders rhythm was going wasn't receptive to feelings of water	no rhythm	lack of rhythm
had no flow couldn't get it to flow awareness of not making boat flow no boat flow, not sudden realisation that boat not flowing	performance not flowing	
didn't hit wall right & off-beat timing went on 1st one & landed on floor timing of R & Cs just went generally miss-timing timing not brilliant	timing off	
hesitation came pretty early on	hesitation	

Fig 7.3.1.1: Hierarchical structure of the second dimension 'lack of rhythm'.

7.3.1.2 Lack of control

Three athletes described feeling 'a lack of control', for example, "control went from high, going into the routine, to just wanting to get it done and get off". 'Lack of physical control' was more specific to physical feelings, for example, "... when I jumped up I thought someone had stolen my arms and replaced them with someone else's, cause they weren't working very well". This dimension comprised five quotes and is presented in fig 7.3.1.2.

Raw themes	First dimensions	Second dimension
1st 30 seconds not in control at all control went, from high going into routine, to just wanting to get it done & get off	lack of control	lack of control
arms weren't working very well (like someone had stolen them) shoulders in wrong position for balance, so legs fell to side arms all over the place	lack of physical control	

Fig 7.3.1.2: Hierarchical structure of the second dimension 'lack of control'.

7.3.1.3 Lack of sharpness

Raw themes	First dimensions	Second dimension
felt lack of sharpness lack of sharpness important	lack of sharpness	lack of sharpness
realised wasn't going to medal because lacked sharpness reality of lacking sharpness affects physical feelings lack of sharpness leads to backing off	consequences of lack of sharpness	

Fig 7.3.1.3: Hierarchical structure of the second dimension 'lack of sharpness'.

"As soon as I realised I didn't have the sharpness, I'm not going to medal, that's the reality" is an example of the nine quotes from one athlete. Two first dimensions 'lack of sharpness' and 'consequences of lack of sharpness' formed the 'lack of sharpness' second dimension (fig 7.3.1.3).

7.3.1.4 Performance didn't feel normal

Two athletes explained that things 'just didn't feel right' or were 'aware that things weren't going as normal', where " ... and certainly was far worse on shifts than I would normally be" is an example of the later. Four quotes produced these two first dimensions (fig 7.3.1.4).

Raw themes	First dimensions	Second dimension
missed chances maybe wouldn't have missed another time far worse on shifts than normal	aware things weren't going as normal	performance didn't feel normal
something just didn't feel right just didn't feel right	just didn't feel right	

Fig 7.3.1.4: Hierarchical structure of the second dimension 'performance didn't feel normal'.

7.3.2 Unusual thoughts

The third dimension, 'unusual thoughts' was comprised 20 raw quotes, five first and two second dimensions (fig 7.3.2). 'Unusual thoughts' captured the theme of quotes which reflected the unusual nature of the thoughts four of the athletes were experiencing.

First dimensions	Second dimensions	Third dimension
not normal thoughts unusually concerned about what others were thinking	unusual thoughts	unusual thoughts
surprised by drop in performance puzzled unsure how to react to situation	surprised/ puzzled	

Fig 7.3.2: Hierarchical structure of the third dimension 'unusual thoughts'.

7.3.2.1 Surprised/ puzzled

This second dimension emerged from sixteen quotes (from four athletes) and three first dimensions (fig 7.3.2.1). "When I did fall off, it was like this big, massive surprise, um to fall off something which I didn't fall off" is an example of the 'surprised by drop in performance' first dimension. The next quote is characteristic of the 'puzzled' first dimension, "... for everything to go wrong that fast, well ... was very odd, because the fact that most of my workout is freestyle and that's my speciality and at that level at this point after so many years of competing you don't expect to do that, hardly ever". The remaining first dimension is 'unsure how to react to situation'.

Raw themes	First dimensions	Second dimensions
steady, focused performance to an unexpected drop immediately shocked (after 1st miss) big massive surprise to fall off something I wouldn't normally fall off before back on, felt disbelief everything's alright now, carry on & then whack, back off	surprised by drop in performance	surprised/ puzzled
what do I do now? saying to myself, why? before getting back on then I fell off & don't know why very odd for everything to go wrong so fast didn't know what was going on	puzzled	
after 2nd miss, asked coach what to do didn't know how to react to situation of not being infront don't know what's going on so I might as well try this	unsure how to react to situation	

Fig 7.3.2.1: Hierarchical structure of the second dimension 'surprised/puzzled'.

7.3.2.2 Unusual thoughts

Two athletes produced four quotes which specifically referred to their 'unusual thoughts' and an 'unusual concern about what others were thinking' (fig 7.3.2.2). An example of the later is " ... me, being me, it's like thinking people' ll be watching, saying oh, he's rubbish on that, he's falling off all the time. ... So all that had gone through me mind, which normally wouldn't, I'm not like not normally that bothered".

Raw themes	First dimensions	Second dimensions
not normal thoughts because it doesn't happen very much	not normal thoughts	unusual thoughts
mind full of what people thinking concerned about what other people were thinking (not normal)	unusually concerned about what others were thinking	

Fig 7.3.2.2: Hierarchical structure of the second dimension 'unusual thoughts'.

7.3.3 Lack of confidence

Twenty-two quotes, from which five first and three second dimensions emerged and subsequently formed the third dimension, 'lack of confidence' (fig 7.3.3). Five athletes contributed quotes to this dimension.

First dimensions	Second dimensions	Third dimension
physically nervous	physically nervous	lack of confidence
drop in confidence indecision during remainder of routine	reduced confidence	
nervous/ scared panic	mentally nervous	

Fig 7.3.3: Hierarchical structure of the third dimension 'lack of confidence'.

7.3.3.1 Physically nervous

"When I held my breath for a long time I started noticing it, it starts pounding in you ears, in your head" and "... so everything just tightens up, your heart's going up, you know, like speeding up no end" are examples of the ten quotes from which the first dimension 'physically nervous' emerged. This was carried through to the second dimension (fig 7.3.3.1). Three athletes contributed to this dimension.

Raw themes	First dimensions	Second dimension
physical feelings immediately concerned him sad feeling in stomach stomach sinks tightened up, heart speeding up no end tight from shoulders to ears, about missed move breathing, noticed it pounding in ears & head breathing was off	physically nervous	physically nervous

Fig 7.3.3.1: Hierarchical structure of the second dimension 'physically nervous'.

7.3.3.2 Reduced confidence

Raw themes	First dimensions	Second dimension
not confident in 1st 15-30 seconds couldn't believe I could sail well less confidence when timing off confidence plummeted, no longer confident I could do it soon aware of lack of confidence, and then lost it	drop in confidence	reduced confidence
can't win situation, whether worth continuing to do the move or not shall I miss out those and carry on with the rest	indecision during remainder of routine	

Fig 7.3.3.2: Hierarchical structure of the second dimension 'reduced confidence'.

"Confidence just plummeted basically ... I wasn't confident that then I could actually do it" clustered with similar quotes to form the 'drop in confidence' first dimension. 'Indecision during the remainder of the game' emerged from quotes such as, "but I can't or should I not do them now, shall I miss those- that bit out and carry on with the rest?" The two clustered to form the 'reduced confidence' second dimension which comprised seven quotes from three athletes (fig 7.3.3.2).

7.3.3.3 Mentally nervous

"I started feeling scared. And it got worse after the first one" characterises the first dimension 'nervous/scared'. This dimension clustered with 'panic' to form the second dimension 'mentally nervous' (fig 7.3.3.3). Five quotes were contributed by three athletes.

Raw themes	First dimensions	Second dimension
feeling more scared after 1st lift nervous, not shaking to bits nervous though	nervous/ scared	mentally nervous
panic panic and let down	panic	

Fig 7.3.3.3: Hierarchical structure of the second dimension 'mentally nervous'.

7.4 Drop in performance

The general dimension 'drop in performance' represented quotes (N=46) made by all of the athletes. The general dimension comprised eight first, four second and two third dimensions (fig 7.4). This dimension confirms that the athletes experienced a catastrophic drop in their performance, and the quotes describe the nature of this drop, in terms of magnitude and temporal patterning.

Second dimensions	Third dimensions	General dimension
noticeable drop in performance drop occurred suddenly performance hit rock bottom	sudden, substantial drop in performance	drop in performance
performance continued to deteriorate		

Fig 7.4: Hierarchical structure of the general dimension 'drop in performance'.

7.4.1 Sudden, substantial drop in performance

Thirty-two quotes from seven performers formed the raw data for five first and three second dimensions; 'noticeable drop in performance', 'performance hit rock bottom' and 'drop occurred suddenly'. The third dimension 'sudden, substantial drop in performance' emerged from the three second dimensions presented in figure 7.4.1.

First dimensions	Second dimensions	Third dimension
large drop in performance performance fell apart started going downhill, last 10 mins of half	noticeable drop in performance	sudden, substantial drop in performance
performance hit rock bottom		
drop occurred suddenly		

Fig 7.4.1: Hierarchical structure of the third dimension 'sudden, substantial drop in performance'.

7.4.1.1 Noticeable drop in performance

Eleven quotes described the extent of the performance drop, for example, "I came about 26th, I hadn't been out of the top 7 all week" and "... it was like just from one extreme to the next". From these quotes emerged the first dimension 'large drop in performance'. Other quotes, such as, "... and then everything from then fell apart" formed the first dimension, 'performance fell apart'. Fifteen quotes by six of the athletes comprised three first dimensions from which emerged the second dimension, 'noticeable drop in performance' (fig 7.4.1.1).

Raw themes	First dimensions	Second dimension
came 26th, hadn't been out of top 7 all week could have scored 9 or 9.1, as it was 8.35 drop in performance is proportional to importance of event performance went from one extreme to the other went from 1st/2nd to 8th over 2 pieces getting back to normal, then went wrong & lost it all again quite big, because I was doing well, & then fell off big drop in performance	large drop in performance	noticeable drop in performance
everything from then on fell apart everything just went terrible made devastating mistakes	performance fell apart	
last 10 mins of half it started going downhill	started going downhill, last 10 mins of half	

Fig 7.4.1.1: Hierarchical structure of the third dimension 'noticeable drop in performance'.

7.4.1.2 Drop occurred suddenly

Raw themes	First dimension	Second dimension
as soon as I released the ball pretty sudden, whacked horse, then fell off very quick & totally unexpected all of a sudden, I lost all sorts of feeling for the water very dramatic, in 15 meters all of a sudden, no control in arms all of a sudden I started taking bad shots as soon as I hit the wall, I felt it it' like a bang it was immediate	drop occurred suddenly	

Fig 7.4.1.2: Hierarchical structure of the second dimension 'drop occurred suddenly'.

Four athletes explained how sudden their drop in performance was, "all of a sudden I lost all sorts of feeling for the water" and "all of a sudden ... I started taking bad shots". Ten quotes formed the first dimension 'drop occurred suddenly' which was carried through to the second dimension (fig 7.4.1.2).

7.4.1.3 Performance hit rock bottom

Two of the athletes who felt they had experienced a large drop in performance also felt that their 'performance hit rock bottom', for example, "... and the bottom just fell out of it". Seven quotes comprised this first dimension which was carried through to the second dimension (fig 7.4.1.3).

Raw themes	First dimensions	Second dimension
the bottom just fell out of it dug myself so far, couldn't get out just went from good to bad to worse instead of performance returning, it went down again, rock bottom & further drop like a flat line on a HR monitor it was like it hit rock bottom, then dig a couple of feet, & then falling off again	performance hit rock bottom	

Fig 7.4.1.3: Hierarchical structure of the second dimension 'performance hit rock bottom'.

7.4.2.1 Performance continued to deteriorate

Five athletes described how their performance reached a lower level than normal, a level from which it didn't return, for example, "... it went downhill from there". The first dimension 'performance was getting worse' emerged from seven quotes and clustered with 'performance didn't pick up' and 'accumulation of mistakes' to form the second dimension, 'performance continued to deteriorate' (N=14). This second dimension was carried through to the third dimension (fig 7.4.2.1).

Raw themes	First dimensions	Second dimension
downward spiral it just got worse it just got out of hand something wrong, downhill with no breaks and it got worse again it seemed hard work to get the boat doing that it went downhill from there	performance was getting worse	performance continued to deteriorate
stayed bad for rest of game performance didn't pick up	performance didn't pick up	
put my hands down on dismount 3rd R &C next minute I was on the floor again I'd make one mistake after another I hit the next one	accumulation of mistakes	

Fig 7.4.2.1: Hierarchical structure of the second dimension 'performance continued to deteriorate'.

7.5 Inappropriate focus

This general dimension emerged from 42 quotes, 13 first and three second dimension, and the emerging third dimension was carried through to the general dimension. Seven of the eight athletes described how their thoughts, focus, concentration and effort were not appropriate for the situation. Figure 7.5 illustrates the second and third dimensions which comprised the general dimension 'inappropriate focus'.

Second dimensions	Third dimension	General dimension
lack of appropriate focus inappropriate effort just wanted to get out of situation	inappropriate focus	

Fig 7.5: Hierarchical structure of the general dimension 'inappropriate focus'.

7.5.1.1 Lack of appropriate focus

This second dimension emerged from 21 quotes by six athletes which subsequently formed ten first dimensions. "But constantly thinking, focusing on the wrong cues", "I mean it was ... I wasn't concentrating, well, it was on a zillion things, I mean it was like scattered thoughts" and " ... and before you know what's happening, you're on top of the next gate", capture the themes of three of the first dimensions, namely; 'inappropriate focus', 'realised I wasn't controlling my thoughts', and 'didn't refocus quickly enough'. The remaining first dimensions are presented in figure 7.5.1.1.

Raw themes	First dimensions	Second dimension
thinking about 1st touch, then hit another one focusing on what's just happened constantly focusing on wrong cues	inappropriate focus	
no focus		
lost my focus silly thoughts went through my head, before getting back on clipping gate distracted me	loss of focus	
take me to whatever rival goes to tried to keep up with him, rather than lift what I could concentrating so much on rival to my left	focusing on opponent	
knew wasn't successful controlling my thoughts concentrating on a zillion different things, & scattered thoughts	realised I wasn't controlling my thoughts	lack of appropriate focus
then next gate is there, before you know what's going on didn't refocus quickly enough	didn't refocus quickly enough	
concentrating but maybe not completely break in concentration with 2 penalties	reduced concentration	
tunnel vision		
zillion thoughts racing through my head	many thoughts	
lost all concept of time		

Fig 7.5.1.1: Hierarchical structure of the second dimension 'lack of appropriate focus'.

7.5.1.2 Inappropriate effort

This second dimension was comprised 11 quotes (from three performers) and three first dimensions (fig 7.5.1.2). Four of the quotes were similar to, "All of a sudden, for one split second, you're forcing something that you don't force, which makes it worse". These clustered to form the first dimension, 'not letting it happen, which clustered with 'inefficient energy expenditure' and 'aware of high energy expenditure' to form the second dimension 'inappropriate effort'.

Raw themes	First dimensions	Second dimension
trying too hard but wasting energy felt like I was using too much energy	inefficient energy expenditure	inappropriate effort
trying to fight the boat more than normal fighting boat, rather than just letting it happen for one split second, you're forcing something that you don't force, which makes it worse conscious effort rather than just letting it happen	not letting it happen	
aware of concentrating on putting a lot of effort in felt like I was putting more effort in	aware of high energy expenditure	

Fig 7.5.1.2: Hierarchical structure of the second dimension 'inappropriate effort'.

7.5.1.3 Just wanted to get out of situation

" ... and then I thought, right, just finish off the routine", is an example of the four quotes comprising the first dimension 'just wanting to finish'. This clustered with the six quotes from the first dimension, 'heart no longer in it', to form the 'just wanted to get out of situation' second dimension (fig 7.5.1.3). Five athletes' quotes formed this dimension.

Raw themes	First dimensions	Second dimension
just had to get back on to finish routine thought, just finish routine just get through & get off not thinking about position, but just getting through without falling off again	just wanting to finish	just wanted to get out of situation
maintained effort until touch, then heart no longer in it didn't want to try 2nd or 3rd lift I almost quit heart not in it after that mistake changed my state of mind, lost the worth of carrying on	heart no longer in it	

Fig 7.5.1.3: Hierarchical structure of the second dimension 'just wanted to get out of situation'.

7.6 Positive feelings

Three of the athletes had some positive feelings through the catastrophic performance. Six quotes formed the two first dimensions 'performance began well' and 'belief in recovery', both of which were carried through to the second dimension. The third dimension 'positive feelings' was similarly carried through as a general dimension (fig 7.6).

Second dimensions	Third dimensions	General dimension
performance began well	————————	positive feelings
belief in recovery	————————	

Fig 7.6: Hierarchical structure of the general dimension 'positive feelings'.

7.6.1 Performance began well

Three athletes commented on how their performance had begun well, for example, "it was swinging really well". Three quotes clustered together to form the first dimension 'performance began well', which was carried through to the second and third dimensions (fig 7.6.1).

Raw themes	First dimensions	Second dimension
swinging really well 1st 10 mins playing real good started routine well	performance began well	

Fig 7.6.1: Hierarchical structure of the second dimension 'performance began well'.

7.6.2.1 Belief in recovery

Only one athlete indicated a 'belief in recovery', epitomised by one of his three quotes, "so I jumped back up believing that, right, I'll catch them all now". This first dimension was carried through to the second and third dimensions (fig 7.6.2.1).

Raw themes	First dimensions	Second dimension
believed in recovery I'll go through & the rest will be alright after 1st miss not concerned, because know what to do	belief in recovery	

Fig 7.6.2.1: Hierarchical structure of the second dimension 'belief in recovery'.

7.7 Discussion

The catastrophe phase of the interview explored the precise nature of the performance drop. Fazey & Hardy (1988) proposed that performance does not follow a symmetrical, continuous pattern as multidimensional anxiety theory suggests (Martens et al., 1990), but performance is actually discontinuous. Essentially, when cognitive anxiety is high and physiological arousal is increasing, a dramatic and sudden drop in performance will occur from the upper to the lower performance surface. It was therefore the purpose of this section of the interview to examine the drop in performance and the associated thoughts, feelings and emotions of the performers. The major findings emerging from the hierarchical content analysis are discussed and related to previous research findings; specifically in relation to the predictions of the catastrophe model (Fazey & Hardy, 1988), that is the basis for the study.

Very little published research has examined the precise nature of performance drops. The anxiety-performance literature (i.e. inverted-U hypothesis and multidimensional anxiety theory) suggests that the path performance takes is smooth and continuous, and that once performance drops it does so in a uniform pattern suggesting that a reduction in anxiety will enable performance to return to the previous levels. However, Fazey & Hardy (1988) proposed that performance follows a discontinuous path with a much more dramatic decline.

The data from the catastrophe phase provided support for the notion of dramatic and sudden performance decrements, as proposed by the catastrophe models (Fazey & Hardy, 1988; Hardy, 1990). Seven of the athletes interviewed described their performance drop as a 'sudden, substantial drop', four of whom also said that their 'performance continued to deteriorate'. The sudden drop in performance is clearly demonstrated by the following quotation:

> All of a sudden, I lost all sorts of feeling for the water. I felt I was using way too much energy, rhythm was going, my kick beat was off, um, somehow or other I just couldn't recover, no matter what I tried.

In addition, one athlete described how one mistake seemed to result in performance deteriorating further:

> I started off fine, you know, scored and all of a sudden, I think I got a little bit too cocky and I started taking bad shots and started trying things I wouldn't normally do and the bottom just fell out of it. ... I do recall one mistake, I had one bad shot and after that I was trying to make up for it, and it seemed like a domino effect".

Only one athlete did not describe his drop in performance as sudden and substantial, however, a closer look at his performance indicates that the magnitude of his performance drop was significant. Specifically, the performer was ranked number one in the World and it was predicted that he would win the World Championships. In fact, he completely "bombed out"- not even managing to complete his three preliminary lifts. Such findings are consistent with the catastrophe models, (as demonstrated by the above), as they describe discontinuities in functions (that is, performance) which are normally continuous. Essentially, the model suggests that when cognitive anxiety is elevated changes in physiological arousal lead to large, discontinuous changes in performance when physiological arousal is at an intermediate level. Although the athletes did not describe a specific interaction, they did make comments which linked thoughts and feelings together, such as;

> I was nervous, cause like when I jumped up I thought that someone had stolen my arms and replaced them with someone else's, cause they weren't working very well".

Findings from both the pre-catastrophe and catastrophe phases of the study relating specifically to the pattern of performance, are consistent with catastrophe models: prior to the catastrophic drop, performance was maintained on the upper (or intermediate surface of the butterfly model) performance surface until the level of the variables changed, causing performance to fall onto the lower performance surface.

Although the present findings may be consistent with the cusp catastrophe model, they appeared to fit more comfortably with higher dimensional models. The 'unusual thoughts and feelings' dimension, which emerged with the second largest number of quotations (N=86), included the third dimension 'lack of confidence'. This dimension comprised 'reduced confidence', 'mentally nervous' (e.g. nervous, scared and panic) and 'physically nervous' (e.g. increased heart rate). Such variables mirror those within the higher dimensional catastrophe model, the butterfly catastrophe (applied to sport by Hardy, 1990; 1996a). Essentially, the model proposes that the presence of self-confidence allows performance to be maintained for longer despite elevated cognitive anxiety and physiological arousal. During the present investigation, the point at which performance declined could have been a result of the drop in self-confidence. Furthermore, the discontinuous changes in performance which appeared in the present study may be the result of the elevated cognitive anxiety and physiological symptoms and reduced confidence, and if so are consistent with the butterfly catastrophe model (Hardy, 1990). Recovery of performance (as suggested in catastrophe models) is explored in the coping phase (chapter 10) of the study.

Having said all this, the data does not unequivocally suggest that the interaction among elevated cognitive anxiety and physiological arousal and reduced confidence resulted in the dramatic performance drop, indeed, the reverse could be true. Thus, the interpretation of causal influence should be treated with caution. The implications of the results suggest that if the levels of these variables remain unaltered, performance will continue to decline (or will not return to the upper performance surface).

The catastrophe models do not account for the emergence of the largest general dimension 'evaluating performance', (112 quotations from all eight athletes). This dimension did not emerge in the pre-catastrophe phase of the interviews. The third dimension, of the same name, emerged from dimensions such as 'resigned to poor performance', 'evaluative state' and 'angry and frustrated with performance', all variables which have received little research attention. Resigned to poor performance was cited by seven of the athletes suggesting that it is an important factor which may reduce the probability of returning to an intermediate or good performance. One athlete describes his resignation to poor performance:

> ... when I clipped the gate with my top blade, and then within half a second, it suddenly registered and dawned on me that that was it, I'd just taken a five second penalty and I wasn't going to achieve what I'd hoped I would achieve on that run.

A further dimension 'evaluative state' was contributed to by six of the athletes interviewed, suggesting that it may have a considerable impact on the remainder of the performance. One of these athletes describes this:

> I slipped into an evaluative state, I hit a pole, after half a second it suddenly dawned on me what I'd done and for the next few seconds my mind was evaluating what that meant.

This athlete went on to describe the consequences of evaluating the first error:

> ... my mind was distracted and I wasn't thinking of the things I should have been thinking about. And that was reflected in what happened, I made another mistake.

These quotes also touch on an aspect the anxiety-performance relationship has failed to examine, the influence of variables on going performance (rather than just pre-performance). More recently, test anxiety researchers (Hagtvet & Ren Min, 1992) examined cognitive performance as a process construct rather than a summary construct (e.g. an average or total score). Findings provided evidence for the changing impact of ability, motivation and anxiety on performance at problem-solving tasks. Furthermore, they found that the effect of state anxiety did not occur until the third puzzle and after this, the effect of state anxiety and negative motivation had no direct influence upon performance. They explain their findings in terms of novelty-familiarity relationship, suggesting that as participants become more familiar with a task which was initially a novelty, the impact of various factors will change. Linking this to athletic performance, similar relationships are likely to exist, that is as performance progresses, either the task appears to become easier or more difficult and therefore the performer will respond differently to these affects.

One athlete went further to compare his evaluative thoughts and feelings during his catastrophic performance to a good performance:

> You start evaluating how your body feels, whereas when you're on a good run you're not just thinking about what the next gate is ... yes, I mean whether you're actually more tired than you would be if you were on a blinding run ... but you shouldn't really think 'oh that seemed hard work to get the boat to do that.

This quotation seems to highlight evaluating performance as a fundamental difference between a good performance and one which is beginning a catastrophic decline. These results, taken together with the second dimension 'inappropriate effort', identified by four athletes as factors contributing to their catastrophic performance, offers some support for the conscious processing hypothesis (Masters, 1992). Two quotations clearly epitomise the "trying too hard" phenomenon identified by Naatenen (1973) and Gallwey (1974): "All of a sudden, for one split second, you're forcing something that you don't force, which makes it [performance] worse" and "... it was a conscious effort, rather than just letting it happen". Essentially, the hypothesis predicts that when skilled performers are cognitively anxious they may regress to higher level cognitive mechanisms in an attempt to consciously control lower level processes that are normally automatic. Thus, the accomplished athlete regresses to cognitive processes, that is, the explicit rules of how to execute the skill resulting in degraded performance. Inappropriate effort also clustered with two further second dimensions 'lack of appropriate focus' and 'just wanted to get out of the situation to form 'inappropriate focus'. These dimensions revealed that the performers were expending energy but either inefficiently or in the wrong direction, to the extent that they were trying to force performance to happen rather than just letting it happen (Gallwey, 1974) and not relying on automatic execution of the skill (Masters, 1992).

Performers also indicated that their motivation to continue had disappeared. The emerging dimensions previously discussed, specifically; reduced confidence, mentally and physically nervous, increased (inappropriate) effort, and an evaluative state, suggest that the best explanation currently available may be a combination of processing efficiency theory (Eysenck, 1982) and the conscious processing hypothesis (Masters, 1992). Essentially, Eysenck's (1982) motivational explanation suggests that cognitively anxious performers will maintain performance through the compensatory mechanism of effort. The increased effort expenditure may reach the stage where it becomes inappropriate as it leads to conscious processing (the 'evaluative state' dimension). Furthermore, effort will only be expended while the performer perceives him/herself to have a moderate probability of success, that is being confident of achieving his/her goal. If the probability of success (self-confidence) drops, effort will be withdrawn resulting in a rapid performance decline. Although these two approaches sit comfortably together, causality is not clear from the present investigation, thus this issue clearly warrants further examination. In the present investigation, performers identified reduced confidence in addition to effort being withdrawn, in addition to the lack of evaluation (i.e. evaluative state) which provide a possible explanation for the dramatic drop in performance and is consistent with the theory. Of course, exploring the entire performance may provide further evidence on these theories, and thus the post-catastrophe phase is explored.

CHAPTER 8.

An in-depth analysis of catastrophic performances and the associated thoughts, feelings and emotions: IV. The post-catastrophe phase

8.1 Results of the hierarchical content analysis

The post-catastrophe phase refers to the period after the large drop in performance and explores the thoughts, feelings and emotions associated with this phase of the experience. 388 raw quotations emerged from the transcripts and subsequently clustered to form 82 first, 30 second, 11 third -dimensions and ultimately five general dimensions (see fig 8.1). The general dimension containing the largest number of quotes is discussed first, followed in a descending order (in terms of the number of quotations contained within them) by the remaining dimensions. For each general dimension, that general dimension is introduced, followed by the lower order dimensions contributing to it. Discussion of the second dimensions includes selected raw quotations from which the raw themes and first dimensions emerged.

8.2 Feelings regarding control

This was the largest general dimension within the post-catastrophe phase and comprised 127 quotes from all of the athletes. Emerging from the quotes were 24 first, nine second and four third dimensions forming the general dimension 'feelings regarding control' (fig 8.2). Quotes referred to the feelings of control the athletes felt they had over either their attentional focus, feelings and behaviours, pressures or opponents.

Second dimensions	Third dimensions	General dimensions
lack of appropriate focus unusual feelings & behaviours not mentally focused	lack of normal focus	feelings regarding control
putting pressure on myself thinking about the outcome thoughts about opponent	self-imposed pressures	
no control in control	control	
resigned to failure withdrawal of effort feeling of apathy	resignation & withdrawal	addressing failure
internal attributions for poor performance external attributions thoughts influenced performance	attributions	
sad & disappointed angry & frustrated regrets	negative emotions	unease
nerves self-doubts confidence drop puzzled	unease	
changed/ rejected goals strategies poor strategy choices	goals & strategies	
positive feelings (to performance & preparation) remained confident held it together performance improved	positive feelings	positive feelings
motivation		

Fig 8.1: Hierarchical structure of the post-catastrophe phase.

Second dimensions	Third dimensions	General dimension
lack of appropriate focus unusual feelings & behaviours not mentally focused	lack of normal focus	feelings regarding control
no control in control	control	
putting pressure on myself thinking about the outcome thoughts about opponent thoughts regarding coach	self-imposed pressures	
feelings regarding the coach		

Fig 8.2: Hierarchical structure of the general dimension 'feelings regarding control'.

8.2.1 Lack of normal focus

This dimension was comprised 46 quotes from all of the athletes interviewed. Nine first and three second dimensions formed the third dimension, 'lack of normal focus' (fig 8.2.1).

First dimensions	Second dimensions	Third dimension
loss of concentration distracted felt was concentrating on the wrong things tunnel vision thinking about social evaluation	lack of appropriate focus	lack of normal focus
unusual feelings abnormal behaviour	unusual feelings & behaviours	
not mentally in it not in right frame of mind	not mentally focused	

Fig 8.2.1: Hierarchical structure of the third dimension 'lack of normal focus'.

8.2.1.1 Lack of appropriate focus

The 24 quotes in this dimension indicated that all of the athletes were in a less than ideal state of concentration. For example, five athletes contributed nine quotes similar to, "... [concentrating] very hard, but on the wrong things" and "I was most definitely thinking about what happened, maybe more than what I was doing, what to do next, what to do immediately, thinking about what happened and then wondering what I was going to do the next, like following weekend, which was the next trial". This quote is an example of those in the first dimension 'felt I was concentrating on the wrong things'. "But really, once you start telling yourself to concentrate, then you've already lost that concentration and it's really hard to get it back", is an example of the quotes within the first dimension 'loss of concentration'. Five first dimensions, including; 'thinking about social evaluation', 'tunnel vision' and 'distracted', clustered to form the second dimension 'lack of appropriate focus' (fig 8.2.1.1).

8.2.1.2 Unusual feelings and behaviours

" ... that feeling of scared that I wasn't going to do good, I usually don't have, I wasn't accustomed to that", is an example of the nine quotes which formed the first dimension, 'unusual feelings'. Another first dimension 'abnormal behaviour' which clustered with 'unusual feelings' included quotes similar to, "I was doing a lot of things not normal for my game". The second dimension was named 'unusual feelings and behaviours' and emerged from 15 quotes (by five athletes) and two first dimensions (fig 8.2.1.2).

Raw themes	First dimensions	Second dimension
not thinking clearly about what I should have done not finely focused lost concentration realisation that focus had gone	loss of concentration	lack of appropriate focus
mind distracted distracted for that period of time	distracted	
might have been thinking about other things too much concentrating on refocusing distracted me thinking about what happened & what to do next, more than on what I was doing concentrating on too ,many things made it worse concentrating hard, on wrong things thinking about things, shouldn't have been lack of appropriate thinking, reflected in 2nd penalty combination of thoughts & what happened influenced me negatively suddenly started to think about external things	felt was concentrating on the wrong things	
not picking up relevant cues tunnel vision started going off, no concept of listening to coach playing just for myself playing with no set moves	tunnel vision	
negative feedback from coach, negative effect thought about dad & what he's thinking thinking about what dad & coach were thinking sponsor's & spectators believed I could do it	thinking about social evaluation	

Fig 8.2.1.1: Hierarchical structure of the second dimension 'lack of appropriate focus'.

Raw themes	First dimensions	Second dimension
thoughts were definitely different not as intense as anticipated not accustomed to feeling scared feelings not normal didn't feel like comps at home, that was the difference not tense, normally am just wasn't me out there maybe I was too relieved thought I was reacting normally, but wasn't	unusual feelings	unusual feelings & behaviours
didn't do normal things gonna try something different doing things not normal for my game don't remember taking breaths or getting pumped up forgetting normal preparation didn't do normal things for my game	abnormal behaviour	

Fig 8.2.1.2: Hierarchical structure of the second dimension 'unusual feelings and behaviours'.

8.2.1.3 Not mentally focused

Despite the small number of quotes (N=7), the quotations in this section were contributed by six of the eight athletes. 'Not mentally in it' emerged from quotes such as, "the last 75m, it was like 100% physically [effort] and nothing mentally". This first dimension clustered with 'not in the right frame of mind' to form the second dimension 'not mentally focused' (fig 8.2.1.3).

Raw themes	First dimensions	Second dimension
using my body not my brain psychological effort dropped effort was 100% physically, nothing mentally thinking back, mind a blank can't really remember what I was thinking	not mentally in it	not mentally focused
not strong in my mind not in right frame of mind	not in right frame of mind	

Fig 8.2.1.3: Hierarchical structure of the second dimension 'not mentally focused'.

8.2.2 Self-imposed pressure

Thirty-three quotes from seven athletes formed the raw data for six first dimensions, which subsequently formed the three second dimensions ‘putting pressure on myself’, ‘thinking about the outcome’ and ‘thoughts about opponents’. The emerging third dimension ‘self-imposed pressures’ is presented in figure 8.2.2.

First dimensions	Second dimensions	Third dimension
put myself under pressure wanted to prove myself	putting myself under pressure	
thinking about the outcome thinking about consequences of the outcome	thinking about the outcome	self-imposed pressures
concerns about the opponent thinking about opponent	thoughts about opponent	

Fig 8.2.2: Hierarchical structure of the third dimension ‘self-imposed pressures’.

8.2.2.1 Putting myself under pressure

Raw themes	Fist dimensions	Second dimension
under pressure about position I needed to make in next trial pressure on myself to prove something building up pressure on myself put more pressure on me to get in position I wanted putting myself under pressure I was supposed to win worrying about my performance rather than them	putting myself under pressure	putting myself under pressure
wanted to prove myself to coach wanted to prove myself, but failed important to be seen doing this unique element regularly still wanted to impress, but as long as I performed well, I'd be happy still wanted to go out & prove myself prove to myself I could do it	wanted to prove myself	

Fig 8.2.2.1: Hierarchical structure of the second dimension ‘putting myself under pressure’.

Five athletes contributed 15 quotes from which two first dimensions emerged. Specifically, athletes felt they were either 'putting myself under pressure' and 'wanted to prove myself'. The performers expressed that they were, for example, "putting myself under more pressure" and "still wanted to go out and prove myself" (fig 8.2.2.1).

8.2.2.2 Thinking about the outcome

" ... but then once I realised I could win, I started thinking about that, distraction, distracted by it" is characteristic of the 12 quotes (from three athletes) comprising the raw data for the two first dimensions. The theme of this first dimension was thinking about the outcome and the consequences of it, hence the second dimension being named, 'thinking about the outcome' (fig 8.2.2.2).

Raw themes	Fist dimensions	Second dimension
if we'd lifted same, I would have won would have been happy with silver started concentrating on results rather than just sailing distracted by thoughts of winning because event was so important, didn't try move again	thinking about the outcome	thinking about the outcome
thought more about possible consequences of success afterwards I have to wait a whole 'nother year felt I'd let another chance go by just want a chance to do good	thinking about consequences of the outcome	

Fig 8.2.2.2: Hierarchical structure of the second dimension 'thinking about the outcome'.

8.2.2.3 Thoughts about opponent

Three athletes contributed to this second dimension, which was comprised seven quotes similar to, "And all I could think about was beating him and not getting back to the important things". The raw themes clustered to form two first dimensions (fig 8.2.3.3).

Raw themes	Fist dimensions	Second dimension
concentrating so much on him, distracted me relying on his performance also pre-occupation with beating that opponent detracted from getting back to important things started thinking about them (opponents) when saw my score try to stop opposition embarrassing you	concerns about the opponent	thoughts about opponent
finally felt good that the other guy was hurt didn't give him any special treatment	thinking about opponent	

Fig 8.2.2.3: Hierarchical structure of the second dimension 'thoughts about opponent'.

8.2.3 Control

The third dimension 'control' emerged from 26 raw quotes made by seven of the athletes, which clustered into six first and the two second dimensions (fig 8.2.3). The theme of this dimension was control, and this included being either in or out of control.

First dimensions	Second dimensions	Third dimension
lost control no control over performance no control no control over emotions	no control	control
control over emotions in control of performance	in control	

Fig 8.2.3: Hierarchical structure of the third dimension 'control'.

8.2.3.1 No control

Quotes within this section described the loss of and lack of control the athletes felt they had in general, in terms of their performance and their emotions, for example, "I didn't feel in control. I clearly wasn't in control, because I hit another gate". This quotation represents those which formed the 'no control over performance' first dimension. "I'd lost the control I'd had from the start of the day" is characteristic of the first dimension, 'lost control'. The second dimension 'no control' emerged from 18 quotes from seven of the athletes which clustered into four first dimensions (fig 8.2.3.1).

Raw themes	First dimensions	Second dimension
lost control & belief in myself lost control I'd had at start of day felt less in control getting desperate ready to explode lost my head	lost control	no control
not as much control of comp as before 2nd piece no control over race not in control, evidence- another touch control over what I did, but not over doing any better	no control over performance	
control doesn't exist, they [opponents] control you absolutely no control no control over anything feeling of being lost the whole race	no control	
no control over emotions no control over emotions to back off no control over eagerness to be World Champ didn't want to talk to anyone, wanted to get in control	no control over emotions	

Fig 8.2.3.1: Hierarchical structure of the second dimension 'no control'.

8.2.3.2 In control

Interestingly, three athletes also felt they maintained some specific sort of control for example, "I had control over my feelings, even when I bombed out". This is characteristic of the first dimension 'control over emotions'. This clustered with 'in control of performance' from which the second dimension 'in control' emerged (fig 8.2.3.2). Eight quotations were contributed by three athletes to form this dimension.

Raw themes	First dimension	Second dimension
stayed calm, good in control of emotions had control over my emotions had control over feelings, even when I bombed out proud of way I handled myself, after I lost maintained dignity despite failure	control over emotions	in control
in control of performance		

Fig 8.2.3.2: Hierarchical structure of the second dimension 'in control'.

8.2.4 Feelings regarding coach

Raw themes	First dimensions	Second dimension
wasn't gonna let coach affect me coach kind of upset me teed off by coach knew coaches' words were going to bother me a little frustrated with coach coach getting on my nerves preoccupied with coach	preoccupied with coach	feelings regarding coach
trying to pay more attention to coach then thought about coach not thinking about game any more, only about coach didn't want to come out of game to hear coaches' words	thinking about coach	
coach tried to take control not really interested in coaches' attempts to relax me should have told coach how I felt coach being uncharacteristic responded differently to coach	abnormal interactions with coach	

Fig 8.2.4: Hierarchical structure of the second dimension 'feelings regarding coach'.

This third dimension emerged directly from the second dimension of the same name. Twenty-one quotations contributed by fifty percent of the athletes formed three first dimensions. The following therefore outlines the hierarchical content of the second dimension 'feelings regarding coach' (fig 8.2.4). 'Preoccupied with coach' and 'abnormal interactions with coach' are two of the first dimensions which are epitomised by the following quotations; " ... so right afterwards I was thinking about it, worrying more or less about what coach was going to say and I knew that was going to bother me a little" and "I think I responded differently to coach".

8.3 Addressing failure

'Addressing failure' emerged from 91 raw quotes, 20 first, six second and the two third dimensions (fig 8.3). The dimension comprised quotes which reflected all of the athletes response to failure, that is, of not achieving the high level of performance they normally achieved. Quotes from each athlete contributed to this general dimension.

Second dimensions	Third dimensions	General dimension
resigned to failure withdrawal of effort feeling of apathy	resignation & withdrawal	addressing failure
internal attributions for poor performance external attributions thoughts influenced performance	attributions	

Fig 8.3: Hierarchical structure of the general dimension 'addressing failure'.

8.3.1 Resignation and withdrawal

The third dimension, 'resignation and withdrawal' emerged from 69 quotes from all of the athletes. Twelve first dimensions formed three second dimensions; 'resigned to failure', 'feelings of apathy' and 'withdrawal of effort' (fig 8.3.1). "I know I felt I'd virtually given up before the end of the last race" is an example of a quote from the latter.

First dimensins	Second dimensions	Third dimension
resigned to impending failure resigned to losing blown it accepting of poor performance too late to change feelings	resigned to failure	resignation & withdrawal
just going through the motions drop in enthusiasm drop in motivation lack of excitement wanting to come out of game	feeling of apathy	
withdrawal of effort thinking about next competition	withdrawal of effort	

Fig 8.3.1: Hierarchical structure of the third dimension 'resignation and withdrawal'.

8.3.1.1 Resigned to failure

"I knew I didn't have a chance to do it [win]. And actually began to realise that I could drop down the rankings quite a lot. Actually, at the time, I would have said that finishing 2nd was definitely out of the question" is characteristic of the 11 quotes which comprised the first dimension 'resigned to impending failure'. Eight quotes provided the raw data for the 'resigned to losing' first dimension, which differed slightly from the previous one, as comments were more specifically related to losing, for example, "I thought more about losing, because they kept getting more points". The first dimension 'blown it', included quotes such as, "I'd screwed up and I knew that I wasn't going to achieve what I dreamed that I could achieve". Two further first dimensions, 'accepting of poor performance' and 'too late to change feelings' clustered with the three above to form the second dimension 'resigned to failure' (fig 8.3.1.1). This dimension comprised 31 quotes from six athletes.

Raw themes	First dimensions	Second dimension
resigned to performance not improving nothing can do about it (re: changing shot) it's gone, it's part of the game you realise it's over with (the game) realised couldn't win, run out of time knew didn't have chance to win, or come 2nd combination of 2 penalties ends it just knew I didn't have it after that my doubts meant I would fail	resigned to impending failure	resigned to failure
lost race before even half way here I am at Worlds again, I'm going to lose performance dropped once realised going to lose resignation to losing thought more about losing nobody wins with 5 second penalty	resigned to losing	
too late to relax too late to have fun (after 1st lift)	too late to change feelings	
immediately thought, I've bombed here kept thinking that I'd blown it I've blown it screwed up & knew wasn't going to achieve my dream	blown it	
did everything else well, couldn't have done much more unfortunately it turned out to be bad unhappy with performance, but accepting	accepting of poor performance	

Fig 8.3.1.1: Hierarchical structure of the second dimension 'resigned to failure'.

8.3.1.2 Feelings of apathy

The second dimension 'feelings of apathy' emerged from 28 raw quotes and five first dimensions (fig 8.3.1.2). "Just to get through the rest of the routine ... doing things to get from A to B" and "So I still went through the motions, but I didn't have that zip that I might have had if I'd ... been clear at that stage" are two examples of the eight quotes comprising the first dimension 'just going through the motions'. 'Drop in motivation' comprised four quotes similar to "so the motivation's just gone out of the window", whilst the ten quotes (from 5 athletes) from which 'drop in enthusiasm' emerged were similar to "you've not got the buzz that you initially started with".

Raw themes	First dimensions	Second dimension
it's just another game resigned to just getting to the finish line I'd finished the routine before I'd done the last tumble went through motions, no zip 2nd half of bars, there you go, done this, I'm getting dressed & going home want to get from A to B then I'll be finished for today want to finish, go home & drown my sorrows	just going through the motions	feelings of apathy
I'd like to have been more excited excitement was missing	lack of excitement	
no longer had 100% excitement, motivation & thrill lacked motivation to continue motivation changed, to just get to finish motivation's just gone out of the window	drop in motivation	
after a while I just stopped caring I would have left if I could have done hard to keep motivation when chance of medal has gone enthusiasm drops with reality of poor run not got the buzz had initially	drop in enthusiasm	
don't care if taken out of game wanted to come out of game	wanting to come out of game	

Fig 8.3.1.2: Hierarchical structure of the second dimension 'feelings of apathy'.

8.3.1.3 Withdrawal of effort

Five athletes provided 10 quotations which clustered into the two first dimensions, 'withdrawal of effort' and 'thinking about next competition' (fig 8.3.1.3). "I know I felt I'd virtually given up before the end of the last race" is an example from the first dimension 'withdrawal of effort'.

Raw themes	First dimensions	Second dimension
withdrawal of effort put less effort in, I'd given up felt I'd given up before end of race I kind of backed off rest of run is irrelevant	withdrawal of effort	withdrawal of effort
failed today, will try again next week thinking about next race thinking more about next week	thinking about next competition	

Fig 8.3.1.3: Hierarchical structure of the second dimension 'withdrawal of effort'.

8.3.2 Attributions

Seven athletes produced 22 quotations which clustered to form eight first and three second dimensions and ultimately the third dimension, 'attributions' (fig 8.3.2).

First dimensions	Second dimensions	Third dimension
trying too hard attributing poor performance to myself attributing poor performance to frustration too much time to think about race self critical of performance	internal attributions for poor performance	attributions
attributing poor performance externally attributing recovery to nose bleed	external attributions	
thoughts influenced performance		

Fig 8.3.2: Hierarchical structure of the third dimension 'attributions'.

8.3.2.1 Internal attributions for poor performance

"I was trying so hard to get back into it, it felt like I was wasting energy" is characteristic of the first dimension 'trying too hard'. This dimension comprised four quotes from as many athletes. Together with four additional first dimensions, the second dimension 'internal attributions for poor performance' emerged, comprising 13 quotes from six athletes (fig 8.3.2.1).

Raw themes	First dimensions	Second dimension
trying too hard think I try to hit it too hard trying hard, not being smart about it trying too hard to get back into rhythm	trying too hard	internal attributions for poor performance
I was probably over-training	attributions to training	
frustration lost me the race frustration stops you recognising the signs	attributing poor perf to frustration	
not good having too much time to think had more time to think about race	too much time to think about race	
never got myself sorted out at that WC it was my lifting that hurt me	self critical of performance	

Fig 8.3.2.1: Hierarchical structure of the second dimension 'internal attributions'.

8.3.2.2 External attributions

Raw themes	First dimensions	Second dimension
unexpected action taken by judges, led to missed final lift coach started warming me up too soon	attributing poor performance externally	external attributions
felt recovered quicker than had I not had the nose bleed thinking about other stuff, nose bleed	attributing recovery to nose bleed	

Fig 8.3.2.2: Hierarchical structure of the second dimension 'external attributions'.

Only two athletes made external attributions, one who made external attributions for his poor performance whilst the other made an external attribution as a contributory for his performance improving. The five quotes formed two first dimensions from which the 'external attributions' second dimension emerged (fig 8.3.2.2).

8.3.2.3 Thoughts negatively influenced performance

Four quotes from three athletes formed the first dimension 'thoughts negatively influenced performance', which was subsequently carried through to the second dimension (fig 8.3.2.3).

Raw themes	First dimensions	Second dimension
scattered thoughts influenced performance thought changes influenced performance thoughts influenced my performance it was a mental thing	thoughts negatively influenced performance	

Fig 8.3.2.3: Hierarchical structure of the second dimension 'thoughts influenced performance'.

8.4 Unease

Second dimensions	Third dimensions	General dimension
sad & disappointed angry & frustrated regrets	negative emotions	unease
nerves self-doubts confidence drop puzzled	unease	

Fig 8.4: Hierarchical structure of the general dimension 'emotions'.

The general dimension 'unease' comprised 92 quotes, 18 first, seven second and the two third dimensions, named 'negative emotions' and 'unease', which are presented in figure 8.4. This dimension reflected the nerves, doubts, disappointment and anger which all of the athletes felt towards the catastrophic drop in their performances.

8.4.1 Negative emotions

The third dimension 'negative emotions' emerged from 54 quotes by all eight athletes. The quotes subsequently clustered to form ten first dimensions and three second dimensions (fig 8.4).

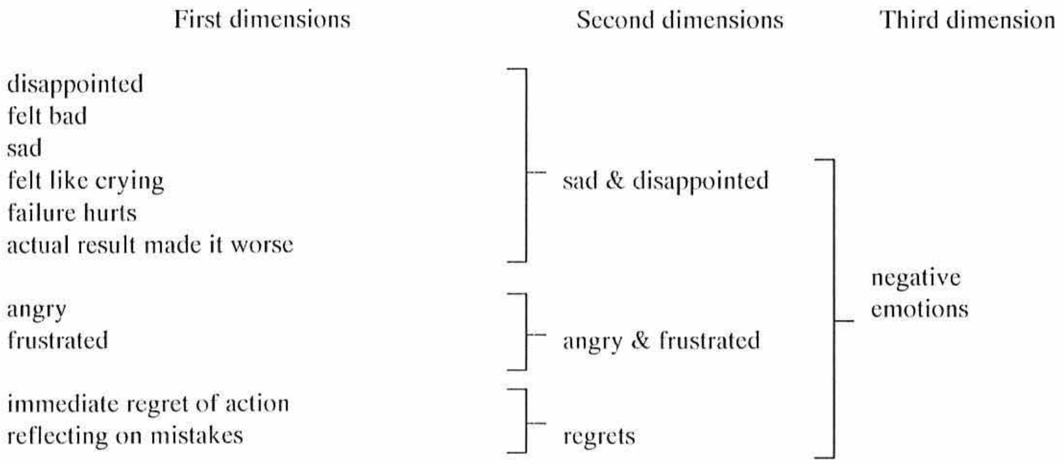

Fig 8.4: Hierarchical structure of the third dimension 'negative emotions'.

8.4.1.1 Sad and disappointed

"I was disappointed more than sad, that I just didn't do good" epitomises the first dimension 'disappointed'. Seven similar quotes by five athletes formed this first dimension. 'Felt like crying' consisted of quotes similar to "I wanted to like scream or cry". "I'd like to have thought that when I was in that situation I would have handled it better, yet at the end of the race, the reality was that I didn't and that was, that cut pretty deep" is characteristic of quotes from the 'failure hurts' first dimension. Six first dimensions clustered to from the second dimension 'sad and disappointed' which consisted of 26 quotes from six of the eight athletes (fig 8.4.1.1).

Raw themes	First dimensions	Second dimension
pretty disappointed	disappointed	sad & disappointed
disappointed more than sad, because didn't do well		
very cheesed off		
disappointed, couldn't understand why performed bad		
disappointed		
disappointed with swim		
after comp felt really bad	felt bad	
felt bad, because nobody could have worked harder		
really, really upset	sad	
immediately started thinking how sad I was		
hollow		
sad		
low after 1st run		
felt sad		
wanted to cry, say damn, it's always here	felt like crying	
felt like crying		
hurts me that I try too hard & don't relax	failure hurts	
hurts that I didn't handle situation better		
hurts that haven't done it		
difficult at WC because that's what I have worked for		
same feelings of resignation at poor performance as 1st Worlds		
position made it worse	actual result made it worse	
score exaggerated extent of mistakes		
knowing time was down affected me in the end		

Fig 8.4.1.1: Hierarchical structure of the second dimension 'sad and disappointed'.

8.4.2.1 Angry and frustrated

"I was extremely frustrated that it didn't happen [recovery]" is an example of the 15 quotes which formed the first dimension, 'frustrated'. This first dimension combined with 'angry', which comprised three quotes to form the second dimension 'angry and frustrated' (fig 8.4.2.1). The second dimension comprised 22 quotes from seven of the athletes interviewed.

Raw themes	First dimension	Second dimension
more anger so angry & disgusted when finished negative aggression to rip next piece apart	angry	angry & frustrated
just frustrated by end, so frustrated started getting frustrated frustrated frustration caused by small margin of error got very frustrated frustrated, rather than angry extremely frustrated it didn't happen (recovery) more frustrating really frustrated afterwards, kicking myself couldn't believe I'd done so badly	frustrated	

Fig 8.3.4: Hierarchical structure of the second dimension 'angry and frustrated'.

8.4.1.3 Regrets

Raw themes	First dimensions	Second dimension
wished could have got the ball back stupid came through my head	immediate regret of action	regrets
thought about details of run & mistake thinking about what shouldn't have done what happens if I fall off again recall that one mistake	reflecting on mistakes	

Fig 8.4.1.3: Hierarchical structure of the second dimension 'regrets'.

Three athletes contributed the six quotes which formed two first dimensions from which this second dimension emerged (fig 8.4.1.3). "I knew I shouldn't have done that, I don't normally do that. ... That's all I could think about in my mind" is an example of the quotes forming the 'reflecting on mistakes' first dimension.

8.4.2 Unease

The third dimension 'unease' emerged from 38 quotes, eight first and four second dimensions (fig 8.4.2). It represents quotes from seven of the eight athletes and reflected their doubts concerning their performance and their incomprehension of the large drop in their performance.

First dimensions	Second dimensions	Third dimension
nervous negative physical symptoms	nerves	unease
self-doubts uncertainty	unease	
confidence dropped it got harder	confidence drop	
couldn't understand why performed so badly unsure how to prepare	puzzled	

Fig 8.4.2: Hierarchical structure of the third dimension 'unease'.

8.4.2.1 Nerves

"... and another thing, you start to evaluate how your body feels" is characteristic of the quotes from which the first dimension 'negative physical symptoms' emerged. Feelings of being nervous and scared formed the first dimension 'nerves'. Together, the two first dimensions comprised eleven quotes from five athletes, which subsequently formed the second dimension 'nerves' (fig 8.4.2.1).

Raw themes	First dimensions	Second dimension
nervous not as relaxed as would have liked really fidgety throughout comp, couldn't sit down, pacing very nervous, scared when got back on, nervous & shaky really nervous once back on	nervous	nerves
preoccupied with tiredness, big blow HR goes up, felt chest pounding start evaluating how your body feels chill bumps, neck hurting, tension shaking & tired more than normal	negative physical symptoms	

Fig 8.4.2.1: Hierarchical structure of the second dimension 'nerves'.

8.4.2.2 Unease

Eleven quotes (from 50% of the athletes), for example, "just, um, get like doubts in your head" formed the first dimension 'unease'. The second dimension of the same name included this first dimension, in addition to 'uncertainty?' (fig 8.4.2.2).

Raw themes	First dimensions	Second dimension
doubts in head drop in performance, due to self-doubts & coaches' doubts more doubts than normal not as self-confident at Worlds; at least until I win a big contest never performed real good at Worlds no fun, once coach started yapping, led to self-doubts don't understand why ranked #1 each year for Worlds	unease	unease
what am I doing (1st thought) what am I going to do in this run now	uncertainty	

Fig 8.4.2.2: Hierarchical structure of the second dimension 'unease'.

8.4.2.3 Confidence drop

Four athletes provided eight quotes describing their drop in confidence. "Only from that early fall, my confidence had gone" is an example from the first dimension, 'confidence dropped'. This clustered with the first dimension 'it got harder' to form the second dimension, 'confidence drop' (fig 8.4.2.3).

Raw themes	First dimensions	Second dimension
less confident in achieving my goal just can't compete in Worlds, I'm just not a WC lifter confidence dropped from that early fall, confidence had gone being negative, I will fall off again because my releases had gone completely	confidence dropped	confidence drop
Two weaker pieces to go, made it tougher than I'd have liked (reduced confidence) much tougher than would have liked	it got harder	

Fig 8.4.2.3: Hierarchical structure of the second dimension 'confidence drop'.

8.4.2.4 Puzzled

Raw themes	First dimensions	Second dimension
more & more disillusioned as to why performed so badly just didn't know why (performed so badly) frustrated at having no idea what caused performance decrease	couldn't understand why performed so badly	puzzled
need to learn how to adapt to Worlds mentally not ready for feelings associated with Worlds don't know how to prepare for Worlds if I understood demands of Worlds, I'd be World Champ	unsure how to prepare	

Fig 8.4.2.4: Hierarchical structure of the second dimension 'puzzled'.

"Usually, I can tell what I've done to lead to such a performance decrease, but this time I had no ideas. I think that's what frustrated me" is an example of the three quotes three athletes contributed to the first dimension 'couldn't understand why performed so badly'. 'Puzzled' emerged from this first dimension, in addition to five quotes within the 'unsure how to prepare' first dimension. From these two first dimensions emerged the second dimension 'puzzled', which comprised eight quotations from three athletes (fig 8.4.2.4).

8.5 Goals and strategies

The general dimension 'goals and strategies' was carried through from the third dimension. The third dimension emerged from 29 quotes contributed by six athletes, eight first and three second dimensions (fig 8.5).

Second dimensions	Third dimensions	General dimension
changed/ rejected goals strategies poor strategy choices	goals & strategies	

Fig 8.5: Hierarchical structure of the general dimension 'goals and strategies'.

8.5.1.1 Changed/rejected goals

Raw themes	First dimensions	Second dimension
goals no longer important all goals gone out of window goal of winning definitely not realistic after 1st few minutes	rejected goals	changed/ rejected goals
goal changed, because failed too early in race to have changed plan changed plan, so broke rules I set myself low score came up, & changed everything, just go through this piece perceived need to do something different, if was to catch up more motivated to winning, less to sailing to plan	changed plan/ goal	

Fig 8.5.1.1: Hierarchical structure of the second dimension 'changed/ rejected goals'.

8.5.1.2 Strategies

'Strategies' emerged from ten quotes by four athletes and three first dimensions, as presented in figure 8.5.1.2. The dimension captured the athletes' efforts to mentally change their performance. An example of the first dimension 'trying to concentrate' is "the last 75m I think I was trying too hard to concentrate".

Raw dimensions	First dimensions	Second dimension
last 75m, trying to concentrate too hard telling yourself to concentrate kept having to concentrate on doing well	trying to concentrate	strategies
putting effort into a different direction effort on floor routine changed because still tight effort to make routine easier effort changed throughout that piece got to do good last piece to stay in with a chance	change in effort	
if I don't regroup in next 10 secs, this is over realised importance of reverting to original plan	realised action was required	

Fig 8.5.1.2: Hierarchical structure of the second dimension 'strategies'.

8.5.1.3 Poor strategy choice

"I knew I shouldn't have done that" is characteristic of the three quotes forming the first dimension 'realised poor choices made'. Seven further quotes clustered into the two first dimensions 'taking risks' and 'strategy exaggerated error' (fig 8.5.1.3). Thus the second dimension comprised 10 quotes made by five of the athletes.

Raw themes	First dimensions	Second dimension
should have recognised it was unlucky rather than losing focus shouldn't have done that realise shouldn't have goal of hurting opponent	realised poor choices made	poor strategy choices
less conservative than had I still been clean took maverick, gambling approach shouldn't gamble in 1st 5 minutes (of 1.25 hr race)	taking risks	
forcing an adjustment exaggerates what was wrong in 1st place deciding on wrong strategy ends your chances	strategy exaggerated error	

Fig 8.5.1.3: Hierarchical structure of the second dimension 'poor strategy choices'.

8.6 Positive feelings

The final general dimension in the post-catastrophe phase is 'positive feelings'. The dimension comprised 49 quotes from seven of the athletes which formed 12 first, five second and two third -dimensions namely; 'positive attitude toward performance' and 'positive feelings' (fig 8.6). 'Positive feelings' demonstrated that despite having experienced a catastrophic performance seven of the athletes were still able to identify something positive.

Second dimensions	Third dimensions	General dimension
positive feelings (to performance & preparation) remained confident held it together performance improved	positive attitude to performance	positive feelings
motivation		

Fig 8.6: Hierarchical structure of the general dimension 'positive feelings'.

8.6.1 Positive attitude to performance

This third dimension emerged from 37 raw quotes from six athletes which subsequently clustered into 10 first and four second dimensions (fig 8.6.1).

First dimensions	Second dimensions	Third dimension
focused well prepared tried hard at ease following failure	positive feelings (to perf & prep)	positive attitude to performance
still feeling confident confident in ability could still place where wanted to, with one fall	remained confident	
performance improved		
held it together able to refocus	held it together	

Fig 8.6.1: Hierarchical structure of the third dimension 'positive attitude to performance'.

8.6.1.1 Positive feelings (to performance and preparation)

Raw themes	First dimensions	Second dimension
each routine has concentration it needs more concentrated no outside distractions no worries about concentration focused	focused	positive feelings (to perf & prep)
fairly successful approach to the race think I prepared way better for this one	well prepared	
gave it my best shot enjoyed pushing myself	tried hard	
less worried about what was going on around me more at ease for 2nd run	at ease following failure	

Fig 8.6.1.1: Hierarchical structure of the second dimension 'positive feelings (to performance & preparation)'.

This second dimension emerged from 11 quotes and four first dimension (fig 8.6.1.1). "I had no worries about my concentration" demonstrates the theme of the first dimension 'focused'. The remaining first dimensions which clustered together to form the second dimension were; 'well prepared', 'tried hard' and 'at ease following failure'. Thirty-seven quotes by six of the athletes formed this second dimension.

8.6.1.2 Remained confident

"I was still confident, I still thought I was a good enough swimmer to not only catch him but still win the race" characterises the first dimension 'still feeling confident'. 'Confidence in ability' and 'could still place where I wanted with one fall' together with 'still feeling confident' generated the second dimension 'remained confident', comprised 14 quotations. Only two athletes contributed to this dimension (fig 8.6.1.2).

Raw themes	First dimensions	Second dimension
jumping back on & like a nervous wreck, but knew I could do it easily still confident could catch him & win still thought I could do it confident even when behind	still feeling confident	remained confident
thought confidence would help confidence in ability concerned about doing job, but confident I could do it confident I could do it	confidence in ability	
almost given into it (allowing myself one fall) one of reasons why I fell, because I could afford one fall	could still place where wanted to, with one fall	

Fig 8.6.1.2: Hierarchical structure of the second dimension 'remained confident'.

8.6.1.3 Held it together

This second dimension emerged from seven raw quotes made by two of the athletes. The quotes clustered into two first dimensions, 'held it together' and 'able to refocus' (fig 8.6.1.3).

Raw themes	First dimensions	Second dimensions
still focused & concentrating because some of preparation was still right felt fortunate next section was open held it together enough, no big mistakes, & no flair	held it together	held it together
got back into focus	able to refocus	

Fig 8.6.1.3: Hierarchical structure of the second dimension 'held it together'.

8.6.1.4 Performance improved

Only one athlete felt that his performance improved, and he made five quotations to this effect, " ... so from then on I couldn't, definitely couldn't afford to fall, so I ended up competing better". The second dimension 'performance improved' was carried through from the first dimension (fig 8.6.1.4).

Raw themes	First dimensions	Second dimension
quite happy with performance happy at end of comp relieved because done my bit to ensure others had to do theirs relief because performed next pieces better than normal competed better, because knew couldn't afford another fall	performance improved	______________

Fig 8.6.1.4: Hierarchical structure of the second dimension 'performance improved'.

8.6.2 Motivation

The third dimension, 'motivation' was comprised 12 quotes by fifty percent of the athletes. The quotes clustered into two first dimensions 'motivated' and 'determined not to make mistakes' (fig 8.6.2). "I was going to make up for it next time I get the ball" and "Mentally, yeah, I was more determined that I wasn't going to fall off" demonstrate the theme of the two first dimensions. The emerging second dimension was carried through to the third dimension.

Raw themes	First dimensions	Second dimension
wanted top make next basket still pretty motivated got even more motivated determined to make up for it	motivated	motivation
just wanted to stay on and not fall off mentally more determined not to fall off motivated only to go from A-B without making mistakes concentrating on not making more mistakes	determined not to make mistakes	

Fig 8.6.2: Hierarchical structure of the third dimension 'motivated'.

8.7 Discussion

The post-catastrophe phase involved examination of the thoughts, feelings, emotions and behaviours of the athletes following their large and sudden drop in performance. This phase did not focus on attempted coping strategies, as these are examined in the next phase of the study, reported in chapter 10. The hierarchical content analysis is discussed in the light of the models and theories highlighted in chapter 5. However, the discussion of results from this chapter is brief as we are more interested in the changes in variables from the pre-catastrophe phase to the post-catastrophe phase, which is included in chapter 9. The five emerging general dimensions of the post-catastrophe phase comprised; feelings regarding control; addressing failure; unease; goals and strategies; and positive feelings.

The largest dimension 'feelings regarding control' comprised various sub-components of control, for example, control of attentional focus, feelings, performance, pressures and opponents. Of the 127 quotes within this general dimension only 8 quotes (by 3 of the athletes) referred to feeling in control over either their emotions or of their performance. In contrast, seven of the athletes provided the remaining quotes referring to feelings regarding lack of control. An example of this lack of control over the match is highlighted in the following quote;

> I realised that we were gonna lose, control doesn't even exist in your vocabulary, cause they control you and once you realise your chances of winning are utterly gone, you can't control it. There's nothing you can do about it, you just play out the time on the clock.

The three athletes who identified feelings of control over one aspect of their experience also felt out of control with another aspect of their experience. For example, the athlete making the above quote also commented; "I still felt very in control of my emotions". Anecdotal reports (Jones & Hardy, 1990b), such as those by Steve Backley and David Hemery, provide support for the potentially strong influence of control upon performance. Backley emphasised the importance of feeling highly aroused, yet still in control of himself and his environment. Similarly, Hemery emphasised that performance "very much depended on having the stress of competition under control" (p.251). Although the role of self-control in the anxiety-performance relationship has received very little attention, some researchers (e.g. Fisher, 1984) have proposed that self-control mediates the effect of stress upon performance. Furthermore, a number of researchers (Carver & Scheier, 1988; Gould, et al., 1992, a & b, 1993; Hardy & Jones, 1990) have suggested that the perception of control may be a crucial indicator of when performers will disengage and thus experience decrements in performance. The emergence of control in the pre-catastrophe phase may have enabled performance to be maintained up to a certain point, until the catastrophe occurred. However, it is not clear from the interviews whether it had a causal influence on the dramatic drop in performance. In the present study, a lack of control following the catastrophic performances was associated with continued poor performance as only one performer experienced a performance improvement after the catastrophe. Its presence in these two phases of the catastrophic experience certainly indicate that control warrants further investigation not only within the anxiety-performance domain, but also in sport psychology research generally. Hardy (1990), in his proposed higher dimensional butterfly model which included the metacognitive variables of cognitive anxiety, somatic anxiety and self-confidence, also suggested the inclusion of self-control. However, this model has yet to be fully tested.

A further emerging general dimension is consistent with the processing efficiency theory (Eysenck, 1982) explanation for performance catastrophes, 'addressing failure', which comprised 'resignation and withdrawal' and 'attributions'. All of the athletes identified resignation and failure, which included resigned to failure, withdrawal of effort and feelings of apathy. One athlete's quote emphasises this dimension;

> ... But my heart wasn't in it after that, after I'd taken a penalty, my heart wasn't in it, um, ... I'd screwed up and I knew I wasn't going to achieve what I'd dreamed that I could achieve.

These findings provide some support for the motivational explanation offered by Eysenck (1982) in his processing efficiency theory. Additionally, as one would anticipate, motivation dropped after the catastrophe began and this is emphasised by one of the athletes' quotations; "I still didn't have 100% motivation and excitement and thrill ... so I still went through the motions, but I didn't have that zip, that I might have had if I'd been clear at that stage". The theory suggests that cognitively anxious athletes will continue to invest effort in the task providing they perceive themselves as having at least a moderate probability of success; once this decreases, the task demands and continued high cognitive anxiety begin to outweigh the effort required. Thus, performance is likely to drop dramatically and suddenly when the performer completely withdraws effort. In the present investigation five athletes identified a withdrawal of effort and a reduction in their self-confidence and performance decline.

Causality is not clear from the performers' responses, however, the raw quotes actually indicate that effort was withdrawn after the drop in performance, which is counter to

Eysenck's (1982) theory. However, it is worth considering that prior to the catastrophe, effort did not emerge as a higher order dimension and confidence was high; in contrast, the catastrophe phase revealed inappropriate effort, an evaluative state and a decrease in self-confidence, whilst the post-catastrophe phase revealed a withdrawal of effort and reduced continued low confidence. The changes in these variables from the pre-catastrophe phase through to the catastrophe and post-catastrophe phases are consistent with the variables in Eysenck's (1982) theory, but are not consistent with Eysenck's theory in terms of the pattern which they follow. The pattern of variables offer more support for Masters (1992) conscious processing hypothesis. Specifically, the inappropriate effort expenditure (Weinberg, 1978; Weinberg & Hunt, 1976) may have resulted in conscious control, evident in the evaluative state general dimension, when performance catastrophically dropped. Of course, causal influences are only suggested from the qualitative research, structural equation modelling (Ecob & Cuttance, 1987) would be required to assess the specific order of influences on performance.

During the post-catastrophe phase self-doubts, nerves and negative emotions became more salient. Six of the eight athletes indicated that these feelings remained elevated, whilst self-confidence dropped, for example; "things weren't the same, my stomach, it dropped ... like feeling nervous" and "... confidence just plummeted basically because you're not too confident that you missed, I missed it. I wasn't confident that I could do it". According to the catastrophe models, performance only returns to the upper performance surface with a considerable reduction in one of these variables. In the present investigation, performance improved for one of the athletes, who demonstrated a considerable reduction in doubts and nerves, which combined with his increasing confidence enabled him to regain the upper performance curve. One of his quotations clearly demonstrates these factors;

> I had doubts, that everyone has, like what happens if I fall off again. ... But as I say I was confident that I could do it and do it well. ... [Heart rate] was going fast simply because my arms were all over the place.

Due to continued doubts and nerves, and confidence remaining low, the other performers were unable to improve their performance. Such findings are consistent with the butterfly model predictions (Hardy, 1990), again suggesting that researchers examine this model, including self-control as a factor. The findings also provide support for performance as a process construct (Hagvet & Ren Min, 1992). Specifically, they provide evidence for covariance of ability, anxiety and motivation with on-going performance on cognitive tasks. Such proposals can be applied to sport performance, suggesting that the changing impact of the variables have a cyclical influence on and with performance, therefore, maintaining performance in a depressed state, or a peak state.

CHAPTER 9.

An in-depth analysis of catastrophic performances and the associated thoughts, feelings and emotions: V. General discussion

9.1 Discussion

Although it is important to recognise both the methodological and conceptual advances that have been made in competitive state anxiety research, it is also evident that many questions remain unanswered. An important consideration, based upon growing support (Hardy, 1990; Hardy et al., 1994; Parfitt & Hardy, 1991) for the catastrophe models, is to examine why such catastrophic performances occur. Thus, a purpose of the in-depth structured interviews was to explore athletes' catastrophic experiences and identify whether the findings support any current theoretical explanations for such large drops in performance. The second purpose addressed whether other variables influence the anxiety-performance relationship which have not previously been identified. Deductive analyses were also conducted to determine which theories best explained the individual athletes' experiences. Thus, the transcripts were examined to determine the support they provided for the models and theories highlighted in the introductory chapter. This general discussion examines the whole process of catastrophic performances in order to address these purposes. Specifically, it links the three phases of the catastrophic performance (pre-, during and post-) identifying only the most noticeable changes; those factors which are consistent with the models/ theories proposed; and those factors previously unexamined within sport psychology.

Given the rather unique nature of this study (similar to a repeated measures design), it was deemed most appropriate to track two of the athletes across their catastrophic performances. The most interesting comparison was between a performer who recovered from his catastrophic performance and a performer who did not. Doing so has enabled us to identify perceived causal inferences. Each of the athletes' experiences is highlighted with detailed quotations taken from the transcripts. Practical implications of the findings are presented, followed by methodological considerations, and finally future research directions identified.

9.2 The catastrophic experience

Prior to examination of the results it is worth highlighting the general dimension 'drop in performance' which emerged in the catastrophe phase. Six of the athletes described their 'sudden, substantial drop in performance', and five of the athletes described how their 'performance continued to deteriorate'. According to catastrophe models, cognitively anxious athletes' performance will be elevated or maintained while physiological arousal is increasing up to a certain point after which a sudden, dramatic drop will occur, hence the term 'catastrophe'. Indeed, performers in the present investigation explained how they were still cognitively anxious ('mentally nervous' dimension) and that their physiological arousal was increasing in the catastrophe phase of the performance, demonstrated by quotes such as; " ... [my] heart was speeding up no end", and " ... noticed it [heart rate] pounding in my ears and head". The findings of the present investigation indicate that performance followed this pattern for all of the athletes interviewed.

Confidence emerged as the largest dimension in the pre-catastrophe phase, demonstrating the importance which performers place upon it for successful performance. Several of the performers quotations were consistent with Hardy's (1990) contention that self-confidence moderates the interactive effects of cognitive anxiety and physiological arousal (or somatic anxiety) by enabling cognitively anxious performers to tolerate higher levels of physiological arousal before experiencing drops in performance. From the pre-catastrophe phase to the catastrophic drop in performance, confidence dropped considerably. Specifically, five athletes commented that their confidence dropped, and this was reinforced by confidence no longer emerging as a general dimension. Indeed, lack of confidence emerged as a third dimension and comprised 'lack of confidence', 'mentally nervous' and 'physically nervous'. Seven of the athletes were unable to return to their previous level of performance. However, two performers did remain confident, one of whom was able to regain the upper performance surface. During the pre-catastrophe phase, cognitive anxiety emerged as a general dimension and somatic anxiety emerged as a third dimension within the 'unease' general dimension, supporting the contention that confidence and anxiety are relatively independent factors (Bandura, 1977; Borkovec, 1978, Martens et al., 1990). Positive feelings towards performance mirrored confidence, as it (identified by all of the athletes) emerged in the pre-catastrophe phase but failed to re-emerge in the catastrophe phase.

According to the catastrophe models, following a catastrophic drop in performance cognitive anxiety and/or physiological arousal needs to be considerably reduced before performance can return to the upper surface. However, self-doubts emerged within the 'unease' general dimension in the post-catastrophe phase and included quotations from all of the athletes, suggesting that for seven of the performers this did not occur, and therefore performance remained low. Two further variables emerged within this dimension; physically nervous, for example, elevated heart rate, and; confidence drop, which are also consistent with the butterfly model (Hardy, 1996).

'Control' (a third dimension) emerged within the pre-catastrophe phase, providing support for its presence within the anxiety-performance relationship. During the catastrophe phase, control did not emerge as a factor, suggesting that its' importance at this stage does not have a direct influence on the performer. Feelings regarding control re-emerged as the largest general dimension in the post-catastrophe phase, specifically, a lack of control, which is a dramatic contrast to the pre-catastrophe feelings of being in complete control. Within the proposed butterfly catastrophe model (Hardy, 1990) it was suggested that control enables performers to maintain an intermediate level of performance; once control is lost, performance will dramatically decline. In addition, control plays an important role in the interpretation of anxiety symptomatology. This relationship is described by the control process model (Carver & Scheier, 1986, 1988) which has been adapted to a sporting context by Jones (1995). Specifically, if performers feel in control they will feel able to cope and achieve their goals, and are therefore predicted to interpret their anxiety symptoms as facilitative to performance, and will invest more effort. Conversely, if they feel out of control, they are predicted to interpret their anxiety symptoms negatively and invest less effort in performance. The deductive analysis indicated that the control process model (Jones, 1995) received some support from seven of the eight performers' experiences (see appendix 4a).

The emergence of confidence and self-control within the present study demonstrate the importance of these factors within any model describing the anxiety-performance relationship. Furthermore, the patterning of metacognitive variables within the present study is at least partially consistent with the butterfly catastrophe model (Hardy, 1990). The emergence of these variables within the experiences of these performers suggests that their inclusion within the butterfly model is justified and thus testing this model is strongly recommended for future researchers. Despite such proposals being made several years ago, this model remains to be fully tested.

9.3 Two brief case studies

Two athletes are examined to identify similarities and differences in their experiences, particularly in terms of their recovery and related causal inferences of emerging factors and performance. Each of the athletes' experiences will be highlighted with detailed quotations taken directly from the transcripts. The first experience to be examined is that of the swimmer, who failed to recover from his catastrophe. This athlete was selected because he was so affected by the catastrophe that he has not returned to competition at this distance.

Consistent with the largest general dimension within the pre-catastrophe phase, the swimmer was exuding confidence;

> Yes, I felt really confident. I'd had a really good summer of training ... my times were looking really good. The best times for a long time so I felt really confident, like I said I felt very strong. I looked ready to go and I was mentally prepared.

The confidence of this swimmer appeared to be overcoming any other factors, such as his thoughts regarding his main rival, and thus sits comfortably with the butterfly model proposed. The swimmer further described his feeling as being 'in flow'; "I was in flow, you know, everything was going great, just like I was not putting forth any effort and I could feel myself being really strong". This quotation also emphasises another variable of note within the catastrophic experience, 'effort'. At this stage, the effort is being put forth because the swimmer was confident of success; as suggested by the processing efficiency theory (Eysenck, 1982). These very positive and confident feelings were reinforced with his feelings of being in complete control; "I was in complete control, I dictated the pace of the race".

However, at this point the swimmer described something which potentially caused his catastrophe, that is his preoccupation with beating one particular opponent;

> I remember concentrating so much on the guy to my left, cause he was the one that was really pushing me, or he was the one trying to keep up, and I remember thinking if I keep this pace, I'll wear him out.

The performance of the swimmer (at this stage) was clearly on the upper performance surface and demonstrating the characteristics of the proposed butterfly catastrophe (Hardy, 1990); that is, feeling confident, aroused (readiness), in control, and slightly anxious in his concern over his main rival. The actual drop in performance occurred dramatically and suddenly and this is clearly demonstrated by the following quotation;

> I didn't hit it right and I was off beat, like half a second and I felt a little slow going off the wall. And I felt like I caught all the water on my shoulders, like I just pushed off a bunch of waves, attached to my shoulders and that immediately concerned me and set an alarm off, and then everything from then on fell apart. Yes, it was very quick and totally unexpected.

He continued to describe the drop and how he tried to reverse it, and yet his performance failed to recover;

> All of a sudden, I lost all sorts of feeling for the water. I felt like I was using way too much energy, rhythm was going, my kick beat was off, um ... somehow or other I couldn't recover, no matter what I tried. I tried taking longer and longer strokes, to get back into it- to stay in the lead. I just kept falling further and further behind after being on top for the first five lengths of the race. I started off first, I was seeded first and I was out front and very comfortable, I felt very strong and then all of a sudden, it just felt like I wasn't pushing any water at all ... I just felt like I was sitting I the same spot just flailing and not going anywhere- turns were terrible, everything was terrible.

The swimmer described his feelings of frustration, which the following quotation demonstrates. This, in addition to the other metacognitive variables, remained elevated and contributed to the catastrophe continuing;

> It was right before going into the wall on the turn after 125m. Something just didn't feel right ... And then when I hit the wall, it was just like I had holes in my hands and I couldn't catch the water and I couldn't push it and when he caught up, I tried to turn it over faster, abandoning everything that I've learned over the years, you know, ... and so I started to get more and more frustrated and I could visualise my face turning red ... And all I could think about was beating him and not getting back to the important things.

The quotation also indicated how the swimmer was still completely preoccupied with beating and hurting his main rival and abandoning his experiential knowledge; an area which had received little attention in sport psychology. The following quotation further emphasises the evaluative, confused state being experienced by the swimmer;

> I had about a zillion different thoughts racing through my mind. ... So I was like 'what am I doing wrong?' and I started paying attention to my hands, started paying attention to my hips, my shoulders, I started breaking off, but trying to keep track at the same time.

This quotation highlights one of the explanations for continued poor performance, that is conscious processing (Masters, 1992). Essentially, in this state of panic, the swimmer began to peruse the explicit rules of how to swim, (paying attention to body parts, and stroke length), and therefore, performance deteriorated further.

The swimmer then described how he began to feel as though he was trying too hard; "... because I was trying so hard to get back into it, it felt like I was wasting energy". This concept fits comfortably with Naatenen (1973) and Gallwey's (1974) notion of trying too hard.

After the performance drop, he proceeded to describe how his physiological arousal increased, as he seemed to be having to work harder in an attempt to improve his performance;

> ... my breathing was off, you know, I had to take a couple of breaths on one side, instead of every 3-5 strokes, to 1-2 strokes, in order to get enough breath and stick my head down to try to get my rhythm back, cause that messed up, you know, my heart rate and everything else.

Therefore, the swimmers' experience suggests that the combination of increasing heart rate, anxiety about his performance, and lost control, whilst remaining confident, all influenced his performance. Indeed, his experience links Masters' (1992) conscious processing hypothesis and Eysenck's (1982) processing efficiency theory together. That is, he began to consciously process his explicit knowledge of competitive swimming, and therefore needed to expend more effort (or compensatory effort, Eysenck, 1982) in an attempt to improve his performance, yet it continued to decline. This combination also sits comfortably with the butterfly pattern of performance remaining on the lower performance curve, as none of the variables were considerably reduced.

The dramatic change in feelings of control and effort put forth are clearly demonstrated by the following two quotations;

> ... first part of the race, yeah, I was in complete control [of emotions] and by the end ... I had absolutely no control, I was just so frustrated.

> I didn't feel like I had to concentrate ... too hard because I was just like in flow, you know. But the last 75m, I think I was trying to concentrate too hard on too many different things ... only made it worse.

From this stage, his performance never recovered. Indeed, the swimmer stated that; "I just thought it doesn't matter if I won the World Championship, I still did that, I still fell apart ... But I haven't competed in the 200m since, and if I have it my way, I won't".

In contrast, one of the gymnasts was the only performer in the study who was able to recover from his catastrophic performance drop, hence his experience being selected for more detailed examination. Indeed, the gymnast felt that his sudden performance drop made him focus more appropriately and that his performance actually improved. This athlete was competing in a two day event, and his catastrophe occurred on the second day. When he began the second day he described his feelings as ; "I was confident that I could make up the small margin that I was trailing by". The gymnast explained the importance of the event (trials for the Olympics) and how he typically rises to the occasion; "So hopefully that'll raise my performance, cause I do tend to do better under more pressure", and goes on to explain how;

> I almost think of it as being a positive thing that I'm so nervous, because in competitions that I'm not nervous I, my mind's not really up for it. ... just sat waiting for it all to start, that's when you feel worse and your heart is beating quickest and your stomach is doing silly things, that's the worst time, the bit when you get more nervous, because you've got time to sit down and think about what you've got to do.

Similarly, he described how he felt nervous going onto that piece, and that these were normal feelings;

> But yeah, I was nervous, cause like when I jumped up I thought that someone had stolen my arms and replaced them with someone else's, cause they weren't working very well.

The gymnast felt confident, positive nervousness, and in complete control throughout the first piece of the competition and his performance was good on the first piece. The only distracting thought he had was;

> I gave myself a back-up saying I can afford one fall if it comes to it, so I'd almost given in to it, because from then on I couldn't, definitely couldn't afford to fall, so I ended up competing better.

Thus, the gymnast may have actually withdrawn effort thereby not maintaining enough to overcome his nervous feelings and physiological arousal and therefore experienced the catastrophic drop. However, because he remained confident, that is, had a favourable expectancy of success (Carver & Scheier, 1988; Eysenck, 1982) he was able to re-invest effort to regain his performance. Therefore, the experience of the gymnast fits more comfortably with Eysenck's (1982) processing efficiency theory.

The gymnast described the magnitude of his fall, in terms of the crucial marks it lost him;

> Quite big [drop] because I was doing well and then I fell off, so, that's, I mean it was a difference of seven tenths of a mark that I lost, due to the fall ... so it was a big drop. ... try to pull yourself back on balance, which I managed, nearly and then I, because of doing that I lost amplitude my circle and hit the horse.

Immediately after the fall, he had potentially distracting thoughts, as seen in the following quotation, but he was able to block these out;

> I thought about him [dad] for a second, I think 'oh god, I wonder what he's thinking' and then about me coach, and then ... I just, I mean that was like a flash a second, and then about calming myself down and getting back on basically. ...So I was just making sure I kept calm to be able to continue making sure that when I did get off, when I finished that routine, that I forgot about it and just got on with the rest, instead of dwelling on it.

Interestingly, the gymnast was still confident, and this confidence seemed to overcome some of his doubts and physiological arousal, which is consistent with Hardy and Jones' (1994) contention that self-confidence moderates the interactive effects of cognitive anxiety and physiological arousal upon performance;

> I mean I had doubts, that everyone has, like what happens if I fall off again. ... But as I say I was confident that I could do it and do it well. ... [Heart rate] was going fast simply because my arms were all over the place.

Despite the fall, the gymnast described how he still felt in control and confident, again demonstrating the importance of further research examining the perceptions of control.

> I felt in control mentally ... when I got back on I was quite nervous, I was quite shaky, so maybe I was a bit less in control than what I would be at this stage if I'd not fallen off, because I wouldn't have been so hyperactive as it was because of the nerves ... although I felt confident that I could do it, because it was the easy part of my routine.

It seems clear from the experience of the gymnast that his confidence and strong belief in himself overcame any of the nervousness and temporary loss of control. A further factor of interest was that the gymnast felt that his motivation increased after the fall; "I'd say a 10 [on a scale of 1 to 10], but I got even more motivated afterwards". This fits comfortably with the processing efficiency theory (Eysenck, 1990; Hardy & Jackson, 1996), suggesting that the performance loss induced extra worry, thereby increasing effort because he felt there was at least a moderate probability of success, and thus facilitated his performance.

At least two fundamental differences can be identified between these two athletes, specifically, the thoughts after the initial performance drop. More specifically, the swimmer was bombarded by thoughts and preoccupation concerning his main opponent and technical modifications, whilst, in contrast, the gymnast momentarily focused on negative thoughts and concerns, but then "you start telling yourself just to calm down and get back on and do it cleanly". Thus, the swimmer was not able to recover from his catastrophic performance, whilst the gymnast recovered and was able to put in a good performance and subsequently won the trials. The two athletes therefore demonstrate the different paths performance takes following a catastrophic drop in performance and are thus consistent with hysteresis (Fazey & Hardy, 1988; Hardy & Parfitt, 1991). The importance of testing this model must therefore be reiterated. Similar to the swimmer, one of the other performers in the present study experienced a preoccupation with his main rival, providing additional support for the suggestion that this may be a cause for catastrophic performances, and therefore requires more research attention.

Given the non-significant differences in the quantitative data (between the modified CSAI-2s for normal, peak and catastrophic performances), no quantitative analyses were conducted on the data. However, it is worth noting the trends from the two athletes discussed above. The swimmer's responses demonstrated that he was not as cognitively or somatically anxious, nor as confident as for his normal or peak performance. However, he was experiencing his symptomatology more frequently, but also more positively. This may indicate that he was over-confident. The gymnast's responses indicated that he was more nervous than the normal and peak performances and was experiencing the anxiety symptoms more frequently and had less self-confidence, in addition to perceiving these symptoms as more facilitative than the normal performance and less facilitative than the peak performance.

9.4 Theoretical explanations underlying performance catastrophes

Having considered the pattern of performance in relation to interactions among variables, attention must be drawn to the underlying explanations for such dramatic drops in performance. The cognitive anxiety dimension during the pre-catastrophe phase included moderate to high confidence, feelings of control, feelings regarding expectations of a tough and demanding event and tough opposition, which would require high energy expenditure;. During the catastrophe phase, significant changes occurred, specifically, the performers began to evaluate their performance, becoming aware of all the little mistakes. 'Evaluative state' was the largest general dimension in the catastrophe phase, and yet did not emerge prior to nor after the performance drop. However, seven of the eight athletes identified that they began evaluating their performance during this phase. Specifically, they identified, technical evaluation, increased self-awareness, negative emotions of anger, focusing on the outcome and that performance deteriorated rapidly. During the catastrophe phase, the accumulation of mistakes, continued performance decline and inappropriate effort expenditure also became salient features, e.g. "trying too hard, but wasting energy" and "trying to fight the boat, more than normal". Such quotations indicate a link between the conscious processing hypothesis (Masters, 1992) and the processing efficiency theory (Eysenck, 1982). The increased effort from the pre to the catastrophe phase suggests that effort may have induced the regression to conscious control of the skilled performance. Indeed, one gymnast commented that "all of a sudden, for one split second, you're forcing something that you don't force, which makes it worse". This combined explanation may also account for the initial performance decrement.

Masters' (1992) conscious processing hypothesis suggests that when cognitively anxious, athletes regress to higher level cognitive mechanisms in an attempt to consciously control lower level automatic processes. In essence, what the hypothesis proposes is how anxious performers begin to focus on explicit rules to perform normally automatically produced skills, causing a breakdown in performance; basically, telling themselves what to do, rather than just letting it happen (e.g. Gallwey, 1974). In addition to the evaluative state, the general dimension 'inappropriate focus' provides support for this concept. The second dimension 'inappropriate effort' (see Weinberg, 1978; Weinberg & Hunt, 1978) comprised quotations which capture the hypothesis; " ... it was a conscious effort, rather than just letting it happen" and "but I was aware that I was trying".

In addition, the findings offer clear support for the cyclical influence of these variables and performance. All performers in the present study experienced an initial decrement, which was accompanied by various cognitions and attempts to overcome it, which was then followed by the further catastrophic decrement. For example, one performer hit one pole, then began to evaluate his performance and then hit another pole; another performer missed a shot, evaluated it, began to try and compensate for the error only to produce further errors; and another performer missed one release and catch, regressed to explicit rules, and subsequently missed the remaining three catches. Essentially, the findings suggest that on-going performance needs to be examined when determining theoretical explanations for the patterning of performance and causal influences. The following statement (Eysenck & Calvo, 1992) is worth considering in the light of the findings from the present investigation;

> The performance can be integrated into a general conceptualisation of the anxiety-performance relationship as a dynamic process, in which there are interactions between cognitions and motives over time during task performance (e.g. Covington & Omelich, 1988; Schwartzer, 1986); with an appraisal function to monitor and evaluate current threat and task performance (Jerusalem, 1990) and a self-regulatory function aimed at coping with task demands and personal feelings of inefficiency (Rost & Schermer, 1989; p.431).

Indeed, the quote highlights the *dynamic process* and *over time*; reinforcing the need for this to be addressed in future research.

The combination of factors emerging in the content analysis demonstrate that processing efficiency theory may account for the failure of seven of the performers to recover. According to processing efficiency theory (Eysenck, 1982) anxious individuals have a greater discrepancy between current aspirations and perceived ability, and will therefore, invest additional effort in the task if they perceive themselves to have at least a moderate probability of success (i.e. self-confidence). Indeed, this was the case for the performers in the pre-catastrophe phase. The additional effort acts as a compensatory mechanism enabling performance to be maintained or even enhanced by overcoming the task-irrelevant cognitive anxiety which could otherwise impair performance. The increased energetical cost may be reflected in higher physiological arousal or somatic anxiety (Frankenhauser & Johansson, 1976). At some point the cost will be overcome and the performer will withdraw effort and performance will deteriorate further. This could potentially explain the experience of seven of performers, with the exception being the gymnast examined in the case study. Specifically, the gymnasts' experience is consistent with this theory, as he was able to regain his performance (after the initial decrement) due to the confidence he had in his ability to perform and be successful.

The post-catastrophe state, 'resignation and withdrawal' (third dimension contributed to by all of the athletes), included feelings of resignation to failure, withdrawal of effort, and of apathy. Five athletes actually described how they withdrew effort, whilst the remaining athletes experienced feelings of resignation or apathy. This withdrawal of effort and reduction in motivation suggests that the athletes' effort outweighed their perceptions of the probability of success, and thus performers failed to recover.

9.5 Deductive Analyses

Results of the deductive analysis (appendix 4c) mirror the findings of the hierarchical content analysis. Furthermore, the deductive analysis similarly provides only partial support for the direction of causality of influences predicted by the catastrophe model. All of the performers' experiences provided some support for the catastrophe models, particularly the butterfly model. The presence and pattern of confidence and control offer support for the butterfly catastrophe model over that of the cusp catastrophe model.

More specifically, the presence of elevated cognitive anxiety and/ or physiological arousal, combined with the noticeable drop in confidence and control from prior to the drop in performance to following it, fits comfortably with the pattern of the performance curve in the butterfly catastrophe model. Only one performers' experience (the gymnast) followed the entire pattern of the butterfly catastrophe. His performance followed the pattern of the catastrophe through to the reduction in physiological arousal and cognitive anxiety, regaining confidence and control, thus enabling his performance to return to the upper performance curve. Although the deductive analysis highlights the importance of these thoughts, feelings and emotions within the catastrophe models, they do not clearly distinguish causality. More specifically, the findings do not demonstrate whether the changes in anxiety and confidence caused the changes in performance or vice versa. Thus, more research is necessary to clarify the causal relationship.

With regard to explanations for catastrophic performances, support was again partial and mixed. With exception to the gymnast (examined in the case study) all performers' experiences provided some support for Eysencks' (1982) Processing Efficiency Theory, as well as for Masters' (1992) Conscious Processing hypothesis. More precisely, seven of the eight performers' experiences could be explained by a combination of the Processing

Efficiency theory and the Conscious Processing Hypothesis, thereby reflecting the conclusions of the hierarchical content analysis (discussed in 9.4). The gymnast, who recovered from his catastrophe, did not appear to slip into conscious processing and so his performance provides support for Eysencks' (1982) theory alone.

The deductive results similarly highlighted the issue of causality within the Processing Efficiency Theory. From the interviews it was not completely clear whether it was the reduction in the probability of success which caused a withdrawal of effort and consequently a drop in performance, or whether the initial drop in performance caused the reduction in the probability of success and subsequent effort withdrawal. This issue is clearly crucial in the explanation of performance catastrophes, and thus warrants closer examination.

9.6 Practical Implications

As alluded to earlier, self-confidence may be one of the most powerful qualities athletes can possess (Jones & Hardy, 1990), to which both the present findings and the theories lend support. Therefore, strategies to increase self-confidence must be paramount in psychological interventions, for example; pre-performance routines (Boucher & Crew, 1987), varied practice through simulation training (Orlick & Partington, 1988), over-learning (Schneider & Shiffrin, 1977), positive self-talk and affirmations (Bunker, Williams & Zinsser, 1993) and setting appropriate goals (Weinberg, 1993). In terms of setting appropriate goals for competition, holistic performance goals which are realistic and achievable are recommended by researchers (Burton, 1989; Hardy, Maiden & Sherry, 1986; Kingston & Hardy, 1994), in order that they may be realised under the stress of competition. Of course, it is important that athletes maintain longer-term outcome goals, providing they do not become preoccupied with them during competition.

The emergence of a combination of thoughts and feelings influencing performance, similar to interactions found in previous research literature (Deffenbacher, 1977; Edwards & Hardy, 1996; Woodman et al., 1997) suggest that multi-modal stress management strategies (Burton,

1990) would be more beneficial than unidimensional approaches such as the matching hypothesis (Davidson & Schwartz, 1976). With respect to catastrophe models, the most appropriate strategy to overcome a sudden and large drop in performance would be to physically relax, cognitively restructure and then reactivate once the upper performance surface has been regained (Hardy, 1996a & b). Learning these strategies should be emphasised to prevent the athlete withdrawing effort due to feeling an inability to cope (evident with seven of the eight performers in the present study) with the dramatic drop in performance (Carver & Scheier, 1988). Of course, teaching athletes to be aware of their optimum levels of anxiety, arousal, confidence and control and how to manipulate these states is critical to prevention of catastrophic performances.

Given the partial support for the conscious control hypothesis (Masters, 1992; Hardy et al., 1996) practical implications fundamental to coaching and education procedures can be suggested. Coaching strategies would include increasing the number of demonstrations and augmented feedback, and coaching by analogy particularly important during the cognitive and associative stages of learning skills (Fitts & Posner, 1967). Essentially, coaching by analogy involves using one analogy which encompasses many technical rules, thus in performing the skill the rules are inadvertently employed. Furthermore, modelling and imagery techniques could be employed more to enable the performers to produce holistic conceptual representations of movements to encourage automaticity, in addition to accelerating learning. Thus, future investigations are warranted in order to better understand the role of implicit and explicit knowledge on performance during stressful competition (c.f. Hardy et al., 1996).

9.7 Methodological Considerations

Researchers (Martens, 1987; Gould & Krane, 1992) have commented on the almost over-reliance on quantitative methodologies in the pursuit of further understanding the anxiety-performance relationship. Whilst recognising the importance of the quantitative approach in this area Gould & Krane (1992) emphasised the strengths of in-depth interviews and advocated that researchers should seriously consider employing such an approach. Indeed, quantitative designs employing standardised inventories fail to provide the contextual insight into the catastrophic experience. Clearly the retrospective qualitative nature of this present investigation provided data rich in detail concerning the competitive experience and was a major strength of this investigation (Lincoln & Guba, 1985).

The inductive/deductive data analysis procedure was an important feature of this investigation and proved to be an insightful strength. To reiterate, the primary purpose of the investigation was to explore elite athletes' experiences of catastrophic decrements in performance. The inductive analysis involved letting the themes/dimensions emerge from the raw data of the interviews; whilst the deductive analysis involved identifying goodness of fit between athletes' experiences and proposed models describing the pattern of the experience and theories which explain the pattern. Investigator biases were controlled by continuous consensus validation throughout the analyses, followed by corroboration by a third experienced qualitative researcher.

All athletes were interviewed between six months and a year following their catastrophic performance. This time-frame enabled the athletes to come to terms with their experience, ensuring that they were comfortable discussing such a personal and emotional experience in great detail. Because the performances were so catastrophic the athletes vividly recalled the intricacy of the experience, thus the investigators felt there was little decay in the athletes' recollection.

Generalisability is always a concern with small sample qualitative studies, however, it is a pragmatic necessity, due to the extensive time taken and the in-depth nature of the hierarchical content analysis. A strength of the present investigation was the elite level of the athletes. Although the present investigation covered six sports, broader inferences from these results should be treated with caution and further investigations are certainly warranted.

9.8 Future Directions

Obviously the nature of research is to seek and offer explanations for questions and identify areas needing further examination. Considering this, several salient themes emerged in the present investigation which have implications for future research. The cusp catastrophe model has recently received some support (e.g. Hardy & Parfitt, 1991; Hardy et al., 1994) yet the higher dimensional models have as yet received no experimental testing. Emerging general dimensions from the various stages of the catastrophic experience, that is confidence and control, clearly highlight the need for testing the higher dimensional catastrophe models. The inclusion of self-confidence within the interactive framework has received support from its limited research attention (Hardy, 1996) and combined with the encouraging results of the present investigation warrant further study. However, it is not only self-confidence which warrants further exploration, but also perceptions of control. Despite the research on perceived control within health psychology, little attention has been devoted to this significant factor within stress and performance of competitive sport. Yet, the desire for personal control of one's internal states, the environment, and the future is probably familiar to most people in some form, particularly in threatening or challenging situations, such as competitive sport performance. Indeed, Fisher (1986) suggested that;

> In spite of considerable interest in perceived control there has been relatively little attempt to understand the relationship between stress and control in any detail and hardly any attempt to consider the psychological processes that must be involved (p2).

Essentially, the psychology of control is concerned with the control of perceptions of reality and of one's responses to those perceptions. This could be one of the determining variables of whether a performer will recover from his catastrophe or not. Throughout the catastrophic experience it is evident that perception of control is an important variable which should no longer be overlooked.

Findings from the present investigation suggest that future research examine the link discussed earlier between Eysenck's (1979, 1982) processing efficiency theory and Masters' (1992) conscious processing efficiency theory, specifically in relation to skilled sport performers. In addition, on-going performance needs to be examined, to identify the cyclical influence of the variables which have emerged within the present study. The "new" variables also need to be examined in this context; particularly, preoccupation with main rival, inappropriate effort (e.g. Jackson & Hardy, 1996; Weinberg, 1978), event importance and thinking about the outcome.

CHAPTER 10.

An in-depth analysis of catastrophic performances and the associated thoughts, feelings and emotions: VI. Coping attempts.

10.1 Results of the hierarchical content analysis

Attempts to cope with the consequences of the catastrophic drop in performance comprised 190 raw quotations. These clustered into, 55 first, 21 second, seven third and finally two general dimensions (see figure 10.1). The two general dimensions appear to be diametrically opposed, yet most athletes had quotes in both of the dimensions, suggesting that the athletes experienced both but at different times. One dimension refers specifically to coping attempts, most of which ultimately failed; whilst the other dimension refers specifically to failed coping and recovery. The largest of the two general dimensions (in terms of number of quotations contained within them) is discussed first. The general dimension is discussed first, followed by the lower order dimensions contributing to it. Discussion of the second dimensions includes selected quotations from which the raw themes and first dimensions emerged.

10.2 Coping

All of the athletes felt they made some attempt at or even managed to cope with their catastrophic drop in performance. One hundred and forty-four quotes clustered into 32 first, 14 second and four third dimensions. The second and third dimensions which clustered to form the general dimension 'coping' are presented in figure 10.2.

Second dimensions	Third dimensions	General dimensions
performance strategies trying to refocus trying to change goals mental & technical strategies trying to keep calm	active strategies	coping
down playing drop in performance recovery coming to terms with failure	recovering from catastrophe	coping
tried to remain positive re-motivated remaining optimistic	staying positive	coping
wanting to learn from mistakes salvage something from performance internal attributions	taking something positive from the experience	coping
failed coping strategies inability to cope failure to recover	failure to recover/ cope	not coping with the catastrophe
resignation regret	negative emotions	not coping with the catastrophe
avoidance strategies		not coping with the catastrophe

Fig 10.1: Hierarchical structure of the coping phase.

Second dimensions	Third dimensions	General dimension
performance strategies trying to refocus trying to change goals mental & technical strategies trying to keep calm	active strategies	coping
down playing drop in performance recovery coming to terms with failure	recovering from catastrophe	
tried to remain positive re-motivated remaining optimistic	staying positive	
wanting to learn from mistakes salvage something from performance internal attributions	taking something positive from the experience	

Fig 10.2: Hierarchical structure of the general dimension 'coping'.

10.2.1 Active strategies

Fifty-eight quotes clustered into 10 first and five second dimensions (fig 10.2.1). Six of the eight athletes attempted to cope using an active approach.

First dimensions	Second dimensions	Third dimension
trying to focus trying to forget mistakes	trying to refocus	active strategies
trying to ensure remaining performance was good need to play harder finish without falling off	performance strategies	
mental strategies technical strategies	mental & technical strategies	
tried to remain calm tried to calm down	trying to keep calm	
trying to change goals		

Fig 10.2.1: Hierarchical structure of the third dimension 'active strategies'.

10.2.1.1 Trying to refocus

"It's just basically saying back in on the present here, you've still got a bunch of gates coming up" and "just get it back together and just try to focus on one thing" are examples of the quotes from which the first dimension, 'trying to focus' emerged. Other quotes emphasised a need to forget the mistakes or the drop in performance, for example, " ... but trying to push out um, the fact that I'd fallen on bar anyway, or not just that one, but that I'd fallen so many times". The first dimension emerging from these quotes was 'trying to forget mistakes'. The two first dimensions emerging from the 26 quotations, from six of the athletes, formed the second dimension 'trying to refocus' (fig 10.2.1.1).

Raw themes	First dimensions	Second dimension
trying to keep it at a stable level try to take mind of performance drop felt had to buckle down & focus tried to regain focus focus on one thing come on, focus back in, failed open section enabled refocusing refocus on rest of course say to myself get focused again, normally works start focusing on the right things deal with the here and now	trying to focus	trying to refocus
try not to think about negatives try to forget about competition try to push out falls trying not to think about mistake I'd made kept calm to ensure finish routine & not dwell on fall concentrate on my performance, forget about others & fall forget it, couldn't change it, just continue & don't fall again try to forget about falls	trying to forget mistakes	

Fig 10.2.1.1: Hierarchical structure of the second dimension 'trying to refocus'.

10.2.1.2 Performance strategies

Five athletes described the specific performance strategies they used to overcome their catastrophic drop in performance, for example, "you know your result's not going to be anything special or just trying to get a good section of the course that was good, so when you're walking back up, maybe there's a split and you're 'right that was good'". This quote is characteristic of the first dimension 'trying to ensure remaining performance was good'. The 'performance strategies' second dimension, comprising eight quotes, also included the first dimensions, 'need to play harder' and 'finish without falling off' (fig 10.2.1.2).

Raw themes	First dimensions	Second dimension
didn't try move again, because competition too important get my head down & close gap just trying to get a good section just block in rest of course	trying to ensure remaining performance was good	performance strategies
going out there to play hard needed to play a bit harder	need to play harder	
just get through, start to end without falling off talking to myself that I couldn't afford another fall	finish without falling off	

Fig 10.2.1.2: Hierarchical structure of the second dimension 'performance strategies'.

10.2.1.3 Mental and technical strategies

"I tried to imagine forcing my way back" is characteristic of the quotes comprising of the first dimension 'mental strategies'. Quotes from three athletes (N=4) formed this first dimension. Seven further quotes by three athletes referred specifically to technical strategies such as strokes, breathing and technical advice (fig 10.2.1.3).

Raw themes	First dimensions	Second dimension
motivational tactic, regarding opponent as fool tried to imagine forcing my way back thought about and visualise what I could do differently in future concentrate on what I was doing	mental strategies	mental & technical strategies
thought of technique changes tried to take longer strokes tried to slow stroke down changed breathing to get rhythm back decided to take a big bite of air tried to get back in touch with my body, it wasn't listening giving myself technical advice	technical strategies	

Fig 10.2.1.3: Hierarchical structure of the second dimension 'mental and technical strategies'.

10.2.1.4. Trying to keep calm

This second dimension emerged from nine quotes contributed by three athletes and two first dimensions. "I started to play more, calm back down" is one of the eight quotes within the first dimension, 'tried to keep calm' (fig 10.2.1.4).

Raw themes	First dimensions	Second dimension
tried not to let coach get to me too much	tried to remain calm	trying to keep calm
try and get back to normal tried to calm down tried to calm down & take a step back, failed trying to get rid of anger & frustration calm myself down by talking to myself talking to myself more & more keep calm & not emotionally angry	tried to calm down	

Fig 10.2.1.4: Hierarchical structure of the second dimension 'trying to keep calm'.

10.2.1.5 Trying to change goals

" ... so basically, if my aim is to medal, which it generally is, maybe I need to change my aims and objectives a little bit for the future" is characteristic of the four quotes (by three athletes) comprising the first dimension, 'trying to change goals' which was carried through to the second dimension (fig 10.2.1.5).

Raw themes	First dimensions	Second dimension
tried to play more as a team need to change aims & objectives for future, not so high trying to change goals	trying to change goals	———————

Fig 10.2.1.5: Hierarchical structure of the second dimension 'trying to change goals'.

10.2.2 Recovering from catastrophe

Forty quotes, eight first and three second dimensions formed the third dimension, 'recovering from the catastrophe' (fig 10.2.2). As an attempt at coping, the athletes tried to put the catastrophe into perspective and this was the theme of the third dimension.

First dimensions	Second dimensions	Third dimension
tried to rationalise it putting things in perspective only small errors	down playing drop in performance	
didn't affect next event can make up for performance at next event recovered	recovery	recovering from catastrophe
expect it to be tough coming to terms with failure	coming to terms with failure	

Fig 10.2.2: Hierarchical structure of the third dimension 'recovering from catastrophe'.

10.2.2.1 Down-playing drop in performance

Four athletes indicated how they tried to put their performance drop into perspective, for example, "it's just one of those things, but it's never happened since" from the first dimension, 'putting things into perspective'. Similarly, athletes tried to rationalise their catastrophic performances, "on that weekend, maybe not [realistic expectation of winning], because not 100% fit". Six similar quotes comprised the first dimension 'tried to rationalise it'. These two first dimensions clustered with 'only small errors' from which the second dimension 'downplaying drop in performance' emerged (fig 10.2.2.1). The second dimension was comprised 23 quotations from five of the athletes.

Raw themes	First dimensions	Second dimension
probably took opponents too lightly I'm very good bar one mistake trying to rationalise it learning curve flattens out quickly not really realistic to win because not 100% fit safety valve, recent operation not in right frame of mind made it worse	tried to rationalise it	down playing drop in performance
bad game, just part of playing more important things in life this is only a game got over it, because we'd qualified for OG tomorrow's another day just one of those things, never happened since just one of those days, everything bad I wasn't going to win anyway	putting things in perspective	
margins of error too fine not a blatant, stupid error only a millimetre out	only small errors	

Fig 10.2.2.1: Hierarchical structure of the second dimension 'down-playing drop in performance'.

10.2.2.2 Recovery

This second dimension was comprised ten quotes relating to four athletes' recovery. 'Didn't affect next event' emerged from quotes by two athletes, for example, "it didn't affect me for Atlanta [next World Cup race]". 'Didn't affect next event', 'recovered' and 'can make up for performance at next event' formed the second dimension 'recovery' (fig 10.2.2.2).

Raw themes	First dimensions	Second dimension
after that game continued winning didn't affect me for next World Cup race saw next race as a way redeeming myself, came 8th	didn't affect next event	recovery
2nd run, wanted to make up for it, prove myself still had an extra attempt at next trial I'll sort it out in training, next week, before next trial	can make up for performance at next event	
confidence-wise, recovered by next week (2 days later) recovered after good 3rd piece	recovered	

Fig 10.2.2.2: Hierarchical structure of the third dimension 'recovery'.

10.2.2.3 Coming to terms with failure

Raw themes	First dimensions	Second dimension
expect comps to get harder accepting only one winner out of several good performers	expect it to be tough	coming to terms with failure
finally told wife I'd bombed out, after 1.25 hr phone call coming to terms with performing badly, but also not winning or achieving goal having to show you can deal with failure, otherwise, you're not a real contender	coming to terms with failure	

Fig 10.2.2.3: Hierarchical structure of the second dimension 'coming to terms with failure'.

Seven quotes from three athletes clustered into two first dimensions to form the second dimension, 'coming to terms with failure'. "You keep telling yourself you're going to win this event, it's all the positive affirmations that you've been doing and then reality comes and you haven't, not only not won it but you've finished 27th" is one of the five quotes comprising the 'coming to terms with failure' first dimension (fig 10.2.2.3).

10.2.3 Staying positive

The third dimension 'staying positive' emerged from 27 quotes, seven first and three second dimensions. Seven of the eight athletes' quotes provided the raw data for this dimension (fig 10.2.3). 'Staying positive' reflected the athletes' attempts to be positive about the situation.

First dimensions	Second dimensions	Third dimension
not giving up	re-motivated	staying positive
tried to re-motivate myself normally cope still confident in ability reassuring that things will be okay	remaining optimistic	
try to be positive tried not to worry	tried to remain positive	

Fig 10.2.3: Hierarchical structure of the third dimension 'staying positive'.

10.2.3.1 Re-motivated

Further coping attempts included 'tried to re-motivate myself', which comprised eight quotes from four athletes, such as, "I turned it into a situation where it was the ultimate challenge". Another athlete indicated that he was not giving up, which formed the 'not giving up' first dimension. Together the first dimensions formed the second dimension 're-motivated' which comprised 11 quotations from five athletes (fig 10.2.3.1).

Raw themes	First dimensions	Second dimension
I'm not giving up	not giving up	re-motivated
felt it was time to get serious you can do this, your last chance saw it as ultimate challenge (2nd run) trying to gee myself up even more try to motivate myself get back on & do it well kicked mat, trying to gee myself up managed to motivate & get myself fired up again, to no avail	tried to re-motivate myself	

Fig 10.2.3.1: Hierarchical structure of the second dimension 're-motivated'.

10.2.3.2 Remaining optimistic

"I was shocked, like immediately shocked and then, like bounced back on and it's only one fall, you won't do, you won't make another one" is characteristic of the three quotes comprising the 'reassuring that things will be okay' first dimension. Five further quotes clustered into two first dimensions. The emerging second dimension was 'remaining optimistic' and emerged from eight quotations from five athletes (fig 10.2.3.2).

Raw themes	First dimensions	Second dimension
generally cope okay say to myself calm down & relax, normally works	normally cope	remaining optimistic
don't have to prove myself if had 3rd run, I would win	still confident in ability	
go through floor, I'll be alright can stay in top 8, to secure place at next trial it's only one fall, you won't make another	reassuring that things will be okay	

Fig 10.2.3.2: Hierarchical structure of the second dimension 'remaining optimistic.

10.2.3.3 Tried to remain positive

"I almost think of nervousness as being a positive thing" highlights the first dimension 'try to be positive', which emerged from four quotes by three athletes. Four additional quotes by three athletes comprised the second first dimension within the 'tried not to worry'. Thus the second dimension comprised eight quotations from four athletes (fig 10.2.3.3).

Raw themes	First dimensions	Second dimension
still had fun despite losing tried not to be sad think of nervousness as positive	try to be positive	tried to remain positive
need to stop worrying about myself tried not to worry about increased weight (with which would have medalled) I'll be alright, don't worry about it no good worrying about it	tried not to worry	

Fig 10.2.3.3: Hierarchical structure of the second dimension 'tried to remain positive'.

10.2.4 Taking something positive from the experience

The third dimension 'taking something positive from the experience' emerged from 19 quotes which clustered into seven first and three second dimensions (fig 10.2.4). Five athletes contributed to this dimension.

First dimensions	Second dimensions	Third dimension
stick to plan inappropriate training identified a need to learn learned from mistakes	wanting to learn from mistakes	taking something positive from the experience
salvage something from performance		
too fired up	internal attributions	

Fig 10.2.4: Hierarchical structure of the third dimension 'taking something positive from the experience'.

10.2.4.1 Wanting to learn from mistakes

"And I'm aware of how I reacted to that situation now, and I can, I've got other ways of dealing with that situation, that I feel might help ... so I've thought about it quite a bit and visualised what I'd do differently" is characteristic of the four quotes clustering into the 'learned from mistakes' first dimension. Ten quotes (from five athletes) and five first dimensions contributed to the second dimension 'wanting to learn from mistakes' (fig 10.2.4.1).

Raw themes	First dimensions	Second dimension
just follow rules & wait & see	stick to plan	wanting to learn from mistakes
not done enough of right training pressure of competition; not enough of right training & atmosphere of OG	inappropriate training	
hope I could cope with it now		
could train myself not to dwell on the situation need to control over-keenness	identified a need to learn	
I can learn from my mistakes awareness led to developing coping strategies for future since OG catastrophe, learned to do my own training/prep	learned from mistakes	

Fig 10.2.4.1: Hierarchical structure of the third dimension 'wanting to learn from mistakes'.

10.2.4.2 Salvage something from performance

Two athletes described trying to get something positive out of their catastrophic performance. "I came to that grey area and it's like, ahr well, I'm getting down to it, I'll get to the finish line, I guess I'll get a bit more practice on the bottom half and that's the mentality I dropped into on that half of the run" is one of the five raw quotes in the second dimension named 'salvage something from performance'. The first dimension was carried through to the second dimension (fig 10.2.4.2).

Raw themes	First dimensions	Second dimension
use bottom half as practice trying to salvage & get through rest of routine luckily it happened later in competition; salvage what can & fix for next week	salvage something from performance	________________

Fig 10.2.4.2: Hierarchical structure of the third dimension 'salvage something from performance'.

10.2.4.3 Internal attributions

"I think what maybe I did do, ... is that I maybe got a little too fired up" is an example of the four quotes made by one athlete in this dimension. The four raw quotes clustered into one first dimension 'too fired up', which was carried through to the second dimension as 'internal attributions' (fig 10.2.4.3).

Raw themes	First dimensions	Second dimensions
got too fired up too fired up and over-keen try too hard	too fired up	internal attributions

Fig 10.2.4.3: Hierarchical structure of the third dimension 'internal attributions'.

10.3 Not coping with the catastrophe

This general dimension was comprised 46 raw quotes from all of the athletes. Twenty-three first, seven second and three third dimensions formed the general dimension 'not coping with the catastrophe' (fig 10.3). Since their catastrophic performances, three of the athletes have retired from their respective sports at a competitive level. Furthermore, two of those clearly indicated that their catastrophic performance drop was a contributing factor.

Second dimensions	Third dimensions	General dimension
inability to cope failed coping strategies failure to recover suprised that I couldn't cope	failure to recover/ cope	not coping with the catastrophe
resignation regret	negative emotions	
avoidance strategies		

Fig 10.3: Hierarchical structure of the general dimension 'not coping with catastrophe'.

10.3.1 Failure to recover/cope

Twenty-four quotes from six of the eight athletes clustered into nine first and three second dimensions. 'Failure to recover/cope' emerged as the third dimension (fig 10.3.1).

First dimensions	Second dimensions	Third dimension
didn't cope very well don't have strategies lose it, when feel can't cope couldn't continue as if nothing had happened	inability to cope	failure to recover/ cope
failed coping strategies		
haven't come to terms with not coping still haven't recovered block at major events	failure to recover	
surprised I couldn't cope		

Fig 10.3.1: Hierarchical structure of the third dimension 'failure to recover/cope'.

10.3.1.1 Inability to cope

"Putting more pressure on myself, more than normal and not coping very well", "I don't know any ... I didn't know any strategies to get back" and "But sometimes when you feel that you can't cope, you can't switch off this, you know you can't cope and you lose it" are examples of three of the first dimensions, namely, 'didn't cope very well', 'don't have strategies' and 'lose it, when feel can't cope'. Two further first dimensions clustered to form the second dimension 'inability to cope' (fig 10.3.1.1). The dimension comprised 9 raw quotes from five of the athletes.

Raw themes	First dimensions	Second dimension
not coping with pressure well didn't cope with it very well	didn't cope very well	inability to cope
don't have a way of dealing with WC pressure didn't know any strategies to get back no confidence, no strategy, just falling off more pieces	don't have strategies	
you can't cope, you just switch off and lose it becomes a catastrophe when I feel I can't cope	lose it, when feel can't cope	
couldn't continue as though nothing had happened don't see much is lost slipping into that half fired up state of mind	couldn't continue as though nothing had happened	
surprised that I couldn't cope	——————	

Fig 10.3.1.1: Hierarchical structure of the second dimension 'inability to cope'.

10.3.1.2 Failed coping strategies

Five athletes identified specific strategies they had used to cope with the catastrophe but which ultimately failed. One athlete provided a detailed description of his attempt to overcome his performance drop, "Just um, well, different parts of the course, different things, concentrating on fighting to get on every wave, just reacting to every change in the wind and just trying to get up close to the boat infront all the time rather than worrying about what was going on. And thinking about the next little step and concentrating on what was happening immediately infront rather than the whole picture and having to work out who I had to beat and the waves and the changes in the wind up the track ... but it didn't work". Eight quotes formed the first dimension 'failed coping strategies', which was carried through to the second dimension (fig 10.3.1.2).

Raw themes	First dimensions	Second dimension
tried to be positive (failed) swimming, no breath & it didn't come back found failing at coping strategies frustrating try and whip it up, didn't happen couldn't get rid of thoughts trying to focus on short-term goals, failed I know what to do to rectify it, failed	failed coping strategies	———

Fig 10.3.1.2: Hierarchical structure of the third dimension 'failed coping strategies'.

10.3.1.3 Failure to recover

Three athletes felt that, at the time of the interviews, they had still not completely recovered from their catastrophic experience, for example, "Even though I had my best performance after that, you would not overcome that two minutes of hell I went through and I just thought, it doesn't matter if I won the World Championships, I still did that, I still fell apart, and I don't think I would [compete again]". This quote is characteristic of the 'still haven't recovered' first dimension. This dimension and two further first dimensions, 'haven't come to terms with not coping' and 'block at major events' formed the second dimension 'failure to recover', which consisted of six quotations from three athletes (fig 10.3.1.3).

Raw themes	First dimensions	Second dimension
hoping, subconsciously, I won't find out if I could cope again	haven't come to terms with not coping	failure to recover
haven't ever recovered from it, only will if I win even winning the WC wouldn't counteract this disaster hindsight, still think it affected me in summer	still haven't recovered	
always goes that way at WC block for big contests	block at major events	

Fig 10.3.1.3: Hierarchical structure of the second dimension 'failure to recover'.

10.3.1.4 Surprised I couldn't cope

One athlete commented on how he was disappointed because he would like to have thought that he could have handled the situation better than he did, and he felt "that cut pretty deep". This dimension emerged from this single quotation, and went through to the second dimension also as 'surprised I couldn't cope' (see fig 10.3.1.4)

Raw themes	First dimensions	Second dimension
disappointed I didn't handle it better	surprised I couldn't cope	———

Fig 10.3.1.4: Hierarchical structure of the second dimension 'surprised I couldn't cope'.

10.3.2 Negative emotions

Only seven raw quotes from four athletes provided the raw data for the third dimension 'negative emotions'. The quotes clustered to form three first dimensions and two second dimensions (fig 10.3.2).

First dimensions	Second dimensions	Third dimension
lost enthusiasm can't change anything	resignation	negative emotions
regret	———	

Fig 10.3.2: Hierarchical structure of the third dimension 'negative emotions'.

10.3.2.1 Resignation

"You can't change anything, like the game, there's no way I can change anything" is an example of the two quotes forming the 'can't change anything' first dimension. 'Lost enthusiasm' comprised four raw quotes, clustered with 'can't change anything' to form the second dimension 'resignation' (fig 10.3.2.1). The second dimension comprised six quotes from three athletes

Raw themes	First dimensions	Second dimensions
reached a point where I just said forget it don't let opponents see I've given up, try the best I can no choice but just do routine and do best I can I don't care, let's go to the next piece	lost enthusiasm	resignation
no way to change things you can't really change anything	can't change anything	

Fig 10.3.2.1: Hierarchical structure of the second dimension 'resignation'.

10.3.2.2 Regret

The first dimension, 'regret' was comprised one raw quote, which was subsequently carried through to the second dimension (fig 10.3.2.2).

Raw theme	First dimension	Second dimension
could have finished in top 2, one of top 2 guys	regret	

Fig 10.3.2.2: Hierarchical structure of the second dimension 'regret'.

10.3.4.1 Avoidance strategies

Two athletes produced the 15 quotes which clustered together to form this dimension. The two athletes actually commented during the interview that they were 'no longer competing in that event' (first dimension), for example, "I haven't competed since the summer [5 months prior to interview] ... and if I have it my way, I won't". Furthermore, one athlete indicated that 'I don't want to experience that again'. Both athletes also suggested 'possible lifestyle changes', such as retiring from the sport or doing it at a less intense level. 'Need a break' and 'don't want to experience that again' are the two further dimensions comprising the second dimension 'avoidance strategies'. The second dimension was subsequently carried through to the third dimension (fig 10.3.4.1).

Raw Themes	First dimensions	Second dimension
happy to stop racing for a while, time to prepare for next one maybe I need a break either need a break or try harder	need a break	avoidance strategies
don't want to experience that hell again	don't want to experience that again	
still training, no longer competing still try and avoid that distance haven't competed since the summer almost certainly go back to another class	no longer competing in that event	
retiring from the sport get some money together do it at a less intense level	possible lifestyle changes	

Fig 10.3.4.1: Hierarchical structure of the second dimension 'avoidance strategies'.

10.4 Discussion

The coping section comprised seven third dimensions, four of which were evidence of attempts at coping with the consequences of the performance drop, whilst the remaining three demonstrated an inability to cope with the catastrophic performance drop. Interestingly, both dimensions (coping and not coping) were experienced by all athletes. Although this appears somewhat contradictory, as Lazarus and Folkman (1980) explained coping represents;

> changing cognitive and behavioural efforts to manage specific internal and/ or external demands that one appraised as taxing or exceeding the resources of the person (p.141).

Essentially, their conceptualisation of coping comprises all efforts to manage demands irrespective of the outcome of these efforts. Indeed, the coping strategies dimension represents *attempts* at coping with the catastrophic performance and that these attempts may be successful or unsuccessful. As alluded to earlier, three of the athletes interviewed have retired from the event in which their catastrophe occurred, two of whom emphasised that the extent of their catastrophe was a contributory factor to their retirement.

The coping section included lower order themes which fit comfortably with coping research. Endler and Parker (1990) proposed a three dimensional approach to coping, which is a similar, but extended version of the two-dimensional problem- and emotion-focused coping model proposed by Folkman and Lazarus (1980). Problem-focused coping refers to problem solving, planning, decision making and / or direct attention; whilst emotion-focused coping refers to cognitive efforts, mental relaxation or behavioural strategies like seeking support. Endler and Parker (1990) identified three classifications: task-oriented, emotion-oriented and avoidance coping; task-oriented and emotion-oriented coping reflect Folkman and Lazarus' (1980) problem- and emotion-focused coping, respectively. The major difference between the two models is the additional dimension of Endler & Parker's (1990) avoidance strategy, representing efforts to mentally or physically disengage from the stressful situation. Folkman and Lazarus (1980) suggest that emotion-focused coping includes the concept of avoidance. Given the emergence of avoidance as a third dimension, in addition to the severity of the avoidance cases within this study, the present results are more consistent with Endler and Parker's (1990) model.

Endler and Parker (1990) suggested that task-oriented coping would be most beneficial when the individual has personal control over the situation, whilst with little control over the situation, emotion-oriented coping would be more appropriate. The present investigation revealed that only one performer (who recovered) was in control of his performance and provided quotations indicating both task-oriented and emotion-oriented coping. This may indicate that task-oriented coping when the performer is not feeling in control increases the probability of failure to recover.

Closer examination of the present findings reveals that the dimensions are consistent with Endler and Parker's (1992) three dimensional model. The performance strategies, and mental and technical strategies dimensions (in the third dimension 'active strategies') are consistent with both task-oriented and problem-focused coping. These strategies are demonstrated by the following athlete quotations; " it frustrated me more, because it wasn't working" and;

> I tried to get feel, get back in touch with my body, because I felt like there was a cut off between here [head] and my body, that there was a big gap and what I was telling it to do, it wasn't listening.

One athlete's task-focused coping response was to "turn it into a situation where it was the ultimate challenge" and therefore felt he became re-motivated.

The emotion-oriented/ focused coping strategies were evident within the majority of dimensions, for example the general dimensions, 'staying positive' and 'negative emotions'. An example of a quote from the gymnast who recovered demonstrates a cognitive strategy; "I was just trying not to think about it [the fall]". Another quote, which contributed to the 'down playing drop in performance' dimension was; "Basically it was just to forget about that because I couldn't do anything about it". Furthermore, the gymnast explained how he rationalised the performance drop by saying; "even the bit I fell off was only a millimetre out". Another athlete simply stated that despite the horrific nature of his performance catastrophe "I'm not giving up".

Two further negative quotations are examples of the negative emotions dimension 'resignation' by athletes who failed to recover;

> So after a certain point in the game, it was like you realise that it's over with and its bad to think that way, but after a while you stop caring.

> ... but because my sole aim was to come away from there having won, and then I knew there was not a chance in hell of me winning with a five second penalty, so that bucket of water came and actually put out quite a bit of the fire

The recovery dimension was interesting as little research has examined the extent to which loss of performance can be recovered. One athlete explained that his catastrophic performance "... didn't affect me for Atlanta [the next World Cup race]"; whilst another athlete explained how "I'll sort it out Monday, and Monday to Friday - it'll be sorted out for next week [the next round]".

The dimensions within the 'not coping' general dimension were primarily emotion-focused coping strategies, for example, 'surprised I couldn't cope', 'resignation' and 'regret'. An example of a quotation highlights the emotion-focused coping;

> I mean I tried to forget about the fall but then after that I was trying to motivate myself to do the 3rd and 4th pieces better than what I normally would so I wouldn't lose any ground on the other two. I was just trying to gee myself even more. ...I was just telling myself to 'come on' and that I couldn't afford another fall'

The failure to recover/ cope dimension was also a reflection of the emotion-focused coping attempts made and represents a theme which has received little attention in the competitive sport literature. This is somewhat concerning given that five of these élite athletes expressed an 'inability to cope'. One athlete clearly stated his inability to cope; "I didn't know any strategies to get back". Three athletes, contributing to the 'failure to recover' dimension, felt they had not recovered completely from the catastrophe at the time of their interviews.

> ... and that's what's really hard to come to terms with at the end when you don't do it because you spend so much time thinking and believing in yourself that you can do it and then you don't.

Furthermore, as previously discussed, two of these athletes have retired from the event in which the catastrophe occurred, clearly indicating an 'inability to cope'.

The avoidance dimension is clearly illustrated by the swimmer;

> No, I still try to avoid um ... any time trial in and around the 200m. I haven't competed since the summer. ... But I haven't competed in 200m since, and if I have it my way, I won't.

It has been suggested by Hardy et al., (1996) that avoidance coping may be effective for short-term stress where the consequences of avoiding the situation would soon dissipate whilst non-avoidance would be more effective for dealing with long-term stress where the consequences would not necessarily dissipate. An example of this type of coping is demonstrated in the following quotation by one of the gymnasts; "I didn't try the move again because the competition was too important". The gymnast avoided the move, in the short-term, which is consistent with the suggestion that avoidance is more effective when the consequences would quickly dissipate. Two of the three athletes who demonstrated long-term stress avoidance coping as they retired from their sport following their catastrophic performance, indicating that they perceived that the stress outweighed their desire to continue competing. The other performer exhibiting avoidance coping was having a rest because of the stage of the season (in essence, forced avoidance), which enabled the short term stress to dissipate. This avoidance phase was what he felt he needed.

The results indicate the dynamic multi-modal nature of coping, which constantly changes as attempts fail and new ones are attempted. However, no-one strategy has emerged from the present phase of the qualitative study as the most successful one. Indeed, the only performer to regain his performance employed all of the strategies proposed in Endler and Parker's (1990) model. Similarly, the performers who did not recover their performance employed the various strategies. Hardy et al.'s (1996) working model of coping in sport demonstrates the complex, dynamic process of coping, which is greatly influenced by trait and state factors, e.g. coping dispositions, personality and motivational factors, state anxiety, and stress appraisal.

Coping research examining avoidance strategies including or resulting in retiring seem to have been largely ignored. Indeed, even Hardy et al.'s, (1996) working model does not include retirement, which, as demonstrated in the present investigation, occurred with two of the performers who experienced a catastrophic performance and an inability to cope. Findings from the present investigation, therefore, indicate a need for researchers to examine this phenomenon.

10.5 Practical Implications

The findings within the coping section of the study demonstrated the dynamic, multi-modal nature of coping attempts, and thus implicate the need for athletes to learn many coping strategies. Indeed, Lazarus & Folkman (1984) defined coping as "a process of constantly changing cognitive and behavioural efforts to manage specific external and/ or internal demands or conflicts appraised as taxing/exceeding one's resources" (p.141). This was evident in the present investigation, in which the coping efforts of these athletes reflected a dynamic and complex variety of strategies, which were used after the catastrophic performance drop and after other strategies failed (c.f. Compas, 1989; Folkman & Lazarus, 1985). Of primary importance is facilitating the athletes awareness of the need for coping. In addition, it is suggested (see Hardy, Jones & Gould, 1996) that athletes be; taught when to employ coping strategies, encouraged to seek help in coping, and encouraged to maintain an on-going assessment of potentially stressful situations. Of course, a major role of learning effective coping strategies is to enable athletes to cope with stress at major events and to cope with unforeseen events, e.g. water being released late on a canoe slalom course, rain suspending play, or perceived bad umpiring.

The implications of the findings must therefore include encouraging sport psychologists to address the issue of élite athletes' inability to cope, not only in terms of research, but also in terms of providing performers with; i) the skills to prevent performance catastrophes, ii) the skills to cope with performance decrements in such a way that they do not become catastrophes, and iii) the skills to cope in the event of a catastrophe occurring. Furthermore, a greater awareness amongst both athletes and coaches is needed concerning the potentially debilitating influence of performance catastrophes on athlete careers.

10.6 Future Dimensions

Carpenter (1992) suggests that coping may; i) counteract the effects of stress by causing improved outcomes; ii) act as a stress buffer; or iii) lower stress levels. Such questions are particularly pertinent in the light of catastrophic performances. Causal, longitudinal and intervention studies would be beneficial in furthering our understanding of the coping process. Indeed, Hardy et al. (1996) suggest that the first consideration be which dependent variables to use, e.g. performance, satisfaction and affect, and to then assess whether the use of particular coping strategies is associated with improvements in these outcome variables. Equivocal results have emerged from a number of studies (e.g. Finch, 1994; Madden, Summers & Brown, 1990) utilising currently available inventories (e.g. COPE, Carver, Scheier & Weintraub, 1989; WCC, Folkman & Lazarus, 1988), emphasising their weak psychometric properties. Thus, researchers should examine the current inventories, to either strengthen the psychometric properties, or to develop a more valid and psychometrically sound inventory. As demonstrated by the findings of the present investigation, researchers should examine coping strategies, particularly concerning the influence of the 'avoidance strategy', given that it resulted in two of the interviewed performers retiring from their respective sports.

CHAPTER 11.

Summary and concluding comments

11.1 Summary

The main research purposes of this research programme were to; examine the influence of anxiety (facilitative and debilitative effects) upon performance; identify additional factors which may influence the anxiety-performance relationship; and identify processes underlying such relationships. The first section of this thesis examined the intensity and direction of competitive state anxiety symptoms and the interactive effects of anxiety sub-components upon netball performance. In this section (chapter 2) the modified CSAI-2 (Jones & Swain, 1992) was utilised to measure intensity and direction of the anxiety symptoms; a retrospective performance measure was used over a season within an intra-individual design. Although the facilitative influence of anxiety upon performance did not emerge directly through the direction scale a significant interaction emerged from the two-factor Cognitive Anxiety x Physiological Arousal quadrant analyses of performance, suggesting that cognitive anxiety may enhance performance, as proposed by catastrophe models (Fazey & Hardy, 1988; Hardy, 1990, 1996a & b).

Recognising the limitations of the modified CSAI-2 (in terms of length and complexity) the first study of the second section was designed to explore shorter self-report measures of anxiety from which to examine possible underlying theories. The original MRF (Murphy et al., 1989) and the modified versions (Krane, 1994) were considered and modified to include direction and frequency of the intensity of the anxiety symptoms. However, results of the concurrent validity study were rather disappointing; that is, the correlations with the respective CSAI-2 sub-scales and dimensions were inconsistent and low. Despite the overall inconclusive results, the cognitive anxiety intensity sub-scale was identified as having potential in its current form. Other findings which emerged were; gender differences, (as previously identified in competitive state anxiety literature, e.g. Jones et al., 1991) and order of completion effects. However, despite the equivocal support for the modified MRFs it was suggested that one might be of use if participants were trained to report their anxiety levels using one of these short self-report scales; or if the MRFs were reworded to clarify the separate anxiety subscales and the 'right now' state response required. Consequently, the second study in this section (chapter 4) utilised the bipolar MRF (MRF-B) with only the intensity and direction sub-scales. The purpose of this study was to identify whether physiological arousal was a reflection of effort required in the context of Eysenck's (1982) motivational explanation of catastrophic performance.

Essentially, it was suggested that following a catastrophic drop in performance, effort required would have to be considerably reduced before performers would perceive themselves able to cope enough to justify investing the extra effort required to regain the upper performance surface. The empirical testing of this concept, therefore, was to examine what would happen to tennis players' effort on a serving task at critical points. The critical points were individually assigned (from a pre-test) goal difficulty levels. In order to assess the catastrophe model predictions, cognitive anxiety was manipulated via ego-threatening and neutral instructional sets. However, the manipulations failed to produce significant differences in cognitive anxiety or performance, therefore no further analyses could be conducted. Chapter four briefly summarised the nature and design of the study and explained the change in direction of the thesis.

The third section of the thesis employed structured in-depth interviews to explore performers' experiences of catastrophic performances, in order to identify any further emotions or cognitions which may not have previously emerged or which have been neglected in the literature. The results from the catastrophe phase (chapter 7) were partially consistent with the catastrophe models, particularly with respect to all of the performers who were interviewed experiencing sudden, dramatic drops in their performance. Further, results provided some support for the inclusion of self-confidence and self-control in Hardy's (1990) proposed butterfly catastrophe model. In addition, the emergence of control indicates a need for more investigations of the control process model applied to sport (Jones, 1995). During the three phases of the catastrophe several 'new' variables emerged which have not been identified in previous research. These include preoccupation with main rival, inappropriate effort, event importance, and thinking about the outcome. Emerging from the coping phase was a rather alarming finding that the élite performers interviewed did not generally possess effective coping strategies.

The specific implications of these studies have already been presented in some detail in the preceding chapters. The purpose of this general discussion chapter therefore, is to collectively discuss the central theoretical and applied issues raised by the studies in this research programme, in an attempt to draw meaningful conclusions. It also provides an overview of the overall limitations of the studies (discussed in more detail within each chapter). Based upon the present research programme, the final section provides suggestions for future research into the underlying processes of performance catastrophes.

11.2 Theoretical implications

A variety of research methodologies have been used in this research programme to examine the anxiety-performance relationship with specific reference to performance catastrophes. This chapter initially addresses the theoretical implications of the current research programme in terms of the facilitative and debilitative effects of anxiety upon performance. The chapter also addresses the implications of findings for measurement tools, not only the development of more expedient, practical tools, but also in terms of the validity of the modified CSAI-2, due to the two additional dimensions. The chapter draws together these findings with the in-depth information produced by the qualitative data; some of which sits comfortably with the butterfly catastrophe model and can be partially explained by a combination of the processing efficiency theory (Eysenck, 1982) and the conscious processing hypothesis (Masters, 1992).

11.2.1 Facilitative and debilitative anxiety

The first study of the research programme offered no direct support for the hypothesised relationship between directional perceptions of anxiety and performance. This was evident in the regression analyses in which direction explained no further variance in performance over and above that accounted for by intensity alone. The results initially appeared contrary to those obtained in the series of studies by Jones and colleagues (e.g. Jones et al., 1993), in which performers who perceived their cognitive anxiety to be facilitative produced better performances than those who perceived their anxiety to be debilitative; and to test anxiety research in which facilitative anxiety effects have been found (e.g. Alpert & Haber, 1960). However indirect evidence was provided by the correlations between anxiety intensity and performance. Further support for the facilitative effects of anxiety emerged in the pre-performance phase of the catastrophic performance of the qualitative study. In this study, all of the performers were experiencing some level of anxiety, and performance was between moderate and good. All of the athletes expressed feelings of confidence, which sits comfortably with the suggestion that confidence may protect against the effects of anxiety upon performance as proposed by Hardy's (1996) butterfly catastrophe model.

11.2.2 Interactive effects and the butterfly catastrophe

The two-factor ANOVA in the first study revealed an interaction between the intensity of anxiety sub-components, which supported the sometime facilitative, sometimes debilitative effects of cognitive anxiety. Such findings are consistent with test anxiety research (Deffenbacher, 1977; Doctor & Altman, 1969; Liebert & Morris, 1967) in which interactive effects emerged among worry, emotionality and performance. Results from the netball study also demonstrated that higher levels of cognitive anxiety had a detrimental effect upon netballers' performances when they were physiologically aroused, but a beneficial effect when not physiologically aroused. These findings, therefore, offer some support for the catastrophe models, as they indicate that cognitive anxiety intensity can sometimes facilitate performance, depending upon the level of physiological arousal (Hardy & Parfitt, 1991; Hardy et al., 1994). Similarly results from the qualitative analyses are consistent with the butterfly model; specifically through the emergence of self-confidence and perceptions of control dimensions.

However, the support provided is not completely unequivocal. The butterfly catastrophe may fit the data better than any other anxiety-performance model/ theory, but it still fails to account for some of the factors which emerged in the qualitative data namely thoughts about main opponent, feelings of pressure and awareness of thoughts. These are three third dimensions which emerged within the qualitative study and which have not previously been identified within the anxiety-performance framework. In addition the catastrophe models offer no explanation for the occurrence of performance catastrophes.

11.2.4 Underlying theories

At least two explanations have been offered for the finding that performance can sometimes improve under higher levels of anxiety (Carver & Scheier, 1986, 1988; Eysenck, 1979, 1982). Carver & Scheier (1986) proposed a control model of anxiety and performance, in which they suggested that anxiety can sometimes have an energising and focusing effect on the individual experiencing it. Essentially, they suggested that if the performer has a favourable expectancy of success and ability to cope, the individual will respond with additional effort.

Similarly, Eysenck's (1979, 1982) processing efficiency theory suggests that anxious performers will invest effort in the task if they still perceive themselves to have at least a moderate probability of success. Eysenck's model incorporates both motivational and resource allocation approaches in explaining this process. The explanation fits quite comfortably with the butterfly catastrophe model, provided one assumes that physiological arousal is a reflection of effort. Indeed, physiological arousal was manipulated by exercise in two investigations examining the hysteresis hypothesis (Hardy & Parfitt, 1991; Hardy et al., 1994), suggesting that physiological arousal may be a reflection of effort. In addition, the explanation also fits the results from the first study, and to a lesser extent data from the qualitative study. More specifically, under high cognitive anxiety and low physiological arousal, performance was maintained which according to processing efficiency theory could be due to the compensatory mechanism of effort. As physiological arousal increased and the probability of success decreased (i.e. confidence dropped), the task demands (that is, the increasing cognitive anxiety) possibly began to outweigh the available resources and performance therefore deteriorated. This theory explains the experience of the gymnast from the qualitative study. More specifically, it appears that the gymnast may have withdrawn effort, affording himself one fall, and thereby not expending enough effort to compensate for his nervous feelings and physiological symptoms and thus he experienced the catastrophic drop. However, because of his self-confidence (favourable expectancy of success and goal attainment) and perceiving that his anxiety was facilitative to performance (Carver & Scheier, 1988; Jones, 1995) he was able to re-invest effort and thus regain his upper performance level. Therefore, Eysenck's (182) explanation fits comfortably with his experience.

The largest dimension emerging from the catastrophe phase of the qualitative study was 'evaluative state', which certainly warrants further attention. Up to this phase no evaluation had emerged, yet once the catastrophic drop began, seven of the eight performers interviewed slipped into an evaluative state. The deductive analysis revealed that all of the athletes' experiences provided partial support for Masters' (1992) conscious processing hypothesis. The hypothesis proposes that cognitively anxious performers begin to focus on the explicit rules to perform normally automatically produced skills, which therefore results in a breakdown in performance. This hypothesis has recently received additional support from Hardy et al., (1996). The hypothesis is also consistent with Naatanen's (1973) concept of 'trying too hard', in addition to Gallwey's (1974) inner game method of coaching, that is 'just let it happen'.

As discussed earlier, the two theories with which the data seem to be consistent, may be closely related. The data suggests that the increased effort in the pre-catastrophe state to the catastrophe state (processing efficiency theory) may have led to a regression to the explicit rules from the early stages of learning (conscious processing hypothesis), therefore resulting in the catastrophic performance drop. The combined explanation would explain the performances of seven of the performers interviewed, whilst the remaining performer's (who recovered his performance) experience can be explained by processing efficiency theory alone.

The other important suggestion emerging from the present research programme, more specifically from the qualitative study, was that of on-going performance. Essentially this refers to the concept of performance being a process construct, and therefore has a cyclical relationship with other factors such as anxiety and motivation (Hagvet & Ren Min, 1992). In their research using puzzles (cognitive tasks) the effect of state anxiety did not occur until the third puzzle. After the third puzzle, negative motivation and state anxiety did not directly affect the process, as it stabilised through the 4th and 5th puzzles. Such research has implications for competitive sport performance, which can change significantly across time, e.g. 90 minutes of a football match, across sets in a tennis match, between first and second runs in canoe slalom.

11.3 Coping strategies

The coping section of the qualitative study revealed some interesting findings, particularly given the limited research conducted on this aspect of performance. Support was found for Endler and Parker's (1990) three-dimensional approach to coping. Specifically, dimensions emerging from the hierarchical content analyses could be classified into the three dimensions proposed by Endler and Parker (1990). One of the most alarming findings, given that they were all élite level performers, was that five of the performers expressed an 'inability to cope' with their catastrophic performance decrement. This in itself is strong support for catastrophe models in general, if not the models which have so far been proposed.

An additional variable emerged in this phase which has received little if no research attention, 'recovery'. Five of the athletes, despite not recovering during the catastrophic performance, recovered in time for their next event, whilst three felt they had still not recovered at the time of the interviews. The present findings are consistent with Hardy et al.'s (1996) suggestion that avoidance coping may be effective for short-term stress where the consequences of avoiding the situation would soon dissipate, as this was demonstrated by the one performer whose performance recovered. Another of the performers' interviewed fits Hardy et al's. (1996) suggestion as he had a considerable break in the season before his next race, by which time the consequences of his performance had dissipated.

The two remaining performers who demonstrated long-term avoidance coping strategies, both retired from their sport because of their catastrophic performance. Such findings reinforce the need for coping models (e.g. Hardy et al., 1996) to include retirement as a coping strategy.

11.4 Practical implications

The most obvious practical implication from the present research programme is the importance of recognising that high levels of anxiety are not necessarily debilitating to performance. The theoretical underpinnings combined with these findings indicate that cognitive anxiety can be beneficial to performance, providing that physiological arousal is not too high, self-confidence is high and the performer perceives he/ she is in control. If high levels of cognitive anxiety are combined with high and increasing levels of physiological arousal, reduced self-confidence and perceptions of control, performance is likely to drop suddenly and dramatically, after which it will be difficult to regain good performance levels. One strategy which has previously been proposed (Hardy ,1990) and which may enable performers who have experienced this catastrophic decrement in their performance to regain good performance would be to have them physically relax (to move back along the physiological arousal axis), cognitively restructure (to regain the upper performance surface), and then re-activate (to regain the highest point on the upper performance surface).

In summary, the clearest implications include teaching performers the following;
i) good stress management strategies (particularly for major events), which include separation of cognitive anxiety and physiological arousal;
ii) good goal-setting skills, to increase self-confidence and reduce discrepancies between present aspirations and previous levels of performance;
iii) preparation that 'controls the controllables';
iv) good preparation skills;
v) exercise caution with 'psyching up' strategies, due to individual differences and the difficulty in recovering from becoming 'psyched-out'.

The first stage toward learning coping strategies is awareness (Ravizza, 1993). Several strategies can be suggested which may help performers to cope better with stressful situations. The sport psychologist can facilitate this process by discussing whether the source of stress is controllable or uncontrollable. Identifying the source of stress is pertinent in terms of assessing the coping strategy to be employed (c.f. Hardy et al., 1996). As the coping data in the present study and Hardy et al., (1996) suggest, task-oriented coping should be avoided if the performer is not in control of his/ her emotions. The most notable implications of the coping phase in relation to catastrophic performances are; to teach performers skills to prevent catastrophes occurring, such as increasing awareness of potential stressors; the skills to cope with initial performance decrements, such as an alternative game plan, or race strategy; and in the event of a catastrophe occurring, strategies to facilitate a return to higher performance levels such as physical relaxation, cognitively restructuring and re-activation.

Combined with the above suggestions is teaching the performers when to employ coping strategies (Hardy et al., 1996), for example, the sailor in the current study began to employ his coping strategies far too early in the race. Another suggestion is to encourage them to seek help coping (identified by the swimmer, who commented that he should have looked at his coach) and to encourage on-going assessment of potential stressors to cope at stressful events and cope with unforeseen, uncontrollable events (e.g. the weather for the sailor). Indeed, as Cohen and Wills (1985) indicate that performers need to be made aware of the importance of good social support, so they do not feel that it is a sign of weakness to seek support, and thus learn better coping skills. Given the alarming finding of the present study (five performers identifying an 'inability to cope') a supportive system is of great importance, to share concerns and discuss potential coping strategies. Of course, it may not be appropriate to discuss such things with peers, due to competing against them, and therefore a network of retired performers could be utilised to help current performers (Hardy et al., 1996). If coping skills are to be employed successfully in stressful situations they should be so well learned that they become automatic (Finch, 1994; Gould et al., 1993). Indeed, this could be the reason why the seven performers in the qualitative study did not cope with the catastrophic drop in their performance.

Finally, results from the present investigation suggest that avoidance strategies should be employed with caution. Two of the three performers in the present study who employed avoidance actually retired from their respective sports. One performer successfully employed short-term stress avoidance which is therefore consistent with Hardy et al's., (1996) suggestion that this strategy may be effective for short-term stress where the consequences of avoidance would soon dissipate

11.5 Treatment and measurement issues

Traditionally, research has examined the anxiety-performance relationship through quantitative methodologies using inventories to measure the anxiety response. Such research designs however, have low internal validity due to the lack of control of confounding variables, and therefore are not particularly effective for inferring causality. Of course the advantage of such investigations is the generalisability of the findings (Martens, 1987; Locke, 1989). Qualitative methodologies have recently become very popular in the sport psychology research literature, as a means of studying the experiences of elite performers (Gould et al., 1990; Orlick & Partington, 1988; Scanlan et al., 1989). Despite the weaknesses inherent in qualitative procedures such as low objectivity, and the inability to infer causality among variables, the holistic nature of behaviour in natural environments can enhance the ecological validity of research findings (Locke, 1989; Siedentop, 1989). The strength of employing qualitative analyses to examine the anxiety-performance relationship has enabled the author to look at the overall performance, determining possible causes and explanations which might not have emerged through quantitative analyses. Examples of this include the overwhelming emergence of perceptions of control and self-confidence, and the evaluative state which followed the initial performance decrement, and which it is proposed led to increased effort. Furthermore, 'new' variables emerged from the hierarchical content analysis such as preoccupation with main rival, thinking about the outcome, inappropriate effort and event importance.

The use of quantitative paradigms in anxiety-performance research is limited by the measurement tools utilised to tap the competitive state anxiety response. However, employing intra-individual designs goes some way to overcoming the potential problems of individual differences (Sonstroem & Bernado, 1982). Given the advances in the conceptualisation of the anxiety response, the additional dimensions in the CSAI-2 (Jones & Swain, 1992) make it become not only very arduous to complete but also bring into question its validity. The series of studies utilising the inventory (Jones and colleagues; e.g. Jones et al., 1993) provide some support for the modified scale. More recently, Jones and Hanton (1996) examined and provided some support for its face validity. Considerably more support for the scale is required before it can be used with complete confidence.

The length and complexity of the scale, however, do emphasise the need for a more practical and expedient measure of anxiety responses. Chapter 3 attempted to achieve this goal. However, the modified short self-report scales do not appear to lend themselves to the additional dimensions of directional interpretations and frequency, particularly the somatic anxiety sub-scale which produced negative relationships with the corresponding CSAI-2 sub-scales. Implications from this study were that some of the scales may be valid when performers are trained to report their anxiety levels (e.g. cognitive anxiety). Of course, more research needs to examine the reliability and validity of the scale when utilised in such a way. One alternative was that the anchor terms for the somatic anxiety and self-confidence sub-scales be changed, and suggestions were given. In addition, it was suggested that performers may be responding to the frequency and direction items with a trait response; and therefore the wording of the instructions may need to be modified to clarify the state response required. A further alternative strategy suggested was the integer scale used with golfers (Hardy, 1996a). Similarly, this study trained performers to record their anxiety on the integer scales. Together, these findings suggest the need for some form of training in order for performers to accurately record the anxiety symptoms, frequency and interpretation of their symptoms.

To utilise the strengths of both quantitative and qualitative design methodologies, both were used to compliment each other in the present research programme (Patton, 1990).

Specifically, hierarchical content analysis and deductive model and theory examination represented the qualitative analysis, whilst the questionnaires represented the quantitative analysis. The two qualitative analyses produced similar results, whilst the small number of subjects deemed the questionnaires results insignificant. Methods triangulation (Patton, 1992) was used, such that qualitative methods might help explain quantitative findings or at least confirm the emergence of these findings, in addition to gaining an in-depth understanding of the anxiety-performance relationship from the performers' perspective (perspective triangulation). Combinations of qualitative and quantitative research methodologies have been utilised in the research literature to examine psychological strategies employed by elite performers (Gould et al., 1992 Eklund & Jackson), and to examine the sources of stress in elite performers (Gould et al., 1993 Jackson & Finch). This approach has rarely been employed in the anxiety-performance research literature, and therefore is a major strength of the present research programme. In addition, a further strength of the qualitative study was the unique design following performers across the duration of an entire performance as in a repeated measures design, thereby enabling a more detailed examination of specific experiences.

11.6 Limitations

Several limitations can be outlined in the present research programme. Given the limited research examining the properties of the modified CSAI-2 (Jones & Swain, 1992) the current research programme should be treated with caution. More research is warranted to determine the validity of the lengthened inventory. Gradually, more research is being undertaken for this purpose (Jones & Hanton, 1996). However, the author maintains that the length and complexity of the modified version deems it almost impractical for use with élite performers. The implicit suggestion, therefore, is that research attention be focused toward developing a more valid short self-report scale, or modifying those examined in the present programme.

As identified in the first study of this programme, research examining pre-performance anxiety and its relationship with performance is characterised by a failure to predict large percentages of performance variance. Measuring anxiety (intensity, frequency and direction) during performance (as identified in the qualitative study) would probably provide a more complete picture, but the practical difficulties of such an approach are obvious. A major challenge for researchers, is to develop methods of examining state anxiety during performance, to examine the on-going cyclical (Hagtvet & Ren Min, 1992) influences of anxiety upon performance. Possibilities include (as previously identified) short self-report scales, or psychophysiological measures, including biochemical, cardiovascular and electrocortical measures (c.f. Hardy et al., 1996).

The disappointing third study in chapter four was a clear limitation of the research programme, due to the failure of the cognitive anxiety and goal difficulty manipulations. However, chapter four provided possible limitations within the methodology and proposed suggestions for future researchers employing a similar design. The change in direction, by employing a qualitative methodology, went some way toward examining the influence of the variables proposed in chapter four (anxiety sub-components, physiological arousal, probability of success achieving the goal, and effort as a reflection of physiological arousal); the potential underlying theories of performance catastrophes; and other stress-related variables which may influence performance.

11.7 Future directions

The results of this research programme confirm that anxiety is a complex phenomenon which, despite having received considerable research attention, warrants further investigations. Although the cusp catastrophe model (Fazey & Hardy, 1988) has received some support, it is limited, due to only including cognitive anxiety and physiological arousal. Quantitative and qualitative evidence has been found to emphasise the importance of self-confidence and its inclusion within any model/ theory concerned with performance catastrophes. Additionally, the qualitative findings highlight the influence of perceptions of control upon performance. Together the emergence of these factors are consistent with Hardy's (1990) proposed butterfly catastrophe model, and therefore indicate a real need for researchers to seriously test this model. Not only do these variables require such attention, but the causal influences of the combinations of interacting variables needs to be more carefully established. Results from the qualitative study in the present investigation reveal nothing about causality and results should be treated with caution. Future studies should examine cognitive anxiety, physiological arousal, self-confidence, perceptions of control, and expenditure of effort, in such a way as to infer causality (e.g. structural equation modelling, Ecob & Cuttance, 1987). Of course, as the present research programme found, manipulating cognitive anxiety and finding a suitable performance task are problematic issues, which require considerable attention. Psychophysiological measures may be used in order to determine the influence of output of effort and muscular movement (Weinberg, 1978; Weinberg & Hunt, 1976) upon performance, and its relationship with the other variables proposed within the butterfly model.

In order to examine the above, further exploration of the anxiety inventories is urgently required. Specifically, the modified CSAI-2 (Jones & Swain, 1992) warrants further validity testing, to ensure the addition of the direction and frequency dimensions do not confound the psychometric properties of the original CSAI-2. However, not only do the addition of direction and frequency have the potential of confounding the strength of the CSAI-2 in terms of the psychometric properties, but also, in terms of the length and complexity of the inventory. Research attention is required, therefore, to determine the most accurate measure of anxiety in a short self-report scale, on which performers could be taught to record their thoughts and feelings.

With respect to the theories proposed, both have limitations which need to be resolved through further investigation, perhaps through a combination of the two theories. However, the two explanations offered for performance catastrophes are by no means exhaustive. For example, Carver and Scheier's (1986, 1988) work is interesting. They proposed that anxiety would be facilitative to performance provided that the performers had favourable expectations of their ability to cope and of goal attainment; however, when their expectancies were no longer favourable, their anxiety would become debilitative and detrimental to performance. Jones (1995) modified Carver and Scheier's (1988) control process model, proposing a model of debilitative and facilitative competitive anxiety. Jones (1995) suggests that if the performer feels he/she has control over the environment and self their anxiety symptoms will be perceived as facilitative; whilst no control over these things will result in debilitative anxiety.

Coping strategies require more detailed attention in the research literature. Not only do researchers need to identify more closely the influence of different aspects of coping upon performance, but more fundamental than this is how to measure coping in a sport context. Further suggestions include conducting case studies to track performers' stress, coping and performance over an extended period of time. Implications from the research programme indicate that these variables vary considerably over time. Indeed, coping is thought to be a constantly changing process, as is the relationship between anxiety and performance (Hagtvet & Ren Min, 1992).

In summary, the present research programme has provided support for the existence of performance catastrophes, therefore countering previous research suggestions that performance follows a uniform path which requires only subtle changes in metacognitive variables in order to return to peak performance (having gone 'over the top', or not having reached the top). Furthermore, some evidence has emerged which supports two of the theories proposed to explain the anxiety-performance relationship. However, it is clear from the results of the qualitative study that we still require considerably more research in order to determine explanations for the patterning of performance, and whether individual differences (e.g. gender, age, culture) result in differential theoretical underpinnings. Certainly we have a long way to go in determining causality among the variables. Hopefully, the present findings have emphasised the need to pursue the theoretical underpinnings of performance catastrophes and coping strategies, in addition to the strength of employing a variety of research methodologies.

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Appendix 1a: Modified CSAI-2s

Appendix 1a: Modified CSAI-2s

NAME: ______________________ CLUB: ________________ DATE: ____________ HEART RATE: __________

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 right now about competition. Please complete this 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 openly. If you worry about 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. Please remember that you are responding to how you feel right now about competition.

Directions: A number of statements which athletes have used to describe their feelings before competition are given below. Read each statement and then circle the appropriate number, in each of the sections, to the right of the statement to indicate *how you feel right now.* There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answers which describe your feelings right now. For the interpretation section, ask yourself whether you regard the intensity of feeling that you are currently experiencing as positive or negative with respect to your performance in this competition. For example, if you circled '1' (Not At All) on the intensity scale, then respond in relation to that feeling on the interpretation scale; i.e. is your lack of concern a positive or negative thing? Similarly, if you respond 'Very Much So' to question 4, then your response on the interpretation scale should indicate whether you interpret these self-doubts positively or negatively.

	INTENSITY				INTERPRETATION						
	Not At All	Somewhat	Moderately So	Very Much So	Very Negative (i.e. debilitative)			Unimportant		Very Positive (i.e. facilitative)	
1. I am concerned about this competition	1	2	3	4	-3	-2	-1	0	+1	+2	+3
2. I feel nervous	1	2	3	4	-3	-2	-1	0	+1	+2	+3
3. I feel at ease	1	2	3	4	-3	-2	-1	0	+1	+2	+3
4. I have self-doubts	1	2	3	4	-3	-2	-1	0	+1	+2	+3
5. I feel jittery	1	2	3	4	-3	-2	-1	0	+1	+2	+3
6. I feel comfortable	1	2	3	4	-3	-2	-1	0	+1	+2	+3
7. I am concerned that I may not do as well in this competition as I could	1	2	3	4	-3	-2	-1	0	+1	+2	+3
8. My body feels tense	1	2	3	4	-3	-2	-1	0	+1	+2	+3
9. I am self-confident	1	2	3	4	-3	-2	-1	0	+1	+2	+3
10. I am concerned about losing	1	2	3	4	-3	-2	-1	0	+1	+2	+3
11. I feel tense in my stomach	1	2	3	4	-3	-2	-1	0	+1	+2	+3
12. I feel secure	1	2	3	4	-3	-2	-1	0	+1	+2	+3
13. I am concerned about choking under pressure	1	2	3	4	-3	-2	-1	0	+1	+2	+3

	Not At All	Somewhat	Moderately So	Very Much So	Very Negative (i.e. debilitative)		Unimportant		Very Positive (i.e. facilitative)		
14. My body feels relaxed	1	2	3	4	-3	-2	-1	0	+1	+2	+3
15. I'm confident I can meet the challenge	1	2	3	4	-3	-2	-1	0	+1	+2	+3
16. I'm concerned about performing poorly	1	2	3	4	-3	-2	-1	0	+1	+2	+3
17. My heart is racing	1	2	3	4	-3	-2	-1	0	+1	+2	+3
18. I'm confident about performing well	1	2	3	4	-3	-2	-1	0	+1	+2	+3
19. I'm concerned about reaching my goal	1	2	3	4	-3	-2	-1	0	+1	+2	+3
20. I feel my stomach sinking	1	2	3	4	-3	-2	-1	0	+1	+2	+3
21. I feel mentally relaxed	1	2	3	4	-3	-2	-1	0	+1	+2	+3
22. I'm concerned that others will be disappointed with my performance	1	2	3	4	-3	-2	-1	0	+1	+2	+3
23. My hands are clammy	1	2	3	4	-3	-2	-1	0	+1	+2	+3
24. I'm confident because I mentally picture myself reaching my goal	1	2	3	4	-3	-2	-1	0	+1	+2	+3
25. I'm concerned I won't be able to concentrate	1	2	3	4	-3	-2	-1	0	+1	+2	+3
26. My body feels tight	1	2	3	4	-3	-2	-1	0	+1	+2	+3
27. I'm confident of coming through under pressure	1	2	3	4	-3	-2	-1	0	+1	+2	+3

NAME: ______________________ **SPORT:** ____________ **DATE:** _______ **Years in competitive sport:** _______

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 right now about competition. Please complete this 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 openly. If you worry about 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. Please remember that you are responding to how you feel right now about competition.

Directions: A number of statements which athletes have used to describe their feelings before competition are given below. Read each statement and then circle the appropriate number, in each of the sections, to the right of the statement to indicate *how you feel right now*. There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answers which describe your feelings right now. For the frequency section, ask yourself how frequently you are experiencing this intensity of feelings. For the interpretation section, ask yourself whether you regard the intensity and frequency of feeling that you are currently experiencing as positive or negative with respect to your performance in this competition. For example, if you respond 'Very Much So' to question 4, then your response on the frequency scale should indicate how frequently you are experiencing these self-doubts and your response on the interpretation scale whether you interpret these self-doubts positively or negatively. If you circled 1 (Not at All) on the intensity scale, then circle 1 on the frequency scale, and then respond in relation to then intensity of that feeling on the interpretation scale.

	INTENSITY				FREQUENCY							INTERPRETATION						
	Not At All	Somewhat	Moderately So	Very Much So	Never						All of the time	Very Negative (i.e. debilitative)			Unimportant			Very Positive (i.e. facilitative)
1. I am concerned about this competition	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
2. I feel nervous	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
3. I feel at ease	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
4. I have self-doubts	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
5. I feel jittery	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
6. I feel comfortable	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
7. I am concerned that I may not do as well in this competition as I could	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
8. My body feels tense	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
9. I am self-confident	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
10. I am concerned about losing	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3

	Not At All	Somewhat	Moderately So	Very Much So	Never						All of the Time	Very Negative (i.e. debilitative)			Unimportant		Very Positive (i.e. facilitative)	
11. I feel tense in my stomach	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
12. I feel secure	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
13. I am concerned about choking under pressure	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
14. My body feels relaxed	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
15. I'm confident I can meet the challenge	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
16. I'm concerned about performing poorly	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
17. My heart is racing	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
18. I'm confident about performing well	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
19. I'm concerned about reaching my goal	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
20. I feel my stomach sinking	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
21. I feel mentally relaxed	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
22. I'm concerned that others will be disappointed with my performance	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
23. My hands are clammy	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
24. I'm confident because I mentally picture myself reaching my goal	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
25. I'm concerned I won't be able to concentrate	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
26. My body feels tight	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3
27. I'm confident of coming through under pressure	1	2	3	4	1	2	3	4	5	6	7	-3	-2	-1	0	+1	+2	+3

Appendix 2a: MRF-M

NAME: ______________________

Please respond to the following with respect to your upcoming competitive event. Please circle the number which represents your response to each statement.

1. My thoughts are-

1	2	3	4	5	6	7	8	9	10	11
Worried									Not Worried	

these thoughts occur-

1	2	3	4	5	6	7	8	9	10	11
	Never									All of the Time

and this will-

1	2	3	4	5	6	7	8	9	10	11
Help my performance									Debilitate my performance	

2. My body feels-

1	2	3	4	5	6	7	8	9	10	11
Tense									Not Tense	

these feelings occur-

1	2	3	4	5	6	7	8	9	10	11
	Never									All of the Time

and this will-

1	2	3	4	5	6	7	8	9	10	11
Help my performance									Debilitate my performance	

3. I am feeling-

1	2	3	4	5	6	7	8	9	10	11
Confident									Not Confident	

these occur-

1	2	3	4	5	6	7	8	9	10	11
	Never									All of the Time

and this will-

1	2	3	4	5	6	7	8	9	10	11
Help my performance									Debilitate my performance	

Appendix 2b: MRF-B

NAME: ______________________

Please respond to the following with respect to your upcoming competitive event. Please circle the number which represents your response to each statement.

1. My thoughts are-

1 2 3 4 5 6 7 8 9 10 11
Worried — Calm

these thoughts occur-

1 2 3 4 5 6 7 8 9 10 11
Never — All of the Time

and this will-

1 2 3 4 5 6 7 8 9 10 11
Help my performance — Debilitate my performance

2. My body feels-

1 2 3 4 5 6 7 8 9 10 11
Tense — Relaxed

these feelings occur-

1 2 3 4 5 6 7 8 9 10 11
Never — All of the Time

and this will-

1 2 3 4 5 6 7 8 9 10 11
Help my performance — Debilitate my performance

3. I am feeling-

1 2 3 4 5 6 7 8 9 10 11
Confident — Scared

these occur-

1 2 3 4 5 6 7 8 9 10 11
Never — All of the Time

and this will-

1 2 3 4 5 6 7 8 9 10 11
Help my performance — Debilitate my performance

Appendix 2c: CSAI-2 Intercorrelations

Order 1: MRF-M, CSAI-2, Males (N= 45)

	CAF	CAIP	SAI	SAF	SAIP	SCI	SCF	SCIP
CAI	.75 ***	.04	.67 ***	.47 **	-.20	-.30 *	-.05	.41 *
CAF		.13	.51 ***	.73 ***	-.19	-.30 *	.10	-.09
CAIP			.12	.09	.56 ***	.40 **	.35 *	.41 **
SAI				.65 ***	.07	-.51 ***	-.14	-.35 *
SAF					-.03	-.40 **	.02	-.35 *
SAIP						.25	-.05	.18
SCI							.54 **	-.39 **
SCF								.58 ***

Order 2: CSAI-2, MRF, Males (N=61)

	CAF	CAIP	SAI	SAF	SAIP	SCI	SCF	SCIP
CAI	.54 ***	-.07	.63 ***	.32 *	-.24	-.52 ***	-.37 **	-.33 *
CAF		-.05	.46 ***	.76 ***	-.16	-.40 **	-.09	-.27 *
CAIP			-.08	-.08	.48 ***	.26 *	.31 *	.46 ***
SAI				.57 ***	-.22	-.49 ***	-.10	-.15
SAF					-.06	-.19	.09	-.07
SAIP						.44 ***	.53 ***	.55 ***
SCI							.55 **	60 ***
SCF								.68 ***

Order 1: MRF-M, CSAI-2, Females (N= 42)

	CAF	CAIP	SAI	SAF	SAIP	SCI	SCF	SCIP
CAI	.73 ***	-.42 **	.53 ***	.39 *	-.28	-.41 **	-.19	-.37 *
CAF		-.10	.34 *	.65 ***	.02	-.20	.12	-.12
CAIP			-.22	.07	.61 ***	.31 *	.19	.49 **
SAI				.64 ***	-.46 **	-.62 ***	-.38 *	-.53 ***
SAF					-.19	-.33 *	.06	-.19
SAIP						.31 *	.25	.59 ***
SCI							.52 **	.73 ***
SCF								.53 **

Order 2: CSAI-2, MRF, Females (N=65)

	CAF	CAIP	SAI	SAF	SAIP	SCI	SCF	SCIP
CAI	.83 ***	-.57 ***	.64 ***	.45 ***	-.41 **	-.46 ***	-.05	-.50 ***
CAF		-.44 ***	.57 ***	.72 ***	-.28 *	-.43 ***	.00	-.37 **
CAIP			-.28 *	-.09	.74 ***	.40 **	.26 *	.62 ***
SAI				.68 ***	-.19	-.43 ***	.05	-.38 **
SAF					.07	-.21	.29 *	-.14
SAIP						.28 *	.26 *	.56 ***
SCI							.58 ***	66 ***
SCF								.38 **

Order 1: MRF-B, CSAI-2, Males (N= 32)

	CAF	CAIP	SAI	SAF	SAIP	SCI	SCF	SCIP
CAI	.76 ***	-.19	.56 ***	.36 *	-.34	-.37 *	-.23	-.17
CAF		-.18	.50 **	.70 ***	-.09	-.19	-.09	.11
CAIP			-.18	.29	.72 ***	.52 **	.29	.50 **
SAI				.53 **	-.18	-.45 **	-.21	-.10
SAF					-.27	.05	.23	.37 *
SAIP						.52 **	.42 *	.62 ***
SCI							.66 ***	.47 **
SCF								.65 ***

Order 2: CSAI-2, MRF, Males (N=36)

	CAF	CAIP	SAI	SAF	SAIP	SCI	SCF	SCIP
CAI	.81 ***	.05	.51 ***	.55 ***	-.15	-.38 *	-.22	-.25
CAF		.14	.50 **	.74 ***	-.15	-.41 *	-.21	-.28
CAIP			-.20	-.03	.33 *	.10	.12	.22
SAI				.57 ***	-.48 **	-.39 *	-.44 **	-.43 **
SAF					-.15	-.32	-.20	-.26
SAIP						.28	.40 *	.58 ***
SCI							.85 ***	81 ***
SCF								.82 ***

Order 1: MRF-B, CSAI-2, Females (N= 25)

	CAF	CAIP	SAI	SAF	SAIP	SCI	SCF	SCIP
CAI	.77 ***	-.11	.53 ***	.29	-.36	-.04	-.20	-.13
CAF		-.13	.10	.15	-.37	.11	-.12	-.08
CAIP			.11	.34	.77 ***	.36	.33	.25
SAI				.29	-.07	-.62 ***	-.39	-.19
SAF					-.14	-.08	-.15	-.15
SAIP						.48 *	.51 **	.45
SCI							.80 ***	.70 ***
SCF								.84 ***

Order 2: CSAI-2, MRF-B, Females (N=27)

	CAF	CAIP	SAI	SAF	SAIP	SCI	SCF	SCIP
CAI	.84 ***	-.27	.69 ***	.70***	-.20	-.51 **	-.22	-.37
CAF		-.37	.58 **	.76 ***	-.20	-.44 *	-.17	-.45 *
CAIP			-.12	-.39 *	.56 **	.34	.03	.56 **
SAI				.77 ***	.14	-.49 **	-.24	-.39 *
SAF					-.16	-.45 *	-.11	-.14
SAIP						.28 *	.26 *	.56 ***
SCI							.58 ***	66 ***
SCF								.38 **

Appendix 3a: Ego-threatening instructions

COMPETITION

The Avery-Richardson Tennis Service Test

One characteristic of a good tennis player is an ability to serve accurately and consistently. Research has shown that the top tennis players in the world score highest on the service test that you are about to perform. Your scores will be compared with both those published for players in the top 100 and also scores published for players in your age group in this country. Whilst you are not expected to compare very favourably with the top players, many of you should score very well and certainly achieve a high ranking when compared with other players of your age.

There will be a first prize of £20 for the player achieving scores at least of above their goals in this section. Other prizes can also be won in this section, for those who perform close to or above their goals. All of your scores will be published and posted at Caernarfon tennis centre and will be distributed to other centres for comparison with players results there.
All the players taking part from this tennis centre will be videoed and a coaching assessment given to each player. Your serve (from the video) may be selected for use in coaching videos for both players and tennis coaches.

This test involves you serving 10 sets of 4 balls into the service court in this order:
1. 1 trial to the left half of the right service court
2. 1 trial to the right half of the right service court
3. 1 trial to the left half of the left service court
4. 1 trial to the right half of the left service court

Your performance will be **scored** using the following point system:
i) placement (location of the 1st bounce) designated service court = **1**
designated half = **2**
ii) speed and spin (location of 2nd bounce). **1** to **4** (see fig 1)

If the ball does not land in the designated area it is a fault and the server has a second attempt, and if this lands in the appropriate service area, it is scored as above. If this attempt does not land in the appropriate area, it is equivalent to a double fault and a zero is recorded for that trial. Foot faults are counted as faults and all lets are repeated.

The maximum points which can be achieved are **24** (4 trials X 6 points; 2 for placement and 4 for speed and spin).

Appendix 4a: Interview Guide

RETROSPECTIVE INTERVIEW:

ELITE ATHLETES, 1995

Participant #: ______ Name: ________________________

Date: ____________

Part I: Time began: ______ Time ended: ______ Length: ______

Date: ____________

Part II: Time began: ______ Time ended: ______ Length: ______

Tara Edwards, Dan Gould & Lew Hardy

September, 1995

I. Introduction

Hello, I'm Tara Edwards, from the University of Wales, Bangor, and am currently on an exchange for the fall semester, to the University of North Carolina, Greensboro. Thanks for agreeing to be interviewed.

The purpose of conducting this study is that we want to learn more about why athletes experience sudden and large decrements in performance. We are therefore trying to gain a better understanding of the whole experience of thoughts, feelings and emotions which lead up to, occur during and occur after a sudden and large decrement in performance. Additionally, we are interested in coping strategies used following a large drop in performance. By getting a clearer picture about what is going on, we hope that we will be able to teach athletes to be aware of all these things, in order to prevent it happening in the future; and in the event that they do experience further dramatic decrements in performance, teach them skills to be able to cope with it.

The information from this project will be used in two ways. It will be presented at international sport science conferences, in addition to being published in scientific journals so that other sport psychologists can benefit from the information.

I want to emphasise that your interview information will remain completely **confidential**. In the presentation of results, we will be focusing on group data. We may want to use selected quotes from the interview in order to illustrate important ideas. These will be strictly anonymous, and we will ensure that your identity is protected. We are using a video recorder to get complete and accurate information, and to speed up the interview process.

As a participant in this project you have several very definite rights. First, your participation in this interview is entirely voluntary, and you are free to refuse to answer any question at any time, or stop the interview at any point. There are no right or wrong answers to the questions that I will be asking. We want to learn from you and benefit from your experience and expertise so that we can better understand the causes of sudden and large decrements in performance, and thus be in a better position to help future athletes in your sport. We hope, therefore, that you will answer our questions in a candid and straightforward way. If there are any questions you do not feel comfortable answering we would rather you declined to comment than gave a socially desirable response. So if you would prefer to not answer a question, simply state "no comment", and no further question related to that topic will be asked.

If you have any questions as we go along please do not hesitate to ask them. Ask for clarification if at any time you do not understand what I am asking. Do you have any questions now about what I have discussed so far? Okay, then let's get started.

During today's session I am going to ask you some background information on your involvement and achievements in your sport. Then I will ask you to recall an event/match when you experienced a sudden and large decrement in your performance.
Today's session will also consist of you completing three very similar questionnaires in reference to three different performances.

Throughout the interview it is important for you to keep in mind that we are interested in your very specific experiences, before, during and after you sudden performance drop. Take your time to recall; pauses are fine. If you still can not remember after thinking back, then let me know, but please don't guess.

I. Demographics

First let me ask you a few questions about your involvement in your sport.

1. Sport? ____________________
2. How many years had you been playing this sport at the time of this catastrophe?

    ____

3. How long had you been competing in this sport at the time of this catastrophe?

    ____

4. What had been your greatest achievement?

    ____

5. What level were you playing at?

    ____

6. When (in terms of time and competition) did you experience the most sudden and large drop in your performance?

    ____

    ____

II. I am now going to ask you to complete two questionnaires.

1. The first one you complete will refer to how you felt immediately prior to a performance that you would view as typical, that is not a great game (event), but not a poor one either. So, can you try to recall a recent event where you had a normal performance, where you had an average game.
2. Now, I want you to complete a questionnaire which asks you to report on how you felt immediately prior to a peak performance where everything came together and you achieved a personal best.

III. General questions: I'm just going to tell you briefly what a catastrophe is, so that we are on the same page.

I want you to recall an event where you experienced a sudden and large decrement in your performance. It should be a performance you had which was a lot worse than you normally have, and which does not happen very often. More specifically, it is when you were playing normally, and then you suddenly began to play really badly, so you felt a very noticeable drop in your performance, like a crash, like the bottom fell out of your performance. This is what we call a catastrophic performance. Take your time to recall everything you can about it.

7. Can you just tell me when the catastrophe was, exactly at what point it all fell apart?
8. What do you remember about your large, sudden drop in performance?
9. Can you describe what happened to you during the lead up to this performance drop?

Finally, I would like you to complete the third questionnaire in terms of how you felt immediately prior to this event.

The last interview will ask you slightly more specific questions about this event. Thank-you for your comments and your time.

Session II.

Today I will give you a brief summary of what was discussed in the first session, and then we will begin the second part of the interview. Today's interview contains a few parts. The first part of the interview today will ask you more specifically about the main factors which you felt were the important contributors to this sudden drop in your performance. The next set of questions will focus on how you coped or did not cope with the drop in performance. The final set of questions will ask you if you experience these often, or if they occur on a smaller scale.

Throughout the interview it is important for you to keep in mind that we are interested in your very specific experiences, before, during and after you sudden performance drop. Take your time to recall; pauses are fine. If you still can not remember after thinking back, then let me know, but please don't guess.

Before I ask you these questions, I would just like to clarify some of the points that you made in the first meeting.

...

Do you have any additional thoughts or comments which you think are important to raise at this time?

IV. Now, I want to ask you some really specific questions about this experience. I want you to ask these questions in terms of how you felt before your sudden drop in performance.

(these are essentially probes, which I will use to pick up on their responses in the general questions). Some of these things you may have mentioned before, but I will ask you anyway, so that I get a very clear picture of your experience.

What thoughts did you have?

    e.g. concerns about performing well, about

    concentration, not choking, performing poorly, self-doubts

Were these thoughts normal, more or less than normal?

Were these thoughts occurring more/same/less than normal?

How were you feeling?

e.g. Butterflies in stomach, clammy hands, tight/loose,

    relaxed/tense, nervous, funny feelings in your stomach, heart racing

Were these feelings normal, more or less than normal?

Were these feelings occurring more/same/less than normal?

What caused you to feel like this?

What were you aware of?

What were the sources of your worry or concerns?

What were you aware of?

How confident were you feeling? More/less than normal?

Would these feelings and thoughts influence your performance?

If so, would they influence your performance positively or negatively?

And, is it a combination of these things, or does one thing have the greatest influence?

What event were you playing in, i.e. did you have a tough or weak opponent?

    Did you expect it to be a demanding match/event?

    Did you feel that you had a realistic chance of winning?

    How important was the match to you?

How much effort were you putting in (mental and physical); how would you rate this on a scale of 1-10 in relation to how much you normally put in?

Was this enough given the situation and the demands of the match.

How motivated were you? on a scale of 1-10, in relation to how much you normally put in

How hard were you concentrating, on a scale of 1-10, in relation to how much you normally put in?

Okay, so remember we are concerned with how you felt immediately prior to this big drop in your performance.

What were your objectives/goals for the match?

What did you feel was your chance of success at this goal/ successful outcome?

How in control of competition/match situation did you feel?

How in control of your emotions did you feel?

How in control of your performance did you feel?

How did you interpret this level of control - (emotions and match)

Were these feelings normal? If not, in what ways did they differ?

Were you experiencing any other thoughts, feelings or emotions that we haven't mentioned?

V. I'm now going to ask you some questions about the drop in performance and what that was like.

How sudden was your drop in performance?

How large was the drop in your performance?

Did this drop in performance influence your thoughts?

What were you thinking about now?

e.g. your concerns about performing well, about concentration, not choking, performing poorly, self-doubts

Were these thoughts normal, more or less than before the drop?

Were these thoughts occurring more/same/less before the drop?

What were your feelings like now?

e.g. Butterflies in stomach, clammy hands, tight/loose, relaxed/tense, nervous, funny feelings in your stomach, Heart racing

Were these feelings normal, more or less than before the drop?

Were these feelings occurring more/same/less than before the drop?

How confident were you feeling? More/less than before the drop?

Would these feelings and thoughts influence your performance?

If so, would they influence your performance positively or negatively?

And, is it a combination of these things, or does one thing have the greatest influence?

Did this drop in performance influence your feelings towards the match, specifically:

Did your expectations of winning change?

Did you notice a change in the amount of effort you were putting in? scale 1-10 in terms of your normal amount of effort?

Did you notice a change in your level of motivation? scale 1-10 in terms of your normal level?

Did you notice a change in your concentration? scale 1-10 in terms of your normal level?

Did you focus change?

Did this drop in performance influence your feelings towards the match, in terms of your:

What did you feel was your chance of success at your goal/ successful outcome now?

How in control of environment/match situation did you feel?

How in control of your emotions did you feel?

How in control of your performance did you feel?

How did you interpret this level of control - (emotions and match)

Were you experiencing any other thoughts, feelings or emotions that we haven't mentioned?

VI. The last set of questions are about what happened after you experienced this drop in performance.

Did you see your performance and the situation as controllable or uncontrollable?

Did you use any strategies to try and regain your normal level of performance?

What did you do to try and overcome this big drop in performance?

What happened to your performance as a result of this strategy to cope?

How did this affect your thoughts?

Did you feel satisfied with your attempt to try and regain your performance?

Was the strategy effective?

Have you used this strategy before?

Is this how you normally cope?

How long did it take to recover?

VII. And finally,

Have you experienced these large, sudden drops in performance before?

If so, how often do you experience them?

Have you experienced drops on a smaller scale?

Is the experience similar?

Do they occur for the same or different reasons?

Appendix 4b: Deductive Model and Theory Examination for all Participants

Deductive model and theory examination: Subject 1: Basketball

CATASTROPHE MODEL	Yes	No	May be
i. were PA and CA high?	PA	CA	✔
ii. did CA enhance performance at any stage during the performance?		✔	
iii. did PA influence performance?	✔		
iv. was there a significant difference in performance prior to and following the catastrophic drop?	✔		
v. did the athlete regain the upper performance level?		✔	
vi. if the athlete regained performance was this due to a reduction in physiological arousal and/or cognitive anxiety?			NA

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
____	____	___✔__

BUTTERFLY CATASTROPHE MODEL (as above but also including these:)	Yes	No	May be
i. were confidence levels different prior to and following the catastrophic drop?	✔		
ii. were feelings of control (of self or environment) different prior to and following the catastrophic drop?	✔		
iii. did the athlete regain an intermediate/upper level of performance?		✔	
iv. if performance was regained was it due to an increase/ maintenance of self-control?			NA

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
____	____	___✔__

PROCESSING EFFICIENCY THEORY	Yes	No	May be
i. was the subjective probability of success different before and after the drop in performance?	✔		
ii. was the effort expended different before and after the performance drop?	✔		
iii. was the motivation different before and after the performance drop?	✔		
iv. did the subjective probability of success influence the amount of effort put in?			✔

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
____	____	___✔__

CONTROL PROCESS MODEL			Yes	No	May be
i. was there a noticeable difference in the athlete's perception of control in their ability to cope with the event and of attaining their goal, from before the drop in their performance to once the drop had started?			✔		
PROVIDES SUPPORT _✔_	DOES NOT PROVIDE SUPPORT ___	PROVIDES SOME SUPPORT ___			
CONSCIOUS CONTROL HYPOTHESIS			Yes	No	May be
i. did the athlete lapse into conscious processing prior to the drop in performance?			✔		
PROVIDES SUPPORT _✔_	DOES NOT PROVIDE SUPPORT ___	PROVIDES SOME SUPPORT ___			

Deductive model and theory examination: Subject 2: Powerlifter

CATASTROPHE MODEL			Yes	No	May be
i. were PA and CA high?			✔		
ii. did CA enhance performance at any stage during the performance?				✔	
iii. did PA influence performance?			✔		
iv. was there a significant difference in performance prior to and following the catastrophic drop?			✔		
v. did the athlete regain the upper performance level?				✔	
vi. If the athlete regained performance was this due to a reduction in physiological arousal and/or cognitive anxiety?					NA
PROVIDES SUPPORT ____	DOES NOT PROVIDE SUPPORT ____	PROVIDES SOME SUPPORT __✔__			
BUTTERFLY CATASTROPHE MODEL (as above but also including these:)			Yes	No	May be
i. were confidence levels different prior to and following the catastrophic drop?			✔		
ii. were feelings of control (of self or environment) different prior to and following the catastrophic drop?			✔		
iii. did the athlete regain an intermediate/upper level of performance?				✔	
iv. if performance was regained was it due to an increase/ maintenance of self-control?					NA
PROVIDES SUPPORT ____	DOES NOT PROVIDE SUPPORT ____	PROVIDES SOME SUPPORT __✔__			
PROCESSING EFFICIENCY THEORY			Yes	No	May be
i. was the subjective probability of success different before and after the drop in performance?			✔		
ii. was the effort expended different before and after the performance drop?			✔		
iii. was the motivation different before and after the performance drop?			✔		
iv. did the subjective probability of success influence the amount of effort put in?					✔
PROVIDES SUPPORT ____	DOES NOT PROVIDE SUPPORT ____	PROVIDES SOME SUPPORT __✔__			

CONTROL PROCESS MODEL			Yes	No	May be
i. was there a noticeable difference in the athlete's perception of control in their ability to cope with the event and of attaining their goal, from before the drop in their performance to once the drop had started?			✓		
PROVIDES SUPPORT ___✓__	DOES NOT PROVIDE SUPPORT _____	PROVIDES SOME SUPPORT _____			
CONSCIOUS CONTROL HYPOTHESIS			Yes	No	May be
i. did the athlete lapse into conscious processing prior to the drop in performance?			✓		
PROVIDES SUPPORT ___✓__	DOES NOT PROVIDE SUPPORT _____	PROVIDES SOME SUPPORT _____			

Deductive model and theory examination: Subject 3: Swimmer

CATASTROPHE MODEL	Yes	No	May be
i. were PA and CA high?	✔		
ii. did CA enhance performance at any stage during the performance?	✔		
iii. did PA influence performance?	✔		
iv. was there a significant difference in performance prior to and following the catastrophic drop?	✔		
v. did the athlete regain the upper performance level?		✔	
vi. If the athlete regained performance was this due to a reduction in physiological arousal and/or cognitive anxiety?			NA

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
____	____	__✔__

BUTTERFLY CATASTROPHE MODEL (as above but also including these:)	Yes	No	May be
i. were confidence levels different prior to and following the catastrophic drop?	✔		
ii. were feelings of control (of self or environment) different prior to and following the catastrophic drop?	✔		
iii. did the athlete regain an intermediate/upper level of performance?		✔	
iv. if performance was regained was it due to an increase/ maintenance of self-control?			NA

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
____	____	__✔__

PROCESSING EFFICIENCY THEORY	Yes	No	May be
i. was the subjective probability of success different before and after the drop in performance?	✔		
ii. was the effort expended different before and after the performance drop?	✔		
iii. was the motivation different before and after the performance drop?	✔		
iv. did the subjective probability of success influence the amount of effort put in?			✔

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
____	____	__✔__

CONTROL PROCESS MODEL	Yes	No	May be
i. was there a noticeable difference in the athlete's perception of control in their ability to cope with the event and of attaining their goal, from before the drop in their performance to once the drop had started?	✔		

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
___✔__	_____	_____

CONSCIOUS CONTROL HYPOTHESIS	Yes	No	May be
i. did the athlete lapse into conscious processing prior to the drop in performance?	✔		

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
_____✔	_____	_____

Deductive model and theory examination: Subject 4: Canoe Slalom

CATASTROPHE MODEL	Yes	No	May be
i. were PA and CA high?	✔		
ii. did CA enhance performance at any stage during the performance?		✔	
iii. did PA influence performance?			?
iv. was there a significant difference in performance prior to and following the catastrophic drop?	✔		
v. did the athlete regain the upper performance level?		✔	
vi. If the athlete regained performance was this due to a reduction in physiological arousal and/or cognitive anxiety?			NA

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
____	____	__✔__

BUTTERFLY CATASTROPHE MODEL (as above but also including these:)	Yes	No	May be
i. were confidence levels different prior to and following the catastrophic drop?	✔		
ii. were feelings of control (of self or environment) different prior to and following the catastrophic drop?	✔		
iii. did the athlete regain an intermediate/upper level of performance?		✔	
iv. if performance was regained was it due to an increase/ maintenance of self-control?			NA

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
____	____	__✔__

PROCESSING EFFICIENCY THEORY	Yes	No	May be
i. was the subjective probability of success different before and after the drop in performance?	✔		
ii. was the effort expended different before and after the performance drop?	✔		
iii. was the motivation different before and after the performance drop?	✔		
iv. did the subjective probability of success influence the amount of effort put in?			✔

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
__✔__	____	____

CONTROL PROCESS MODEL			Yes	No	May be
i. was there a noticeable difference in the athlete's perception of control in their ability to cope with the event and of attaining their goal, from before the drop in their performance to once the drop had started?			✔		
PROVIDES SUPPORT __✔__	DOES NOT PROVIDE SUPPORT ____	PROVIDES SOME SUPPORT ____			
CONSCIOUS CONTROL HYPOTHESIS			Yes	No	May be
i. did the athlete lapse into conscious processing prior to the drop in performance?			✔		
PROVIDES SUPPORT __✔__	DOES NOT PROVIDE SUPPORT ____	PROVIDES SOME SUPPORT ____			

Deductive model and theory examination: Subject 5: Canoe Slalom

CATASTROPHE MODEL			Yes	No	May be
i. were PA and CA high?			✔		
ii. did CA enhance performance at any stage during the performance?			✔		
iii. did PA influence performance?					✔
iv. was there a significant difference in performance prior to and following the catastrophic drop?			✔		
v. did the athlete regain the upper performance level?				✔	
vi. If the athlete regained performance was this due to a reduction in physiological arousal and/or cognitive anxiety?					NA
PROVIDES SUPPORT ____	DOES NOT PROVIDE SUPPORT ____	PROVIDES SOME SUPPORT __✔__			
BUTTERFLY CATASTROPHE MODEL (as above but also including these:)			Yes	No	May be
i. were confidence levels different prior to and following the catastrophic drop?			✔		
ii. were feelings of control (of self or environment) different prior to and following the catastrophic drop?			✔		
iii. did the athlete regain an intermediate/upper level of performance?				✔	
iv. if performance was regained was it due to an increase/ maintenance of self-control?					NA
PROVIDES SUPPORT ____	DOES NOT PROVIDE SUPPORT ____	PROVIDES SOME SUPPORT __✔__			
PROCESSING EFFICIENCY THEORY			Yes	No	May be
i. was the subjective probability of success different before and after the drop in performance?			✔		
ii. was the effort expended different before and after the performance drop?			✔		
iii. was the motivation different before and after the performance drop?			✔		
iv. did the subjective probability of success influence the amount of effort put in?					✔
PROVIDES SUPPORT ____	DOES NOT PROVIDE SUPPORT ____	PROVIDES SOME SUPPORT __✔__			

CONTROL PROCESS MODEL		Yes	No	Maybe
i. was there a noticeable difference in the athlete's perception of control in their ability to cope with the event and of attaining their goal, from before the drop in their performance to once the drop had started?		✔		
PROVIDES SUPPORT __✔__	DOES NOT PROVIDE SUPPORT ____	PROVIDES SOME SUPPORT ____		
CONSCIOUS CONTROL HYPOTHESIS		Yes	No	Maybe
i. did the athlete lapse into conscious processing prior to the drop in performance?		✔		
PROVIDES SUPPORT __✔__	DOES NOT PROVIDE SUPPORT ____	PROVIDES SOME SUPPORT ____		

Deductive model and theory examination: Subject 6: Single-handed Sailing

CATASTROPHE MODEL	Yes	No	May be
i. were PA and CA high?	✔		
ii. did CA enhance performance at any stage during the performance?			?
iii. did PA influence performance?	✔		
iv. was there a significant difference in performance prior to and following the catastrophic drop?	✔		
v. did the athlete regain the upper performance level?		✔	
vi. If the athlete regained performance was this due to a reduction in physiological arousal and/or cognitive anxiety?			NA

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
____	____	__✔__

BUTTERFLY CATASTROPHE MODEL (as above but also including these:)	Yes	No	May be
i. were confidence levels different prior to and following the catastrophic drop?	✔		
ii. were feelings of control (of self or environment) different prior to and following the catastrophic drop?	✔		
iii. did the athlete regain an intermediate/upper level of performance?		✔	
iv. if performance was regained was it due to an increase/ maintenance of self-control?			NA

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
____	____	__✔__

PROCESSING EFFICIENCY THEORY	Yes	No	May be
i. was the subjective probability of success different before and after the drop in performance?	✔		
ii. was the effort expended different before and after the performance drop?	✔		
iii. was the motivation different before and after the performance drop?	✔		
iv. did the subjective probability of success influence the amount of effort put in?			✔

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
____	____	__✔__

CONTROL PROCESS MODEL			Yes	No	May be
i. was there a noticeable difference in the athlete's perception of control in their ability to cope with the event and of attaining their goal, from before the drop in their performance to once the drop had started?			✔		
PROVIDES SUPPORT __✔__	DOES NOT PROVIDE SUPPORT _____	PROVIDES SOME SUPPORT _____			
CONSCIOUS CONTROL HYPOTHESIS			Yes	No	May be
i. did the athlete lapse into conscious processing prior to the drop in performance?			✔		
PROVIDES SUPPORT __✔__	DOES NOT PROVIDE SUPPORT _____	PROVIDES SOME SUPPORT _____			

Deductive model and theory examination: Subject 7: Gymnast

CATASTROPHE MODEL	Yes	No	May be
i. were PA and CA high?		✔	
ii. did CA enhance performance at any stage during the performance?	✔		
iii. did PA influence performance?	✔		
iv. was there a significant difference in performance prior to and following the catastrophic drop?	✔		
v. did the athlete regain the upper performance level?		✔	
vi. If the athlete regained performance was this due to a reduction in physiological arousal and/or cognitive anxiety?			NA

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
____	____	__✔__

BUTTERFLY CATASTROPHE MODEL (as above but also including these:)	Yes	No	May be
i. were confidence levels different prior to and following the catastrophic drop?	✔		
ii. were feelings of control (of self or environment) different prior to and following the catastrophic drop?	✔		
iii. did the athlete regain an intermediate/upper level of performance?		✔	
iv. if performance was regained was it due to an increase/ maintenance of self-control?			NA

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
____	____	__✔__

PROCESSING EFFICIENCY THEORY	Yes	No	May be
i. was the subjective probability of success different before and after the drop in performance?	✔		
ii. was the effort expended different before and after the performance drop?	✔		
iii. was the motivation different before and after the performance drop?	✔		
iv. did the subjective probability of success influence the amount of effort put in?			✔

PROVIDES SUPPORT	DOES NOT PROVIDE SUPPORT	PROVIDES SOME SUPPORT
____	____	__✔__

<table>
<tr><td colspan="3">CONTROL PROCESS MODEL</td><td>Yes</td><td>No</td><td>May be</td></tr>
<tr><td colspan="3">i. was there a noticeable difference in the athlete's perception of control in their ability to cope with the event and of attaining their goal, from before the drop in their performance to once the drop had started?</td><td>✔</td><td></td><td></td></tr>
<tr><td>PROVIDES SUPPORT
__✔__</td><td>DOES NOT PROVIDE SUPPORT
_____</td><td colspan="4">PROVIDES SOME SUPPORT
_____</td></tr>
<tr><td colspan="3">CONSCIOUS CONTROL HYPOTHESIS</td><td>Yes</td><td>No</td><td>May be</td></tr>
<tr><td colspan="3">i. did the athlete lapse into conscious processing prior to the drop in performance?</td><td>✔</td><td></td><td></td></tr>
<tr><td>PROVIDES SUPPORT
__✔__</td><td>DOES NOT PROVIDE SUPPORT
_____</td><td colspan="4">PROVIDES SOME SUPPORT
_____</td></tr>
</table>

Deductive model and theory examination: Subject 8: Gymnast

CATASTROPHE MODEL			Yes	No	May be
i. were PA and CA high?			✔		
ii. did CA enhance performance at any stage during the performance?			✔		
iii. did PA influence performance?			✔		
iv. was there a significant difference in performance prior to and following the catastrophic drop?			✔		
v. did the athlete regain the upper performance level?			✔		
vi. If the athlete regained performance was this due to a reduction in physiological arousal and/or cognitive anxiety?				✔	
PROVIDES SUPPORT ___✔___	DOES NOT PROVIDE SUPPORT _____	PROVIDES SOME SUPPORT _____			
BUTTERFLY CATASTROPHE MODEL (as above but also including these:)			Yes	No	May be
i. were confidence levels different prior to and following the catastrophic drop?				✔	
ii. were feelings of control (of self or environment) different prior to and following the catastrophic drop?			✔		
iii. did the athlete regain an intermediate/upper level of performance?			✔		
iv. if performance was regained was it due to an increase/ maintenance of self-control?					✔
PROVIDES SUPPORT _____	DOES NOT PROVIDE SUPPORT _____	PROVIDES SOME SUPPORT ___✔___			
PROCESSING EFFICIENCY THEORY			Yes	No	May be
i. was the subjective probability of success different before and after the drop in performance?			✔		
ii. was the effort expended different before and after the performance drop?			✔		
iii. was the motivation different before and after the performance drop?			✔		
iv. did the subjective probability of success influence the amount of effort put in?					✔
PROVIDES SUPPORT _____	DOES NOT PROVIDE SUPPORT _____	PROVIDES SOME SUPPORT ___✔___			

<table>
<tr><td colspan="3">CONTROL PROCESS MODEL</td><td>Yes</td><td>No</td><td>May be</td></tr>
<tr><td colspan="3">i. was there a noticeable difference in the athlete's perception of control in their ability to cope with the event and of attaining their goal, from before the drop in their performance to once the drop had started?</td><td></td><td>✓</td><td></td></tr>
<tr><td>PROVIDES SUPPORT
_____</td><td>DOES NOT PROVIDE SUPPORT
__✓__</td><td colspan="4">PROVIDES SOME SUPPORT
_____</td></tr>
<tr><td colspan="3">CONSCIOUS CONTROL HYPOTHESIS</td><td>Yes</td><td>No</td><td>May be</td></tr>
<tr><td colspan="3">i. did the athlete lapse into conscious processing prior to the drop in performance?</td><td></td><td>✓</td><td></td></tr>
<tr><td>PROVIDES SUPPORT
_____</td><td>DOES NOT PROVIDE SUPPORT
__✓__</td><td colspan="4">PROVIDES SOME SUPPORT
_____</td></tr>
</table>