Anxiety, self-confidence, self-efficacy and performance: some challenges to current thinking.

Ph.D. Thesis

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Declaration

This work has not been previously accepted in substance for any degree and is not being currently submitted in candidature for any degree.

Signed ........................................... (Candidate)
Date ..............................................

Statement 1

This thesis is the result of my own investigations, except where otherwise stated. Other sources are explicitly acknowledged in the references.

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Statement 2

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Acknowledgements

Well...where do I start? I find myself sitting here in my office with a 2 year lecture position in a world renowned sport science department finalising my PhD submission. Who’d have thought! There are of course, many people whom I’d like to thank for their help and support throughout the past 6 years. Firstly thanks to my family for continued love and support. Special thanks must go to my sister and my father for always being there. Knowing that you are both constantly close by has helped enormously.

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love and dearly miss you both.
Summary

The thesis critically reviews the relationships between anxiety and sports performance, self-confidence and sports performance, and self-efficacy with progress towards life goals. Limitations to previous research are highlighted and alternative theoretical explanations are offered. In subsequent empirical chapters these alternative explanations are tested. The first chapter provides a critical overview of the research area. Limitations are highlighted, and alternative theoretical explanations are presented. Chapter 2 explores the anxiety-performance relationship and provides two empirical studies that suggest that previous findings on the cusp-catastrophe model of anxiety and performance may have been due to a complex interaction between cognitive anxiety and effort required rather than between cognitive anxiety and physiological arousal. Results from both studies provide evidence to support a cognitive explanation for the effects of anxiety upon performance.

Chapter 3 explores the relationship between self-confidence and performance and addresses the issue that previous research has only considered actual self-confidence (e.g. confidence levels measured within an hour of performance) and has generally ignored the nature of “self” e.g., the “ideal”, “ought” and “feared” self-confidence levels that may be used by performers as reference points. Results revealed that discrepancies from these ‘selves’ significantly predicated 11% performance variance over and above “actual” measures of self-confidence.

Chapter 4 explores limitations in previous research into the effects of self-efficacy on goal progress; namely that this research has tended to focus only upon approach goals. However, research suggests that both goal importance and goal polarity (i.e. approach and avoidance goals) may moderate the effects of self-efficacy on goal progress. Results revealed (amongst other findings) that self-efficacy was significantly correlated with
progress on important avoidance life goals but not with progress on important approach goals.

The final chapter provides a general discussion of the thesis findings, suggestions for future research and applied implications.
Chapter 1

INTRODUCTION
Introduction

As will become apparent from this introduction, sport psychology research has its roots deeply imbedded in mainstream psychology. It is a little surprising, therefore, that, despite these deep roots, sport psychology research has often ignored developments in mainstream psychology. Reasons for this are a little unclear. However, recent review articles by Walker, Kremer, and Moran (2006) and Hardy (2006) have at least highlighted the issue. According to Walker et al. (2006) some sport psychology researchers take the view that sport psychology and mainstream psychology should remain separate entities and that “striking up good relations with mainstream psychology is not what sport psychology should be about” (p. 30). Hardy (2006) equally acknowledges the problem that sport psychologists have largely ignored research in mainstream psychology and vice versa. However, findings in the present thesis show that by amalgamating theories from both disciplines can be rather profitable.

The present work covers three-areas which are bound by a link through self-confidence, self-efficacy, processing efficiency theory, self-discrepancy theory, goal importance and performance. In order to understand the research questions being presented and the common links between them, it is necessary to start the introduction with an overview to some of the ‘traditional’ approaches to stress and performance. The thesis then highlights some of the contradictory findings and limitations revealed in sport psychology research, and propose theories from mainstream psychology that could help further the understanding of such relationships.
Anxiety and performance

Multidimensional Anxiety Theory

Although the measurement of multidimensional anxiety in sport is not necessarily new (e.g. Hardy & Whitehead, 1984; Martens, Burton, Rivkin, & Simon, 1980) the antecedents of multidimensional anxiety can be traced back to theories in mainstream psychology. For example, Spielberger (1966) first distinguished two components of anxiety namely, state and trait anxiety. Spielberger defined state anxiety as “subjective, consciously perceived feelings of tension and apprehension, associated with... arousal of the autonomic nervous system” (p. 17). State anxiety was characterised to be situationally relevant, in that it is the individual’s response to a particular threatening situation. However, trait anxiety was characterised as a general disposition to respond to relatively unthreatening situations with a disproportionately high level of state anxiety. Spielberger (1985) suggested that trait anxiety was a personality characteristic reflecting individual susceptibility to state anxiety. Therefore, some individuals may be more susceptible to state anxiety than others.

Research has shown strong support for the state-trait distinction. Eysenck (1992) stated that one major function of anxiety is that it “serves to facilitate the rapid detection of signs of impending danger, and is especially valuable in potentially threatening environments” (p. 42). Although this process has some obvious advantages, some individuals (i.e. those with high trait anxiety) can become hypervigilant to threatening stimuli in the environment thereby becoming prone to anxiety symptoms. Macleod and Mathews (1988) found that the attentional bias towards threat is an interactive function of trait and state anxiety. In other words, individuals who are high in trait anxiety are more prone to pick out and selectively attend to threatening stimuli in the environment especially with increasing levels of state cognitive anxiety. With this in mind, cognitive psychology researchers have investigated the varying effects that state anxiety has on a number of tasks and conditions and found...
that comparing individuals who are high and low in trait anxiety a profitable research strategy (e.g. Broadbent & Broadbent, 1988; Byrne & Eysenck, 1995; Eysenck & Byrne, 1992; Fox, 1993; MacLeod & Mathews, 1988; Mogg, Bradley, & Hallowell, 1994; Mogg, Mathews, Bird, & Macgregor-Morris, 1990).

Liebert and Morris (1967) were the first researchers to conceptualized state anxiety as two separable components, namely worry and emotionality. Worry was defined as the “cognitive elements of anxiety experience, such as negative expectations and cognitive concerns about oneself, the situation at hand, and potential consequences” whereas emotionality was defined as “one’s perception of the physiological-affective elements of the anxiety experience, that is indications of autonomic arousal and unpleasant feeling states such as nervousness and tension” (Morris, Davis, & Hutchings, 1981, p. 541). These two anxiety responses were theorized to be conceptually independent in that they were aroused and maintained by different situational conditions (Morris et al., 1981). Morris and Liebert (1973) further demonstrated that threat of electric shock was associated with arousal of emotionality only, and that failure feedback on an intellectual task was associated with arousal of worry only.

Since the development of multidimensional anxiety theories (Davidson & Schwartz, 1976; Lacey, 1967; Liebert & Morris, 1967; Spielberger, 1966) concerns have been raised that since anxiety responses are situationally specific, researchers should use situationally specific measurements (Magnusson & Ekehammar, 1975; Martens, 1977; Spielberger, 1966). Consequently, following this line of reason, researchers in sport psychology developed their own sport specific measurements of multidimensional anxiety (e.g. Martens et al., 1980; Martens, Burton, Vealey, Bump, & Smith, 1990). Martens et al. (1990) multidimensional anxiety theory (MAT) also separates anxiety into two constructs, namely cognitive and somatic anxiety. Martens et al. (1990) used Morris et al’s, (1981)
definitions of worry when defining cognitive anxiety. Morris et al. termed worry as “negative expectations and cognitive concerns about oneself, the situation at hand, and potential consequences” and emotionality as “one’s perception of the physiological-affective elements of the anxiety experience, that is, indications of autonomic arousal and unpleasant feeling states such as nervousness and tension” (p. 541). The hypothesised effects of worry were largely derived from Wines’ (1971) Distraction Theory, which proposed that stimuli that create worry draw attention away from the task at hand, thereby impairing performance. Consequently, the first prediction of MAT states that cognitive anxiety will have a negative relationship with performance. Although the theorizing is rather unclear, Martens et al. (1990) conceptualisation of somatic anxiety seems to be derived from Broadhurst’s (1957) and Oxendine’s (1970) extension of the inverted U hypothesis (Yerkes & Dodson, 1908). The inverted U hypothesis predicts that as arousal increases performance will simultaneously increase up to some point, after which further increases in arousal will have a detrimental effect upon performance (possibly due to muscular tension interfering with motor tasks; Weinberg 1978). Consequently, the second prediction of MAT is that somatic anxiety will have an inverted-U shape relationship with performance. However, the approach of measuring ones awareness of physiological arousal (i.e. somatic anxiety) with regard to performance has been criticised in recent literature. Woodman and Hardy (2001) state that, “measuring a performer’s perception of physiological arousal might not be the most effective manner in which to test for such effects” (p. 295). In other words, if arousal is predicted to directly interfere with performance then measuring ones perception of arousal (somatic anxiety) may not be the most effective measurement to test for such effects (Woodman & Hardy, 2001). One additional weakness of MAT is that it offers no explanation as to why somatic anxiety should have an inverted-U relationship with performance (Woodman & Hardy, 2001).

The final prediction of MAT regards self-confidence. Whilst factor analysing the item pool for the Competitive State Anxiety Inventory -2 (CSAI-2), Martens et al. (1990) found that
cognitive anxiety split into two factors. The first factor was derived from negatively phrased items, and was labelled cognitive anxiety. The second factor was derived from positively phrased “cognitive anxiety” items and was labelled self-confidence. However, as self-confidence emerged as an independent (orthogonal) factor it was erroneously described by Martens et al. as being bipolar with cognitive anxiety. In other words, Martens et al. (1990) stated that “cognitive A-state and self-confidence represent the opposite ends of a cognitive evaluation continuum, state self-confidence being viewed as the absence of cognitive A-state, or conversely, cognitive A-state being the lack of state self-confidence” (p. 129). As yet, no research has supported this claim. Having said all this, the final prediction of multidimensional anxiety theory is that self-confidence will have a positive relationship with performance.

Support for the predictions of multidimensional anxiety theory has been equivocal (Woodman & Hardy, 2001). Although Burton’s (1988) study found support for all three predictions of MAT in swimmers, other studies have been less supportive of its predictions. For example, reviews by Raglin (1992) and Burton (1998) found mixed support for the specific predictions of MAT. Raglin found that 4 out of 8 studies reviewed revealed no support for MAT and 3 studies revealed partial support. Burtons’ review of 16 studies found strong support in 2 studies, moderate support in 6 studies, and weak support in 8 studies.

According to Woodman and Hardy (2001) one of the reasons for the conflicting results may have been due to poor terminology used in the CSAI-2 items. For example, many of the items in the cognitive anxiety scale e.g. “I am concerned about this competition” may be interpreted in two completely different ways. For example, (whilst quoting a study by Barnes, Sime, Dienstbier, & Plake, 1986), Woodman and Hardy comment that, “it could be argued that concern is not necessarily a reflection of worry or cognitive anxiety, but rather
a perception of the importance of the upcoming event” (p. 303). A further reason for the conflicting results may be that a negative affective state may not always have a negative effect upon performance. For example, Hardy and Parfitt (1991) and Hardy, Parfitt, and Pates (1994) found that free shot performance in basketball and crown green bowling performance were significantly higher under conditions of high cognitive anxiety than low cognitive anxiety.

Additionally, conflicting results in CSAI-2 research may be due to it suffering from poor structural validity (Woodman & Hardy, 2001). Two recent studies that have examined the psychometric properties of the CSAI-2 (Lane, Sewell, Terry, Bartram, & Nesti, 1999; Tsorbatzoudis, Varkoukis, Kaissidis-Rodafinos, & Grouios, 1998) have both raised further questions about the factor structure of the instrument on all three subscales. This led Cox, Martens, and Russell (2003) to use confirmatory factor analysis (CFA) to revise the structure of the CSAI-2 in one sample, and then use a second sample to validate the revised structure. The final revised CSAI-2R contains 17 items (7 somatic anxiety items; 5 cognitive anxiety items; 5 self-confidence items) and Cox et al. reported that the revised CSAI-2 revealed a good fit of the data to the model (CFI = .95, NNFI = .94, RMSEA = .054). Cox et al. (2003) further argued that this revised CSAI-2R should replace the original CSAI-2 in future research. Unfortunately, all the data collected utilising the CSAI-2 in the present thesis was conducted prior to Cox et al’s. (2003) validated CSAI-2.

There are two final criticisms of multidimensional anxiety theory that need bringing to attention. First, MAT ignores the interactive effects that cognitive and somatic anxiety may exert on performance. In other words, it attempts to explain a possible three-dimensional relationship between cognitive and somatic anxiety and performance as a series of separate relationships (Hardy, 1990). Second, the self-confidence scale of the CSAI-2 assumes that individuals who score the same confidence levels should feel equally confident. However,
this assumption does not fit well with how individuals’ experiences differ in various psychological situations (Higgins, 1987; Kelly 1955). In other words, the CSAI-2 does not take into account the nature and content of the way individuals construct the viewpoint they have about the world around them. More specifically, confidence and anxiety states that are considered good by one individual may not be considered so good by another (this limitation will be discussed in more detail later in the chapter).

The Cusp-Catastrophe Model of Performance

Hardy (1990) proposed a three-dimensional model of anxiety and performance that attempted to address the contradictory findings regarding the anxiety and performance relationship. According to this model, the interactive effects of cognitive anxiety and physiological arousal on performance could be described in three hypotheses. Firstly, when physiological arousal is low, increasing levels of cognitive anxiety should be associated with an increase in performance. However, when physiological arousal is high, increasing levels of cognitive anxiety should have a detrimental effect upon performance (left and right faces of the model). Second, when cognitive anxiety is low, increasing levels of physiological arousal are predicted to have an inverted-U relationship with performance (see back face of the model). Under conditions of high cognitive anxiety, increasing levels of physiological arousal is predicted to cause a large and significant drop in performance from surface (A) to surface (B). Third, once such a catastrophic drop in performance has occurred, a large and significant decrease in physiological arousal is required before performance would flip back on to the upper surface of the model (see front face of the model). It is worth noting that while conceptualising the model Hardy (1990) used physiological arousal (i.e. heart rate, muscular tension etc) rather than somatic anxiety (the perception of the physiological response) as the asymmetry factor. The reason that physiological arousal was chosen was that it could influence performance both directly through changes in ones activation state (Hockey & Hamilton, 1983; Humphreys &
Revelle, 1984) and indirectly through one's perception of arousal levels. Somatic anxiety, on the other hand, can only exert indirect effects upon performance (due to somatic anxiety simply being the perceptions of one's physiological symptoms).

According to the catastrophe model, under conditions of high cognitive anxiety the path that performance follows when physiological arousal is increasing (1), should be different to the path that performance follows when physiological arousal is decreasing (2). This pattern is termed hysteresis and should occur only under conditions of high cognitive anxiety not low cognitive anxiety (see Figure 1). Support for the hysteresis hypothesis has been shown in the two studies that have directly tested it (Hardy & Parfitt, 1991; Hardy et al., 1994). It has also been argued that it has some explanatory value with the effects of arousal on everyday memory (Deffenbacher, 1994), and social anxiety and performance (Strahan & Conger, 1999).

![Figure 1. The cusp catastrophe model](image)

Although the cusp-catastrophe model of performance might be considered to provide a useful description of what happens to performance under conditions of high anxiety,
according to Hardy et al. (1994) a much more interesting question remains about how such changes come about. Hardy and Parfitt (1991) suggest that one possible theory that could explain performance catastrophes is Eysenck and Calvo’s (1992) processing efficiency theory (PET).

**Processing Efficiency Theory**

According to Hardy and Parfitt (1991), Eysenck and Calvo’s (1992) processing efficiency theory may provide a good explanation of how performance catastrophes occur. There are two main predictions of processing efficiency theory. Firstly, worry or cognitive anxiety is predicted to pre-empt some of the processing and storage resources of the working memory system and as a consequence individuals have a reduced attentional capacity to focus on the task at hand. Baddeley (1986) theorised that working memory consists of three components, a modality-free central executive, a phonological-articulatory loop, and the visuo-spatial sketch pad. According to Baddeley (1986), the central executive is the most important part of working memory, responsible for storage and retrieval from long term memory, planning and decision making, and in situations involving novel tasks. Ashcraft (1994) suggests that the central executive supports such tasks by using resources from a capacity limited central pool. The articulatory loop is used for verbal rehearsal and the transient storage of speech-based input. Finally, the visuo-spatial sketch pad is used for visual memory much in the same way as the articulatory loop is used for verbal memory. These latter two components are sub-systems that work for the central executive and have their own limited pool of resources. However, when these two sub-systems are overloaded they can both drain resources from the pool in the central executive control system thus applying extra strain on working memory (Hopko, Ashcraft, Gute, Ruggiero, & Lewis, 1998). According to processing efficiency theory this is one of the major effects that worry has on task performance, in that, worry pre-empts some of the processing and storage resources (from the central executive component and the phonological loop) of the working
memory system (Eysenck & Calvo, 1992). One consequence of this is that, any adverse
effects of worry on task performance should be greater on tasks which exert large demands
on the capacity of the working memory system (i.e. complex tasks), especially if it is both
the central executive and the phonological loop that are under demand (Derakshan &

The second important prediction of processing efficiency theory is that worry or cognitive
anxiety indicates the importance of the task to the performer. This can lead the anxious
performer to allocate additional processing resources and activities (e.g. effort and
strategies) if they feel that performance is, or may be, sub-standard. According to Eysenck
and Calvo (1992) in this way it is often possible to reduce or eliminate the negative effects
of worry on task performance at the cost of applying additional effort to the task. However,
according to earlier versions of the theory (Eysenck 1982), increased effort will only occur
when performers perceive themselves to have at least a moderate subjective probability of
success; that is to say, when they are at least moderately confident. Thus, according to
Eysenck and Calvo (1992), processing efficiency can be defined as performance
effectiveness divided by effort, and anxiety typically impairs processing efficiency (via on
increased task effort) more than performance effectiveness (task outcome). Processing
efficiency theory has received empirical support from recent studies in main stream
psychology (e.g. Calvo, Eysenck, Ramos, Jiménez, 1994; Derakshan & Eysenck, 1998;
Elliman, Green, Rogers, & Finch, 1997; Hopko et al., 1998; Keogh & French, 1997) and in
the context of sport performance (e.g. Hardy & Hutchinson, in press; Smith, Bellamy,

In their previous tests of the catastrophe model Hardy and Parfitt (1991) and Hardy et al.
(1994) manipulated physiological arousal by means of physical exercise and monitored it by
measuring heart rate. That is, athletes performed under conditions of low and high cognitive
anxiety with their heart rate increasing from maximum – 40 beats per minute, maximum – 30, maximum – 20, maximum – 10, and finally at maximum heart rate. Consequently, it is possible that the physiological arousal recorded in these studies reflected the effort required to perform the task rather than anxiety-induced physiological arousal (Hardy, 1999). As previously mentioned, Hardy and Parfitt (1991) suggested that processing efficiency theory could provide a logical explanation for performance catastrophes (and possibly the previous contradictory findings in the anxiety and performance literature). For example, the cusp catastrophe model predicts that under conditions of high cognitive anxiety (worry), increasing levels of physiological arousal will be accompanied by an increase in performance up to some optimal point. After which, performance is predicted to make a sudden and dramatic drop. Processing efficiency theory makes similar predictions in that as task demands increase individuals who are high in cognitive anxiety can increase effort to compensate for the extra strain placed on their resources. However, this increasing effort will eventually be of no use if task demands increase beyond a certain threshold. Therefore, processing efficiency theory predicts that, individuals high in cognitive anxiety can maintain or even improve performance upon tasks high in difficulty, but only to a certain point. After which the performer is likely to give up as they can no longer perform under such conditions. They would then need to perceive a considerable drop in task demands before they would perceive it worthwhile reinvesting effort in the task. In this way, processing efficiency theory can explain both the sudden decrements in performance and the occurrence of hysteresis predicted by the catastrophe model.

In light of the above discussion, the central question in Chapter 2 examines whether the results of previous tests of performance catastrophes could have been due to a complex interaction between cognitive anxiety and effort required rather than between cognitive anxiety and physiological arousal, and further examines the role that processing efficiency theory could play in such catastrophes.
Self-confidence

In just the same way as the cognitive anxiety and performance literature has shown contradictory findings between the hypothesised relationship, so the self-confidence and performance literature has shown similar contradictions. For example, according to Martens et al. (1990) self-confidence should have a positive linear relationship with performance. However, several studies have found no significant relationship between self-confidence and performance (e.g. Gould, Petlichkoff, & Weinberg, 1984; Maynard & Cotton, 1993; Williams & Krane, 1992) and some have even found a negative linear relationship (e.g. Gould, Petlichkoff, Simons, & Vevera, 1987). Furthermore, Woodman and Hardy’s (2003) meta-analysis of the relationship between self-confidence and sport performance revealed effect sizes from $r = -0.027$ to $r = 0.64$. As mentioned on page 15/16, one further criticism of Martens et al. (1990) CSAI-2 is that it ignores individual perceptions of self-confidence states. In other words, according to the CSAI-2, individuals who report the same self-confidence score (e.g. 24) will feel and perform in similar manners. This assumption does not fit well with reports of how individuals’ affective experiences differ in various psychological situations as a function of their self-concept (Higgins, 1987; Kelly 1955). For example, two athletes may report similar levels of self-confidence to perform a similar task, but their personal viewpoint of how they have prepared for that task or whether they perceive that they have the required resources to meet task demands, may be entirely different. In its present form however, the CSAI-2 cannot account for such individual differences.

Self-discrepancy Theory

Self-discrepancy theory (Higgins, 1987) predicts that certain emotions will occur due to large discrepancies between pairs of psychological entities named self-guides. Higgins (1987) states that there are three domains to the self: (a) the actual self; (b) the ideal self; and (c) the ought self. The actual self is described as your representation of the attributes
that you believe you actually possess. The ideal self is described as the representation of the attributes that one would ideally like to possess. The ought self is described as the representation of the attributes that one believes one should or ought to possess. Higgins (1987) also suggested that there are two standpoints to the self; one's own standpoint and that of significant others. Therefore, self-discrepancy theory incorporates four standpoints of the self i.e. actual/own versus ideal/own; actual/own versus ideal/other; actual/own versus ought/own; and actual/own versus ought/other. Higgins (1987) further states that “Just as your emotional response to your performance is not determined by the properties of the performance per se, but by its significance or meaning to you self-discrepancy theory assumes that the motivational or emotional effects of your actual/own attributes, or self-concept, are determined by the significance to you of possessing such attributes” (p. 322). In other words the affect that one experiences will depend on which self-guide is most salient at that time.

Higgins (1987) specifically hypothesises that when a discrepancy occurs between the actual self and an ideal self in relation to one's own standpoint, then the discrepancy is seen as absence of positive outcomes. When this discrepancy occurs, it is hypothesised to be related to dejection related emotions such as disappointment and dissatisfaction due to individuals believing that their personal hopes or wishes have, as yet, been unfulfilled. When a discrepancy occurs between the actual self and an ideal self in relation to some others standpoint, then the discrepancy is predicted to be related to dejection related emotions such as shame, embarrassment, or feeling downcast. This is due to individuals believing that they have lost standing or esteem in the opinion of significant others. When a discrepancy occurs between the actual self and an ought self in relation to one's own standpoint, then this type of discrepancy is predicted to lead to agitation related emotions such as guilt, self-contempt, uneasiness and anxiety. This is due to the ought self being driven by obligations and with this discrepancy, the presence of negative outcomes are
salient (i.e. expectation of punishment). Finally, when an individual has a discrepancy
between the actual self and the ought self in relation to some other’s standpoint, according
to Higgins (1987) the discrepancy again represents the presence of negative outcomes and
as such, are predicted to be related to anxiety and tension. This is due to fear of
punishments or sanctions from significant others.

Markus and Nurius’ (1986) work also incorporates the role of possible selves, but further
distinguishes the role of the feared self. Whilst testing the predictions of self-discrepancy
theory, Carver, Lawrence, and Scheier (1999) further incorporated the role of the feared
description of the feared self defined as “a set of qualities the person wants not to become
but is concerned about possibly becoming” (p. 785). According to Carver et al. (1999)
ideal selves seem to require only approach goals (discrepancy reduction), however, ought
selves seem to have a dual purpose in that they are underlined by both approach motives
(discrepancy reduction), and by the motivation to avoid an anti-self i.e. a feared self
(discrepancy enlargement). Carver et al. (1999) found some support for self-discrepancy
theory in that, anxiety and guilt were strongly related to actual/feared discrepancies when
individuals were close to the feared self and in such cases discrepancies from the
actual/ought self played no role. However, when the feared self was more remote, anxiety
and guilt were strongly related to actual/ought discrepancies.

Although self-confidence is usually measured using self-report questionnaires (e.g. CSAI-
2) it does seem strange that so far the nature of the self has been ignored. For example, take
two athletes who report similar perceptions of self-confidence on Martens et al. (1990)
CSAI-2 e.g. they both score 24 out of a possible 36. According to Martens et al. both will
be feeling the same perception of self-confidence and hence, perform in a similar fashion.
However, imagine that the first athlete has a discrepancy between their actual self-
confidence level and their ideal/ought level of self-confidence, in other words, their actual self-confidence level (24) is considerably below the ideal/ought level of self-confidence (e.g. 32) that they perceive is required to perform the task successfully. On the other hand, the second athlete feels that his/her ideal/ought level should be around 24 and has no discrepancy from that value. Although these two athletes report similar actual levels of self-confidence for the same task, in reality, they have very different confidence states as one has a large discrepancy from their ideal/ought self-guide and the other has not.

Therefore, the central question in Chapter 3 examines the interactive and predictive role that ideal, ought, and feared self-discrepancies have in the relationship between self-confidence and performance. Furthermore, as self-discrepancies are usually associated with negative affect, such self-discrepancies could also explain cognitive anxiety associated with performance.

**Self-efficacy**

Recently some conflicting results have also been reported with regard to efficacy expectations and performance. Bandura's (1977, 1986, 1997) self-efficacy theory refers to situational specific self-confidence rather than the global levels of self-confidence referred to above as measured by Martens et al. (1990) CSAI-2. For example, a golfer could be very confident about their all round abilities on the golf course, but under certain conditions he/she may have a low level of confidence about their putting abilities. This micro level of self-confidence is referred to as self-efficacy. Bandura (1986) defines self-efficacy as "peoples judgements of their capabilities to organise and execute courses of action required to attain designated types of performances...it is concerned not with the skills one has but with the judgements of what one can do with whatever skills one possesses" (p. 391). Bandura postulates four key determinants upon which individual's base their self efficacy. These are discussed in order of importance. Firstly mastery experiences; previous
experiences of success help to build a robust sense of self-efficacy. The second source of self-efficacy comes from vicarious experiences; seeing others succeed serves as another effective tool for promoting a sense of self-efficacy. Thirdly, verbal persuasion is proposed to produce a heightened sense of self-efficacy by significant others expressing faith in one's capabilities. Finally, one's own interpretation of emotional arousal will contribute the least to perceptions of self-efficacy, in other words reduced stress levels and negative emotions should increase self-efficacy.

It is partly on the basis of personal efficacy beliefs that people choose what challenges to undertake, how much effort to expend in the endeavor, and how long to persevere in the face of difficulties (Bandura 1997). Bandura states that “different people with similar skills, or the same person under different circumstances, may perform poorly, adequately, or extraordinary, depending on fluctuations in their beliefs of personal efficacy” (p. 37). However, there has been some confusion as to how self-efficacy should be measured which has added to the conflicting findings. Moritz, Feltz, Fahrback, and Mack’s (2000) meta-analysis of self-efficacy and sport performance revealed that depending on how self-efficacy was measured percent variance accounted for ranged from 1% to 12.6%. To test the convergent validity of self-efficacy operationalizations, Lee and Bobko (1994) compared five different measures of self-efficacy. Only measures that were in concordance with Bandura’s (1986) recommendations for measuring self-efficacy were used. Lee and Bobko found that self-efficacy measures that used 1-item confidence ratings showed the least convergent validity. Magnitude (individuals ratings whether they can perform at specific levels for specific tasks i.e. responses are either yes or no) and self-efficacy strength (individuals rate their degree of confidence that they can perform at that level i.e. 0-100% and the scores are summed) proved to be the most useful measure of self-efficacy. However, it's worth noting that there are two self-efficacy strength measures, the first method is to add all the strength scores for all magnitude levels, the second is to add all the
strength scores for magnitude levels that were only answered with a yes. This later method, termed a composite measure of self-efficacy strength, was shown to have the highest convergent and predictive validities. Consequently, it was recommended by Lee and Bobko (1994) that researchers should use measures of self-efficacy magnitude and a composite measure of self-efficacy strength (where the strength estimates associated with magnitude responses answered “yes” are summed) in future research.

Although there is a considerable volume of research that supports the predictions of self-efficacy theory (see for example, Bandura 1997) the theory is not without its critics (e.g. Eysenck, 1978; Kirsch, 1985; Vancouver, Thompson, & Williams, 2001; Vancouver, Thompson, Tischner, & Putka, 2002). Vancouver et al. (2001) criticised self-efficacy theory by stating that cross-sectional correlational results were a function of past performance’s influence on self-efficacy rather than the influence of self-efficacy upon future performance. In other words, according to Vancouver et al. (2001) it is not clear whether the relationship found between self-efficacy and performance is due to self-efficacy’s actual effect on present performance or previous performances effect on subsequent self-efficacy and present performance. By looking at the self-efficacy and performance relationship across time, Vancouver et al. (2001) found that previous performance did have a positive effect on self-efficacy, but that self-efficacy in turn did not have a positive effect on subsequent performance. This effect was replicated across two studies. In two further follow-up studies, Vancouver et al. (2002) significantly manipulated levels of self-efficacy by inflating previous performance scores and further found that this increase in self-efficacy actually decreased performance in subsequent trials. This finding suggested that previous performance accomplishments can lead to overconfidence (overly inflated levels of self-efficacy) which may cause the performer to set a higher standard of goal which they ultimately fail to achieve.
Can self-efficacy really have a negative impact upon performance? Bandura and Locke (2003) do not seem to think so. Bandura and Locke criticised Vancouver et al.’s. (2001, 2002) findings on many fronts. For example, the guessing game that Vancouver et al. (2001, 2002) used in their experiments lacked real life significance. Bandura and Locke claimed that Vancouver et al. (2001) ignored the motivating influence of higher level goals that self-efficacy creates. They also claimed that the interaction of these two variables was ignored i.e. individuals with high self-efficacy create higher goals which also drives performance and stated that guessing does not allow for performances that provide skill acquisition and controllability of performance upon which self-efficacy is based.

According to Bandura and Locke (2003), ignoring such variables would promote the “saw-toothed” effect that Vancouver et al. (2001, 2002) found between self-efficacy and performance. However, even Bandura and Locke (2003) admit that “Given the complex multicausality of human functioning and the social and ethical constraints on the opportunity to apply experimentally designed influences, no single investigatory approach can provide a full explanation of behaviour” (p. 96).

Approach and Avoidance Goals

Another limitation of self-efficacy theory is that so far research has tended to focus upon approach based personal goals at the expense of avoidance based personal goals. Personal goals have been described as “consciously articulated, personally important objectives that individuals pursue in their daily lives; they are self-investments that provide individuals with a sense of purpose, structure, and identity” (Elliot, Sheldon, & Church, 1997, p. 915). Approach goals are embedded in a discrepancy reduction system, that is to say, when a goal is created a discrepancy is simultaneously created. When one moves towards an approach goal the discrepancy reduces (Bandura, 1991; Carver & Scheier, 1998). However, research also indicates that individuals may be motivated to increase a discrepancy between a present state and an undesired end state (Carver & Scheier, 1998;
Elliot & Church, 1997). These goals are embedded in a discrepancy enlargement system and with this type of goal the motivation salience is avoidance based (King, Richards, & Stemmerich, 1998; Markus & Nurius, 1986). In recent literature, these two types of self-regulation systems have generally been termed approach and avoidance goals (Dickson & MacLeod, 2004a; Elliot & Church, 1997; Elliot & Sheldon, 1998; Elliot & Thrash, 2002).

Gray’s (1982) biological model of motivation provided the neurological framework for approach and avoidance goals. Gray hypothesised two motivational systems that underlie personality and emotional systems, specifically, a reward-driven system termed the behavioural activation system (BAS) and a punishment-driven system termed the behavioural inhibition system (BIS). The BAS represents sensitivity to signals of rewards and escape from punishment, and is responsible for positive feelings such as happiness, elation, and hope. The BIS is theorised to regulate punishment and aversive experiences. This system is sensitive to signals from nonreward and punishment, and is in turn responsible for feelings of anxiety, fear, and sadness. However, limited studies have tested Gray’s (1982) motivational model but results have found that depression and anxiety are both characterised by high BIS and that depression involves interference to, or diminishment of the BAS system (Fowles, 1988, 1994; cf. Dickson & MacLeod, 2004a).

Not unlike Higgins (1987) self-discrepancy theory, personality and goal theorists propose that the pursuit of approach goals will be related to positive subjective well being and that the pursuit of avoidance goals will be related to negative subjective well being (e.g. Coats, Janoff-Bulman, & Alpert, 1996; Emmons, 1986; Elliot & Sheldon, 1998; Elliot et al., 1997). For example, Coats et al. (1996) reported that up to 70% of individual personal strivings were reported as avoidance based and found that avoidance goals were related to pessimism, depression, and low self-esteem whereas approach goals were associated with more positive self-evaluations and greater psychological well-being. In a school sample of
adolescents, Dickson and Macleod (2004b) found that depression was associated with a personal approach goal deficit, whereas, anxiety was correlated with an increase in personal avoidance goals. One reason for these findings could be that, if the individual is constantly monitoring the possible negative outcome of an avoidance goal, they are more prone to anxiety symptoms and threat than individuals who focus upon the outcome of an approach goal (Elliot & Church, 1997).

Carver et al. (1999) hypothesised that many motives will differ in importance or impact in different circumstances. More specifically, Carver et al. suggested that if an individual is close to a feared value all that matters is getting away from it. However, due to the “attention grabbing nature” of feared values, individuals are hypothesised not only to increase the discrepancy, but this increase will be directionless (they want to be anywhere than close to a feared value). It is only when some distance from the feared self is created that approach goals become more salient and attention grabbing. Consequently, individuals may be more motivated to escape from a feared value especially if they are close to a feared value (avoidance goal). In this instance, approaching a desired value may not be so important. On the other hand, individuals who are far from a feared self may be more motivated to move towards a desired self, i.e. an approach goal (as the desire to avoid a feared goal diminishes). Carver et al.’s. (1999) hypothesis was partly derived from Markus and Nurius (1986) and Oyserman and Markus (1990) argument that a feared self motivates the person to act to deviate from that representation to ensure that the feared self never materialises. As previously mentioned, on testing the role of the feared self, self-discrepancies, and affect, Carver et al. (1999) found that when individuals were close to the feared self, actual/ought self-discrepancies were unrelated to negative affect. However, amongst individuals who were far from their feared self, actual/ought discrepancies predicted negative affect. Carver et al. concluded that when a person is too close to an undesired state, there is strong motivation to escape which is congruent with the thinking
that evolution places greater importance on avoiding danger than attaining desired ends (Pratto & John, 1991).

Goal Importance and Self-efficacy

Although Bandura’s (1977) self-efficacy theory has been shown to influence what type and level of goal an individual will set, one further area of research that has generally been ignored (and may moderate the relationship between self-efficacy and progress) is goal importance. Assuming that individuals pursue multiple goals (Kernon & Lord, 1990), the goal that is most important should get the most attention. Although little consideration has been paid to goal importance levels, some research has shown positive correlations between goal importance and progress that were independent of self-efficacy. For example, with regards to public speaking, Seijts, Meertens, and Kok (1997) manipulated task importance in 3 goal conditions: low goal difficulty, high goal difficulty and very high goal difficulty. They found that perceived task importance moderated the relationship between goal level and performance. Results indicated that participants in the important very high goal difficulty condition maintained effort and persistence. However, participants in the unimportant very high goal difficulty condition appeared to reduce their effort and persistence leading to a substantial decrease in performance. Interestingly, task importance was of little relevance when low and high goals were set. In a more recent study, Orbell, Johnston, Rowley, Davey, and Espley (2001) examined the role of self-efficacy and goal importance upon progress of functional activity after joint replacement. Goal importance was defined as the importance that individuals placed in their ability to perform 32 everyday functional activities. They found that when pre-surgery goal importance was high, it made relatively little difference to the extent of disability 9 months after surgery whether participants had high or low levels of self-efficacy with regards to recovery (measured at 3 months post op). However, when goal importance was low, self-efficacy at 3 months post-op made a significant contribution to levels of disability, with individuals
high in self-efficacy being less disabled after 9 months surgery. Therefore, it appears that in some cases, when goal importance is high, self-efficacy effects may diminish. This finding begs the question that if something is really important to an individual, would they need high levels of confidence in order to achieve it?

According to Orbell et al. (2001) although self-efficacy theory provides a parsimonious account of behavioural success, motivation to achieve a goal may also be determined by the importance that an individual attaches to the achievement of that goal. However, due to a lack of research in goal importance and its interaction with self-efficacy upon goal progress, this relationship remains rather unclear.

Consequently, in order to further our understanding of the self-efficacy and performance relationship, the central question in Chapter 4 fills an apparent gap in the self-efficacy and performance literature by testing the interactive effects that different goals (i.e. approach and avoidance goals) and goal importance may have upon the self-efficacy and performance relationship.
Summary of thesis

The present chapter has provided an overview of the development of catastrophe models of performance in sport and specifically addresses one previous limitation. Subsequently, the need to take into consideration the nature of the self in sport by using self-discrepancy theory as a framework was also highlighted, as was the need to take goal importance and avoidance goals into consideration when examining the relationship between self-efficacy and goal progress.

The first empirical chapter of this thesis (Chapter 2), reports two experiments that test Hardy's (1999) assertion that previous evidence of performance catastrophes and the hysteresis hypothesis may have been due to a complex interaction between effort required rather than physiological arousal. With this in mind, Eysenck and Calvo's (1992) processing efficiency theory could potentially explain both performance catastrophes and the occurrence of hysteresis. A letter transformation task (Eysenck, 1985; Hamilton, Hockey, & Rejman, 1977) was used to manipulate effort required in two studies. This consisted of participants transforming random letters in the alphabet and then storing the transformed letters in working memory, this allows the researcher to push working memory resources to the limit and thereby demonstrating any adverse effects that anxiety may have upon performance.

Chapter 3 reports on a novel approach to measurement issues in self-confidence research. For example, should two athletes who report similar levels of self-confidence really perform in similar fashion? What if one athlete had a discrepancy in their self-guide and the other had not? Chapter 3 takes the nature of the self into consideration when examining the relationship between self-report anxiety and confidence measures and sport performance. Chapter 3 adapted Martens et al. (1990) CSAI-2 to take into consideration the ideal, ought, and feared levels of self-confidence and compared them to actual self-
confidence measure when accounting for performance variance. Furthermore, it examined
the extent to which self-discrepancies could further explain performance anxiety.

Chapter 4 addresses additional questions about the relationship that self-efficacy has with
performance. Previous research investigating the relationship between Bandura’s (1977)
self-efficacy theory and goal accomplishment/performance has tended to focus only upon
approach goals (i.e. discrepancy reduction goals). Research has generally ignored the fact
that most life settings contain multiple and often conflicting goals (Kernon & Lord, 1990).
Research also indicates that some individuals may be motivated to avoid an anti-goal i.e. a
discrepancy enlargement goal; rather than achieve an approach goal. Furthermore, the role
of goal importance has also been generally ignored in the goal setting literature.
Consequently, the final question of the thesis examined the effect that self-efficacy exerts
upon goals that vary in polarisation (approach and avoidance based) and importance (high
importance vs. low importance).

Chapter 5 concludes the thesis. In more detail, the chapter provides a summary and
integrated discussion of the thesis findings, implications from both theoretical and applied
perspectives, limitations and future directions.
The remainder of the thesis consists of three empirical chapters that attempt to address the following questions:

1) Does the asymmetry factor in the cusp-catastrophe model of anxiety and performance need to be relabelled effort required?

2) How does the nature of the self interact with performance in self-report questionnaires?

3) How do approach and avoidance goals and goal importance interact with self-efficacy and performance relationship?

This thesis is written as a collection of research papers that are designed in such a way that they cover an extensive range of topics and areas. This approach helps train the candidate to focus upon single research questions which allow the candidate to engage with the research process at an early stage and to conduct research with a view to publication. The thesis does not readily follow a single thread (where little steps are taken as study follows study) and instead uses different approaches to examine limitations in previous research. The advantages and limitations of such an approach are further discussed in the final chapter.
Chapter 2

ANXIETY AND PERFORMANCE

Anxiety induced performance catastrophes: investigating effort required as an asymmetry factor

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Abstract

Two studies are reported that test the hypothesis that previous support for the cusp-catastrophe model of anxiety and performance, and the hysteresis effect in particular, could have been due to a complex interaction between cognitive anxiety and effort required rather than between cognitive anxiety and physiological arousal (Hardy, 1999). We used task difficulty to manipulate effort required in a letter transformation task. Experiment 1 (n = 32) used high levels of trait anxiety together with a competitive environment to induce state anxiety. Experiment 2 (n = 20) used a competitive environment with social pressure and ego threat instruction to induce high levels of worry. Both studies revealed significant three-way interactions as hypothesised with follow-up tests showing some support for the hysteresis hypothesis in study 1, and strong support for the hysteresis hypothesis in study 2. The findings support a processing efficiency theory (Eysenck & Calvo, 1992) explanation of anxiety-induced performance catastrophes and indicate that two cusp catastrophe models of performance may exist; one that incorporates the interactive effects of cognitive anxiety and physiological arousal upon performance and the other that incorporates the interactive effects of cognitive anxiety and effort required upon performance.
Research has repeatedly revealed that high levels of cognitive anxiety can have a detrimental effect upon a number of (varying) tasks and situations. Anxiety has been shown to impair performance on memory tasks, including letter transformation (e.g., Eysenck, 1985) and letter span tasks (e.g., Parfitt & Hardy, 1993), as well as complex motor tasks such as indoor climbing (Pijpers, Oudejans, & Bakker, 2005) and free throw shooting in basketball (e.g., Hardy & Parfitt, 1991). However, positive anxiety effects have also been recorded on motor tasks (e.g., Calvo & Alamo, 1987), anagram solving tasks (e.g., Blankstein, Toner, & Flett, 1989), and both free throw and rebound shooting in basketball (e.g., Hardy & Parfitt, 1991; Parfitt & Hardy, 1993). One model that attempts to provide at least some level of explanation for these contradictory findings is Hardy’s (1990) cusp catastrophe model.

Catastrophe theory was originally developed by the French mathematician René Thom (1975) to model geometrically all the naturally occurring discontinuities in the world. Hardy (1990) proposed the cusp catastrophe model of anxiety and performance as a means of explaining the mixed and apparently contradictory findings that had previously been reported regarding the effects of anxiety upon performance (for reviews, see Eysenck, 1992; Parfitt, Jones, & Hardy, 1990). The model is based on the view that performance anxiety is a multidimensional construct combining a cognitive component, “negative expectations and cognitive concerns about oneself, the situation at hand and potential consequences” (Morris, Davis, & Hutchings, 1981, p. 541), and a physiological arousal component, defined in this context as “the organism’s natural physiological response to anxiety-inducing situations” (Hardy, 1990, p. 85). The cusp catastrophe model uses this multidimensional conceptualisation to predict interactive effects for cognitive anxiety (worry) and physiological arousal upon performance in a 3-dimensional model (see Figure 1).
The model proposes that a series of four relationships exists between cognitive anxiety, physiological arousal, and performance (Hardy, 1990, 1996a). Firstly, it is proposed that cognitive anxiety (worry) has a positive relationship with performance when physiological arousal is low (left face of the model). Secondly, cognitive anxiety will have a negative relationship with performance when physiological arousal is high (right face of the model). Thirdly, when cognitive anxiety is low, physiological arousal has an inverted-U shaped relationship with performance (see the back face of the model). Finally, when cognitive anxiety is high, increased levels of physiological arousal lead to a catastrophic drop in performance from the upper performance surface (A) to the lower performance surface (B), as indicated by the front face of the model. Furthermore, once this catastrophic drop in performance has occurred, a large reduction in physiological arousal is required to bring performance back on to the upper performance surface. Thus, a central prediction of the catastrophe model is that when cognitive anxiety is high, the path followed by performance is different when physiological arousal is increasing (see path 1 in figure 1) to the path followed by performance when physiological arousal is decreasing (see path 2 in figure 1). This horizontal displacement of behaviour (performance) is termed *hysteresis*, and should occur under conditions of high cognitive anxiety but not under conditions of low cognitive anxiety. Support for the hysteresis effect has been found in both (the) studies that have directly tested it (Hardy & Parfitt, 1991; Hardy, Parfitt, & Pates, 1994). Other predictions of the model have also received some empirical support from various studies of motor performance (see, for example, Edwards & Hardy, 1996; Hardy & Parfitt, 1991; Hardy, Woodman, & Carrington, 2004; Woodman, Albinson, & Hardy, 1997).
Despite some encouraging support, criticisms have been levelled at the model. For example, Gill (1994) criticised the model on its difficulty to test due to its apparent complexity. Furthermore, whilst attempting to test the predications of the cusp catastrophe model, Cohen, Pargman, and Tenenbaum (2003) found no support for the hysteresis hypothesis on an indiscriminate dart throwing task. They claimed that the cusp catastrophe model “lacks the sound framework necessary to examine the effects of multidimensional anxiety and physiological arousal on motor performance” and that, “the model fails to provide a tool for accurately describing performance catastrophes” (p. 155). However, Cohen et al. failed to include cognitive anxiety as a moderator variable in their test of hysteresis (a basic requirement) and also failed to provide any statistical evidence to support their claims against the hysteresis hypothesis (Woodman & Hardy, 2005). In a later paper, Tenenbaum and Becker (2005) also raised a number of other unsubstantiated criticisms at the cusp catastrophe model that Woodman and Hardy (2005) summarily dismissed.
One further criticism of research into the hysteresis hypothesis is, however, valid. In previous tests of the hysteresis hypothesis by Hardy and associates (Hardy & Parfitt, 1991; Hardy et al., 1994), physiological arousal was manipulated by means of physical exercise and monitored by measuring heart rate; that is to say, athletes performed under conditions of low and high cognitive anxiety with their heart rate increasing from maximum – 40 beats per minute, to maximum heart rate. Consequently, it is possible that the physiological arousal recorded in these studies reflected the physical effort required to perform the task rather than anxiety-induced physiological arousal (Hardy, 1999). Because of this possibility, Hardy (1999) suggested that there was some ambiguity about the precise nature of the asymmetry factor in the cusp catastrophe model. On the basis of the available evidence, it could be anxiety-induced physiological arousal, exercise-induced physiological arousal, exercise-induced effort, or anxiety-induced effort.

In this context, Eysenck and Calvo’s (1992) processing efficiency theory is worthy of some consideration. A main prediction of processing efficiency theory is that worry pre-empts some of the processing and storage resources of a limited capacity working memory system (Baddeley, 1986). One consequence of this is that any adverse effects of worry on task performance should be greater on tasks that exert large demands on the capacity of the working memory system. A second important prediction of processing efficiency theory is that worry or cognitive anxiety can serve a motivational function. More specifically, the anxious performer may attempt to increase effort and thereby activate additional processing resources if he/she feels that performance is, or may be, sub-standard. If successful, such increases in effort increase the available working memory and, consequently, may enhance performance (Eysenck & Calvo, 1992). However, according to earlier versions of the theory (e.g. Eysenck, 1982), increased effort will only occur when performers perceive themselves to have at least a moderate subjective probability of success; that is to say, when they are at least moderately confident. Thus, according to processing efficiency
theory, anxiety typically impairs processing efficiency (task performance divided by effort) more than it impairs task performance - hence the theory's name. The predictions of processing efficiency theory have received empirical support from a number of studies (e.g., Calvo, Eysenck, Ramos, & Jiménez, 1994; Derakshan & Eysenck, 1998; Kellogg, Hopko, & Ashcraft, 1999; Murray & Janelle, 2003; Smith, Bellamy, Collins, & Newell, 2001).

Hardy and Parfitt (1991) used the above arguments to suggest that processing efficiency theory could provide one explanation of how cusp catastrophes might occur. As worry (cognitive anxiety) and effort required increase, one might reasonably expect that a point would be reached where performers would no longer perceive themselves to have a moderate subjective probability of success, and so would then withdraw their effort from the task at hand. Once performers have given up in this way, they might need to perceive a considerable reduction in the quantity of effort required before they would feel it worthwhile re-investing effort in the task. In this way, processing efficiency theory can explain both the sudden decrements in performance and the occurrence of hysteresis predicted by the catastrophe model, provided one assumes that physiological arousal is a reflection of effort required by the task. In fact, Eysenck (1992) argues that this is exactly what the physiological response associated with anxiety is — a reflection of compensatory effort.

In light of the above arguments, the present paper reports two experiments that test Hardy's (1999) assertion that previous evidence in support of the cusp catastrophe model could reflect a complex interaction between cognitive anxiety, (level of) effort required, and the direction of change of effort required (rather than between cognitive anxiety and physiological arousal). In order to place attentional demands upon both processing and storage resources on the working memory system (Eysenck & Calvo, 1992), the criterion
measure for both studies was a letter transformation test (Hamilton, Hockey, & Rejman, 1977). Experiment 1 used high levels of trait anxiety (Spielberger, Gorsuch, & Lushene, 1970) together with a competitive environment to induce state anxiety. Experiment 2 used a competitive environment with social pressure and ego threat instructions to induce worry. In both studies, effort required was manipulated by means of task difficulty. It was predicted that hysteresis would occur under conditions of high cognitive anxiety/worry but not under conditions of low cognitive anxiety/worry.

EXPERIMENT 1

Method

Participants and Measures

Two hundred and ninety-eight undergraduates from the University of Wales, Bangor, UK, agreed to complete the trait scale of the State-Trait Anxiety Inventory (STAI; Spielberger et al., 1970; see below). Thirty-two participants (18 males and 14 females; $M$ age = 20.01, $SD$ = 2.63) were further selected on the basis of extreme scores on the trait version of the STAI. Sixteen participants (6 male and 10 female; $M$ age = 20.10, $SD$ = 2.41) were classified as high trait anxious with all having trait scores of 50 or above ($M$ = 55.87, $SD$ = 2.68) and sixteen (12 male and 4 female; $M$ = 19.90, $SD$ = 2.89) were classified as low trait anxious with all having trait scores of 28 or below ($M$ = 24.86, $SD$ = 2.79). Previous research has reported using similar values (e.g. Eysenck & Byrne, 1992; Mogg, Mathews, Bird, & Macgregor-Morris, 1990).

State Trait Anxiety Inventory. The trait version of Spielberger et al.'s (1970) State-Trait Anxiety Inventory was used to assess trait anxiety. The trait part of the inventory has twenty items and uses a Likert-type format with the scale ranging from 1 (almost never) to 4 (almost always), so that a score between twenty (low) and eighty (high) is recorded for each individual. According to Spielberger, Gorsuch, Lushene, Vagg, and Jacobs (1983), the
trait anxiety norms for United States college students is a mean of 38.3 and 40.4 for males and females, respectively. Internal consistency of the measure for college-based students was reported between .73 and .86 (Spielberger et al., 1983).

**Competitive State Anxiety Inventory-2.** As the nature of the anxiety manipulation included a competitive environment, state anxiety was measured using the Competitive State Anxiety Inventory-2 (Martens, Burton, Vealey, Bump, & Smith, 1990). The CSAI-2 was used in previous tests of the model (Hardy & Parfitt, 1991; Hardy et al., 1994). This inventory contains 27 items, 9 for each of the three subscales (self-confidence, cognitive anxiety, and somatic anxiety). The 27 items are measured using a Likert-type scale ranging from 1 (not at all) to 4 (very much so). Thus, the range of possible scores for each subscale is from 9 (low) to 36 (high). The internal consistency for the three subscales has been demonstrated in several studies with alpha coefficients ranging from 0.79 to 0.90 (Martens et al., 1990). For the purpose of the present study, only the data from the cognitive anxiety subscale were retained for analysis.

**Task**

**Letter Transformation Task.** A letter transformation task (Eysenck, 1985; Hamilton et al., 1977) was used to manipulate effort required (via task difficulty). The task required participants to transform a series of random letter strings (ranging from 1 to 5 letters) at a given distance of +4 and within the range of A to V. For example, if a participant were asked to transform one letter e.g., the letter A, the answer would be E (A + 4 = E). If a participant were asked to transform five letters e.g., FCRHU, the answer would be JGVLY (FCRHU + 4 = JGVLY). Letters were randomly generated by means of a Q-Basic programme and were presented on a computer monitor.
In one-letter trials, when the letter appeared on the monitor a timer would start, participants would press the return key to clear the screen, type in their response, and then press the return key, at which point the timer would stop. When the task required two or more letters to be transformed the participant would press the return key to see the first letter, at which point the timer would start, the participant would then press the return key again to see the second letter (at which point the first letter disappeared) and so on. After seeing all the letters, the participant keyed in their total response one letter at a time, and then stopped the timer by again pressing the return key. Time taken and the percentage of letters correct were used as performance measures.

The participants were given verbal and written instructions on the computer screen immediately before the trial started. The instructions stated that they were required to work through the following problems at a transformation distance of + 4. They were asked to wait until they had seen all the letters in each problem before they started transforming them. They were also informed they had to transform all the letters before they could type in the answer. Finally, they were also asked to perform the task as quickly and accurately as possible, as a combination of time taken and correct responses would be used as their performance measure. The next time they pressed the return key the trial would begin. At this point the first letter appeared on the screen.

Procedure

Participants attended two sessions approximately one week apart. The first session was a practice session that participants attended individually. This session enabled participants to familiarise themselves with the task after which written consent was obtained. At the end of the first session, participants were asked to attend a second session a week later in order to complete the study.
This first session consisted of four practice trials at each difficulty level starting with one letter, then two, three, four and five. This was then repeated in reverse order (i.e., five, four, three, two, and one). After these practice trials participants had a practice session that was the same as the testing session. For these trials, participants completed ten trials at each level from one letter through to five and then from five through to one. To counterbalance for order of presentation of direction, half the participants completed the practice session with difficulty increasing and then decreasing (1 to 5 and then 5 to 1 letters) and the other half completed the study with difficulty decreasing and then increasing (5 to 1 and then 1 to 5 letters).

In the second session, unbeknown to the participants, two participants were timetabled to be present at each of the trials. Upon entering the room, the two participants were told that they would be competing against each other. They were also told that the winner of the session would be entered into a league where the top three performance scores would win cash prizes of £75, £50, and £25 for first, second, and third place, respectively. The loser of the session would get nothing. They then sat side by side at two computers separated by a large screen. The participants had a warm-up session consisting of two trials at each of the five levels in their respective directions (i.e., task difficulty increasing then decreasing or vice versa). At the end of the warm-up session, the CSAI-2 was administered. The testing followed immediately with half the participants completing the trials with difficulty increasing then decreasing and the other half completing the trials with task difficulty decreasing then increasing. After every ten trials at each level, participants were provided with feedback from the monitor on percentage of letters correct and time taken. Each participant was blind to the other’s score throughout the study.
Results

Trait Anxiety

As mentioned in the method, the means (and standard deviations) for the low and high trait anxiety groups were 24.86 (± 2.79) and 55.87 (± 2.68), respectively. An independent samples t-test showed this difference to be highly significant \( t(30) = 32.19, p < 0.001 \).

State Anxiety Analysis

To test whether the high trait anxiety group had higher levels of state anxiety than the low trait anxiety group, an independent samples t-test was conducted on the cognitive anxiety subscale of the CSAI-2. For the low trait anxiety group, the mean (± SD) for cognitive state anxiety was 14.12 (± 4.73). For the high trait anxiety group, the mean (± SD) for cognitive state anxiety was 21.86 (± 3.31). An independent samples t-test showed that this difference was highly significant \( t(30) = 5.25, p < 0.001 \). Thus, by using high and low levels of trait anxiety coupled with a competitive environment two distinct cognitive anxiety groups were successfully created. Throughout the rest of the study these two groups are referred to as high or low cognitive anxiety groups.

Performance Analysis

To test the hypothesis that hysteresis would occur under conditions of high cognitive anxiety but not under conditions of low cognitive anxiety, two separate three-factor mixed-model analyses of variance (2 x 2 x 5), with repeated measures on the last factor, were conducted on the two performance scores (i.e., percentage letters correct and total time taken for each 10 trial block). The independent variables were cognitive anxiety (high vs. low), direction (effort required increasing vs. effort required decreasing), and task difficulty level (1 letter strings to 5 letter strings). The Wilks’ Lambda estimate from the multivariate solution was used for all repeated measures terms.
Percent Letters Correct. Results revealed no significant main effects for direction $F(1, 30) = 0.77, p = 0.38 (\eta^2 = .025)$. However, results revealed a highly significant main effect for difficulty, $F(4, 27) = 16.65, p < 0.001 (\eta^2 = .712)$. There was no significant interactions between direction and anxiety group $F(1, 30) = 0.06, p = 0.80 (\eta^2 = .002)$; or between difficulty and anxiety group $F(4, 27) = 0.31, p = 0.86 (\eta^2 = .045)$; or between direction and difficulty $F(4, 27) = 1.06, p = 0.39 (\eta^2 = .137)$. However, as hypothesised, a significant three-factor interaction occurred between direction, difficulty, and anxiety group, $F(4, 27) = 2.75, p < 0.05 (\eta^2 = .290)$.

To explore the three-factor interaction, follow-up tests were conducted in both the high and low cognitive anxiety conditions. The hysteresis hypothesis predicts that under conditions of high anxiety the path followed by performance when effort required (task difficulty) is increasing should be different to the one it follows when effort required is decreasing. More specifically, in the high anxiety condition, there should be a significant drop in performance in the increasing condition and a significant jump in performance in the decreasing condition; however, the significant jump up in the effort decreasing condition should be at a lower level of effort than that at which performance dropped in the effort increasing condition. Conversely, under low anxiety, performance paths in the increasing and decreasing conditions should be relatively smooth and superimposed.

Tukey’s HSD post-hoc tests were performed by hand. A probability level of $< 0.05$ was used in all follow-up tests. As previous tests of the cusp catastrophe model have shown that hysteresis effects only occur at high levels of physiological arousal (cf., Hardy & Parfitt, 1991; Hardy et al., 1994), follow-up tests were carried out only on levels three, four, and five, where hysteresis is predicted to occur. In the high cognitive anxiety group there was a significant drop in performance of 9.21% in the increasing condition between levels four and five. This was accompanied by a significant jump in performance of 11.06% in the
decreasing condition between levels four and three. No other differences were significant (see Table 1).

Table 1  Letter % Correct Performance Cell Means (Standard Deviations) for Percentage Correct in the High and Low State Anxiety Groups

<table>
<thead>
<tr>
<th>Scores % correct</th>
<th>High state anxiety</th>
<th>Low state anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increasing</td>
<td>Decreasing</td>
</tr>
<tr>
<td>Difficulty level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 1</td>
<td>91.87%</td>
<td>92.50%</td>
</tr>
<tr>
<td></td>
<td>(16.01)</td>
<td>(16.12)</td>
</tr>
<tr>
<td>Level 2</td>
<td>85.62%</td>
<td>87.50%</td>
</tr>
<tr>
<td></td>
<td>(18.96)</td>
<td>(20.00)</td>
</tr>
<tr>
<td>Level 3</td>
<td>82.26%</td>
<td>83.09%</td>
</tr>
<tr>
<td></td>
<td>(22.46)</td>
<td>(19.50)</td>
</tr>
<tr>
<td>Level 4</td>
<td>77.96%</td>
<td>72.03%</td>
</tr>
<tr>
<td></td>
<td>(22.38)</td>
<td>(25.25)</td>
</tr>
<tr>
<td>Level 5</td>
<td>68.75%</td>
<td>64.62%</td>
</tr>
<tr>
<td></td>
<td>(27.37)</td>
<td>(22.94)</td>
</tr>
</tbody>
</table>

In the low state anxiety group there were significant drops in performance in the effort increasing condition of 10.52% between levels three and four, and 14.97% between levels four and five. This was followed by a significant jump in performance in the decreasing condition of 9.78% between levels five and four. No other differences were significant (see Table 1).

*Time Taken.* The results for time taken revealed a highly significant main effect for difficulty, $F (4, 27) = 53.21, p < 0.001$. ($\eta^2 = .887$) showing that as effort increased time significantly increased. However there was no significant main effect for direction $F (1,$
The interactions revealed no further significant findings; direction and anxiety group $F(1, 30) = 1.61, p = 0.21, (\eta^2 = .051)$; difficulty and anxiety group $F(4, 27) = 1.04, p = 0.40, (\eta^2 = .134)$; direction and difficulty $F(4, 27) = 1.31, p = 0.29, (\eta^2 = .163)$; or direction, difficulty, and anxiety group $F(4, 27) = 0.37, p = 0.82, (\eta^2 = .052)$ (see Table 2 for means and standard deviations).

Table 2  Performance Cell Means (Standard Deviations) for Time Taken in the increasing and Decreasing Conditions of both High and Low State Anxiety Groups

<table>
<thead>
<tr>
<th>Difficulty level</th>
<th>Time Taken</th>
<th>High state anxiety group</th>
<th>Low state anxiety group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increasing</td>
<td>Decreasing</td>
<td>Increasing</td>
</tr>
<tr>
<td>Level 1</td>
<td>4.48</td>
<td>3.98</td>
<td>4.06</td>
</tr>
<tr>
<td></td>
<td>(1.37)</td>
<td>(1.00)</td>
<td>(0.76)</td>
</tr>
<tr>
<td>Level 2</td>
<td>10.24</td>
<td>9.82</td>
<td>10.32</td>
</tr>
<tr>
<td></td>
<td>(3.24)</td>
<td>(3.03)</td>
<td>(1.92)</td>
</tr>
<tr>
<td>Level 3</td>
<td>18.01</td>
<td>17.23</td>
<td>17.84</td>
</tr>
<tr>
<td></td>
<td>(6.54)</td>
<td>(5.88)</td>
<td>(4.95)</td>
</tr>
<tr>
<td>Level 4</td>
<td>26.48</td>
<td>27.40</td>
<td>24.17</td>
</tr>
<tr>
<td></td>
<td>(8.16)</td>
<td>(8.86)</td>
<td>(8.66)</td>
</tr>
<tr>
<td>Level 5</td>
<td>35.58</td>
<td>36.34</td>
<td>32.14</td>
</tr>
<tr>
<td></td>
<td>(12.84)</td>
<td>(10.80)</td>
<td>(13.37)</td>
</tr>
</tbody>
</table>

Discussion

Results revealed the hypothesised significant three-way interaction between anxiety, direction, and task difficulty upon one aspect of performance (i.e. % letters correct). Follow-up tests suggested that hysteresis did occur in the high cognitive anxiety condition. In the low anxiety condition, performance paths were hypothesised to be
relatively smooth and superimposed. Follow-up tests revealed that there were significant drops in performance in the increasing condition between levels three to four and four to five. This was matched by a significant jump in the decreasing condition between levels five and four, but there was no matching significant jump between levels four and three. However, although performance paths were not as smooth as hypothesised, it should be noted that the decrease in percentage correct from level three to four (10.5%) was not hugely different from the increase in percentage correct from level four to three (6.9%).

One weakness in the design of experiment 1 may have been the anxiety manipulation. We used high levels of trait anxiety and a competitive environment to induce high levels of state cognitive anxiety. The competitive environment consisted of two individuals competing against one another (with performance scores being anonymous), where the winner had the opportunity to receive a cash prize. However, winning the competitive session only resulted in a slim chance of winning some prize money. Furthermore, the consequences of poor performance with this manipulation were quite low. For example, if halfway through the experiment participants did not feel that they had any chance of success, they could withdraw effort from the task without any major apparent consequences other than wasted time.

Experiment 2 aimed to extend and clarify the present findings. It used a social anxiety manipulation where prize money was awarded on the basis of both team and individual scores as opposed to just an individual’s score. With this manipulation, failure in one’s own performance would become detrimental to the whole team. Making performance public (rather than anonymous) should, according to previous research, increase task importance, effort and persistence (Seijts, Meertens, & Kok, 1997).
EXPERIMENT 2

Method

Participants and Measures

Forty undergraduates from the University of Wales, Bangor, UK, volunteered for the study. There were 33 males and 7 females aged 18-35 years ($M = 20.76, SD = 2.84$).

Worry-Emotionality Inventory. The measure of state anxiety used in experiment 1 was changed for experiment 2. As the CSAI-2 was conceptualised and developed within a sport setting, we had concerns that it might not be the most appropriate measure to use in a non-sport laboratory setting with a non-sport task. State anxiety was therefore measured using Morris et al. (1981) revised Worry-Emotionality Inventory (WEI). The WEI is a measure of state test anxiety separating worry (cognitive anxiety) from emotionality (the somatic response to anxiety). The inventory has five items in each subscale and is scored on a Likert-type format ranging from 1 (The statement does not describe my present condition very well) to 5 (The statement describes my present condition very well). Thus, a score of five (low) to twenty-five (high) can be recorded for each participant. The internal consistency for the WEI has been shown to be high with alpha coefficients exceeding 0.80 (Skinner & Brewer, 1999). For the purpose of this study, only the data from the worry subscale were retained for analysis.

Task

The same letter transformation task was used as in Experiment 1.

Procedure

In case participants withdrew effort from the task in experiment 1 because of no apparent consequences other than wasted time, experiment 2 was designed to increase the consequences of doing so. Participants were tested in eight teams of five; each team
attended two sessions approximately one week apart. The first session was identical to that described in Experiment 1, with the only difference being that participants attended in groups of five rather than alone. The second session used a competitive environment to elevate worry. To achieve this, at the start of the second testing session each team was told that they would compete against the other teams for a cash prize of £50. However, the prize would be offered only to the highest scoring member of the highest scoring team. It was emphasised that each participant was part of a team and that it was the team’s average score that would determine the winner. Consequently, if an individual performed poorly then the team's average score would suffer, thus lessening the chances of the any individual from that team winning. At the start of the main testing session participants were reminded that their individual scores would be compared to those obtained from their other team members. Each individual was also told that a full report of the results would be circulated to each team member after the experiment. Furthermore, as each team member was seated side by side, each was aware of the others’ progress throughout the study. At the start of the second session, the team had a warm-up consisting of two trials at each of the five levels in their respective directions (difficulty increasing then decreasing, or difficulty decreasing then increasing). At the end of the warm-up, the WEI was administered, followed immediately by the commencement of the competitive test.

Results

State Worry Analysis

In order to create two highly distinct worry groups, the participants were median split on the worry subscale of the WEI, with the middle twenty worry scores removed. This left twenty participants for the final analysis, 16 males and 4 females ($M$ age $= 20$, $SD = 2.44$). The mean age ($\pm SD$) for the high worry group was 20.60 ($\pm 3.21$) and consisted of 8 males and 2 females. The mean age for the low worry group was 19.40 ($\pm 1.17$) and consisted of 8 males and 2 females. The means ($\pm SD$) for the worry scores were 16.82 ($\pm 1.83$) for the
high worry group and 6.64 (± 1.32) for the low worry group. An independent samples $t$-test confirmed that this difference was highly significant $t(18) = 14.28, p < 0.001$.

**Performance Analysis**

The main performance data were analysed in exactly the same way as in Experiment 1 using a three-factor (worry x direction x difficulty level) analysis of variance with repeated measures on the final factor.

**Percent Letters Correct.** Results revealed no significant main effects for direction $F(1, 18) = 1.05, p = 0.31, (\eta^2 = .055)$. However, results revealed a highly significant main effect for difficulty, $F(4, 15) = 15.25, p < 0.001, (\eta^2 = .803)$. There was no significant interaction between direction and anxiety group $F(1, 18) = 0.05, p = 0.82, (\eta^2 = .003)$; or between difficulty and anxiety group $F(4, 15) = 0.57, p = 0.68, (\eta^2 = .132)$; or between direction and difficulty $F(4, 15) = 1.05, p = 0.41, (\eta^2 = .219)$. However, as hypothesised, a significant three-factor interaction occurred between direction, difficulty, and anxiety group, $F(4, 15) = 3.37, p < 0.05, (\eta^2 = .474)$.

To explore the three-factor interaction, follow-up tests were conducted on the high and low worry conditions. As in Experiment 1, it was hypothesised that, in the high worry condition, there would be a significant drop in performance in the effort increasing condition and a significant jump in performance in the effort decreasing condition; this significant jump should be at a lower level of effort required than where it dropped in the increasing condition. In the low worry condition, performance paths in the effort increasing and effort decreasing conditions were hypothesised to be relatively smooth and superimposed.
Tukey HSD post-hoc tests were performed by hand. A probability level of < 0.05 was used in all follow-up tests. Results revealed that, in the high worry group, there was a significant drop in performance of 15.15% in the effort increasing condition between levels four and five. This was accompanied a significant jump in performance of 13.73% in the effort decreasing condition between levels four and three. No other significant differences were revealed (see Table 3).

Table 3  Letter Performance Cell Means (Standard Deviation) for Percentage Correct in the High and Low Worry Groups

<table>
<thead>
<tr>
<th>Difficulty level</th>
<th>High state anxiety</th>
<th>Low state anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increasing</td>
<td>Decreasing</td>
</tr>
<tr>
<td>Level 1</td>
<td>100% (0.00)</td>
<td>99% (3.16)</td>
</tr>
<tr>
<td>Level 2</td>
<td>95% (4.08)</td>
<td>92% (7.14)</td>
</tr>
<tr>
<td>Level 3</td>
<td>85.66% (12.67)</td>
<td>88.98% (7.71)</td>
</tr>
<tr>
<td>Level 4</td>
<td>82.75% (10.50)</td>
<td>75.25% (9.46)</td>
</tr>
<tr>
<td>Level 5</td>
<td>67.60% (13.05)</td>
<td>69.60% (16.93)</td>
</tr>
</tbody>
</table>

In the low worry condition there was one marginally significant jump in performance of 12.10% in the decreasing condition between levels five and four. No other significant differences were revealed (see Table 3).
Time Taken. The results for time taken revealed a highly significant main effect for difficulty, $F(4, 15) = 32.68, p < 0.001, (\eta^2 = .897)$ showing that as effort increased time significantly increased. However there was no significant main effect for direction $F(1, 18) = 0.27, p = 0.60, (\eta^2 = .015)$. The interactions revealed no further significant findings; direction and anxiety group $F(1, 18) = 0.96, p < 0.34, (\eta^2 = .051)$; difficulty and anxiety group $F(4, 15) = 1.28, p = 0.32, (\eta^2 = .255)$; direction and difficulty $F(4, 15) = 1.35, p = 0.29, (\eta^2 = .265)$; direction, difficulty, and anxiety group $F(4, 15) = 0.65, p = 0.63, (\eta^2 = .148)$ (see Table 4 for means and standard deviations).

Table 4  Performance Cell Means (Standard Deviations) for Time Taken in the Increasing and Decreasing Conditions of both High and Low Worry Groups

<table>
<thead>
<tr>
<th></th>
<th>High state anxiety group</th>
<th>Low state anxiety group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Direction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increasing</td>
<td>Decreasing</td>
</tr>
<tr>
<td>Difficulty level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 1</td>
<td>3.61</td>
<td>3.97</td>
</tr>
<tr>
<td></td>
<td>(0.62)</td>
<td>(0.92)</td>
</tr>
<tr>
<td>Level 2</td>
<td>11.13</td>
<td>11.54</td>
</tr>
<tr>
<td></td>
<td>(2.75)</td>
<td>(4.43)</td>
</tr>
<tr>
<td>Level 3</td>
<td>20.85</td>
<td>20.48</td>
</tr>
<tr>
<td></td>
<td>(4.93)</td>
<td>(5.95)</td>
</tr>
<tr>
<td>Level 4</td>
<td>31.46</td>
<td>34.66</td>
</tr>
<tr>
<td></td>
<td>(10.77)</td>
<td>(14.18)</td>
</tr>
<tr>
<td>Level 5</td>
<td>43.33</td>
<td>49.49</td>
</tr>
<tr>
<td></td>
<td>(15.34)</td>
<td>(23.40)</td>
</tr>
</tbody>
</table>
Discussion

The findings replicated those of Study 1, in that there was a significant three-way interaction between worry, direction, and task difficulty upon % letters correct. Additionally, the hysteresis effect in the high worry condition was rather clearer in Experiment 2 than Experiment 1, as was the absence of hysteresis in the low worry condition.

General Discussion

The main aim of the present study was to test Hardy’s (1999) proposition that previous evidence of performance catastrophes could reflect a complex interaction between cognitive anxiety, effort required, and direction of change in effort required rather than between cognitive anxiety and physiological arousal. According to early versions of Eysenck and Calvo’s (1992) processing efficiency theory (e.g., Eysenck, 1982), the potentially positive motivational effects of cognitive anxiety should only occur if participants perceive themselves to have at least a moderate probability of success. In the present study, it was hypothesised that when worry was high, as levels of task difficulty increased, there would come a point when high anxious individuals would no longer perceive themselves to have a moderate probability of success, and would therefore withdraw effort from the task. Furthermore, once performers had given up in this way, it was hypothesised that they would then require a considerable reduction in the level of task difficulty before they would feel it worthwhile reinvesting effort. In both experiments, this hysteresis hypothesis was supported.

These results are interesting because they offer an entirely cognitive explanation of the effects of anxiety upon performance, whereby such effects arise as the result of a complex interaction between cognitive anxiety and task difficulty. This sort of explanation is entirely consistent with processing efficiency theory in which physiological arousal and
emotionality are regarded only as physiological symptoms of any increased effort that the
performer invests; that is to say, they have no causal role in performance effects (Eysenck,
1992; Eysenck & Calvo, 1992). However, it is somewhat at odds with previous studies that
have suggested that anxiety-induced physiological arousal may be an important influence
upon performance (Burton, 1988; Fenz & Epstein, 1967, 1968; Gould, Petlichkoff, Simons,
& Vevera, 1987; Parfitt & Hardy, 1993; Parfitt & Pates, 1999). It is perhaps important to
note that the criterion tasks in those studies all involved a strong motor component, whilst
the criterion tasks in the studies used by Eysenck and Calvo (1992) to formulate processing
efficiency theory were generally cognitive tasks. Of course, the fact that evidence exists to
support a complex interaction between cognitive anxiety and effort required does not rule
out the possibility that a (similar) interaction also exists between cognitive anxiety and
physiological arousal. Future research might attempt to clarify this situation by devising
alternative paradigms to test these two models - or, indeed, a third cusp catastrophe model
(of self-confidence and task importance) that has been proposed by Carver and Scheier
(1998) but, to the best of the current author's knowledge, has not yet been empirically
tested. In a similar vein, the fact that a cusp catastrophe model of anxiety and performance
is consistent with both sets of complex interactions that have been obtained does not mean
that such models are the only means of modelling these interactions. Nevertheless,
catastrophe models are the only models currently available that predict such interactive
effects.

It is interesting to note that in both of the present studies, worst performance occurred
under conditions of low anxiety (study 1, level five, 61.1%; study 2, level five, 65.4%).
The fact that relatively poor performance occurs in a low anxiety condition is consistent
with previous research on performance catastrophes by Hardy and Parfitt (1991) and Hardy
et al. (1994). In both these studies, participants' best performances were significantly better
in the high cognitive anxiety condition than in the low cognitive anxiety condition.
Furthermore, their worst performances were significantly worse in the high cognitive anxiety condition than in the low cognitive anxiety condition. However, because of the between-groups design used in the present study, it was not possible to test for such here. From a processing efficiency theory perspective, all of these findings suggest that the (positive) motivational effects of anxiety can, and often do, outweigh the (negative) cognitive effects.

It is worthy noting the important, albeit somewhat implicit, role that self-confidence (subjective probability of success) played in developing the current hypotheses from Eysenck and Calvo’s (1992) processing efficiency theory and Hardy’s (1990) cusp catastrophe model. As previously noted, in Eysenck’s (1982) earlier theorizing, this role of self-confidence was explicitly stated, but in the more formally developed version of processing efficiency theory (Eysenck & Calvo, 1992) no such mention was made. The present authors suspect that this omission does not reflect a change of thinking on Eysenck’s part, but rather a tactical decision because of the difficulty of finding evidence in previous published research to support its inclusion. Such a decision would not be surprising given the complexity of experimental design that would be required to collect such evidence. Nonetheless, some evidence does exist to support the inclusion of self-confidence in a processing efficiency theory framework. In a test of a higher order butterfly catastrophe model, Hardy et al. (2004) found that self-confidence moderated the interactive effects of cognitive anxiety and somatic anxiety. Specifically, they found that when highly confident performers were cognitively anxious, they were more able to tolerate the effects of increased somatic anxiety before experiencing performance loss. This finding is clearly consistent with Eysenck’s (1982) earlier theorizing on the role of self-confidence.

Task importance and task relevance may also have influenced the present findings. Mean performance scores in study 2 (where consequences of failure were high) were almost
always higher than comparable scores in study 1 (see Tables 1 and 3 respectively). It is likely that as the consequences of failure increase, the importance of performing well on the task increases. For example, (as previously stated) Seijts et al. (1997) found that perceived importance of the task (public speaking) moderated the relationship between goal level and performance. They found that participants who perceived the task as unimportant appeared to reduce effort and persistence when very difficult goals were set, which led to a substantial decrease in performance. Conversely, participants who perceived the task to be important maintained their effort and persistence, even when faced with very difficult goals. Several other researchers (see, for example, Parfitt et al., 1990) have also pointed to the importance of situationally relevant and meaningful criterion tasks from a design perspective. The present study could clearly be criticised from this perspective as importance and situational relevance were artificially stimulated. This criticism is particularly relevant in any study in which participant motivation is a key variable.

There are other limitations to the present studies. According to Carver and Scheier (1998) sensed rate of progress towards a goal is a key determinant of positive or negative affect. For example, if rate of progress is satisfactory, positive affect will arise. If rate of progress is slower than expected, negative affect will arise. As testing in the present studies took on average 45 minutes to complete, there may have been large fluctuations in participants’ anxiety states depending on whether they perceived their rate of progress to be satisfactory or not. Such random changes in anxiety could clearly have clouded the present findings. However, by their random nature, they cannot account for the fairly systematic results obtained.

A second limitation of the study concerns the use of multiple ANOVAs and hence the use of multiple comparisons which may lead to the likelihood of committing a type 1 error (significant findings when in fact there are none). However, due to the systematic findings
across both experiments (identical main effects and interactions) and identical hysteresis
effects in the high anxiety conditions a type I error seems highly unlikely. Furthermore,
due to the fact that we used ANOVAs and multiple comparisons to identify a priori
specified pattern of results, the chances of such results being obtained by chance is
extremely low.

A third limitation of the present studies is that no measure of effort invested was taken.
Such a measure would go some way to confirming (or otherwise) the roles of effort
required and effort invested in the performance effects obtained. It may also explain the
non-significant findings in the performance measure time-taken. For example, according to
processing efficiency theory (Eysenck & Calvo, 1992), individuals who are experiencing
high levels of worry and anxiety may invest extra effort in the task in order to prevent sub-
standard performances. Consequently, as the present results indicate, performance times
between low and high anxious individuals should be similar, but highly anxious
individuals should report significantly higher levels of effort in order to perform the task.
Future research might consider using either a self-report measure of effort (e.g. Zijlstra,
1993), a psycho-physiological measure (e.g., Mullen, Hardy, & Tattersall, 2005), or both,
to monitor effort required and effort invested throughout testing.

To conclude, the present studies have shown support for the hysteresis hypothesis within
the framework of a cusp catastrophe model of anxiety and performance, based upon a
complex interaction between cognitive anxiety and effort required. The findings also lend
support to a processing efficiency theory explanation of anxiety-induced performance
catastrophes, and encourage further exploration of the precise role of self-confidence
within a processing efficiency theory framework.
Chapter 3

SELF-CONFIDENCE AND PERFORMANCE

Pre-competition self-confidence: The role of the self

This chapter is published as;
Abstract

Higgins's (1987) self-discrepancy theory holds that certain emotions occur as a result of discrepancies between pairs of psychological entities called self-guides. The present study explores self-discrepancies in self-confidence in relation to performance and cognitive anxiety. Slalom canoeists ($n = 81$) reported 'ideal', 'ought', and 'feared' levels of self-confidence three hours before a national ranking slalom tournament. Within half an hour of the start of the race, canoeists reported their 'actual' self-confidence and cognitive anxiety levels. Hierarchical multiple regression analyses revealed that self-discrepancies predicted significantly more performance variance than actual self-confidence alone. Additionally, hierarchical multiple regression analyses revealed that, contrary to the specific predictions of self-discrepancy theory, ideal and feared discrepancies (not ought and feared discrepancies) significantly predicted cognitive anxiety. Additional findings, implications and future directions for research into the nature of the self in sport are discussed.
The importance of self-confidence for success in sports has been well documented in various sport settings (Feltz, 1994; Mahoney & Avener, 1977; Vealey, 1999; Woodman & Hardy, 2003). However, self-confidence has been operationalized in several ways in the sport psychology literature, with most researchers typically using theoretical frameworks proposed by Bandura (1977, 1986) or Vealey (1986; Vealey, Hayashi, Garner-Holman, & Giacobbi, 1998).

Bandura’s (1977, 1986) theory defines self-efficacy as a person’s judgment of his/her capability to organize and execute courses of action required to attain a certain type of performance. It is concerned not with the skills one has but with the judgments about what one can do with whatever skills one has. Bandura postulated four key determinants upon which athletes base their self-efficacy beliefs: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal. Vealey’s (1986) model of sport confidence is similar to self-efficacy theory in that it is concerned with the belief or degree of certainty that individuals have about their ability to be successful in sport. The model predicts that trait (dispositional) sport confidence and goal orientations (e.g., performance and outcome goals) interact to determine state sport-confidence, which in turn directly influences performance. Several limitations and a lack of empirical research into the sport confidence model led Vealey et al. (1998) to extend her model to include sources of self-confidence in sport, which in essence extends Bandura’s (1977, 1986) four sources of self-efficacy to nine.

Woodman and Hardy’s (2003) meta-analysis of the relationship between self-confidence and sport performance revealed effect sizes that ranged from $r = -0.27$ to $r = 0.64$. Furthermore, a recent meta-analysis of the self-efficacy/sport performance relationship (Moritz, Feltz, Fahrback, & Mack, 2000) revealed that depending on how self-efficacy and
performance were assessed, the proportion of performance variance accounted for ranged from 1% to 12.6%.

One possible reason for these equivocal findings may be in the way that self-confidence and self-efficacy have been conceptualized and measured. For example, consider two male athletes who report the same level of self-confidence for the same task: Athlete A scores 5 out of a possible 10 but feels that this level should be higher for the task; Athlete B also scores 5 but feels that this level is adequate for the task. Although both athletes report the same score for self-confidence, Athlete A has a discrepancy between his perceived level of self-confidence and the level he feels is needed in order to be successful. In this example, Athlete A may be feeling more discomfort about performing the task than Athlete B, due to having a lower level of self-confidence relative to his ideal levels. Consequently, the relationship between self-confidence and performance is likely to be somewhat different depending on the performer's perception of the level of self-confidence he/she needs in order to perform the task successfully.

One theory that could explain this phenomenon is Higgins's (1987, 1996) self-discrepancy theory, which holds that certain emotions occur as the result of discrepancies between pairs of psychological entities called self-guides. According to Higgins (1987), there are three basic entities of the self: (a) the actual self, one's representation of the attributes that he/she believes he/she actually possesses; (b) the ideal self, one’s representation of the attributes he/she would ideally like to possess; and (c) the ought self, one’s representation of the attributes that he/she believes he/she should or ought to possess. According to the theory, living up to an “ideal” means attaining something desired, whereas living up to an “ought” usually means doing something to avoid disapproval from the self or others. Self-discrepancy theory proposes that people are motivated to reach a condition wherein their self-concept (actual self) matches their self-guide (ideal self and ought self).
Carver and Scheier (1998) have recently suggested that ideal selves are determined by approach goals which exert their influence upon behaviour via discrepancy-reducing feedback loops. In other words, the more one moves toward the goal the more one reduces the discrepancy between the actual and the ideal self. In contrast, according to Carver and Scheier, ought selves not only involve moving toward a positive goal (as Higgins's original theory states), but also trying to simultaneously move away from an anti-goal or a feared self - a set of qualities that a person wants not to become but is concerned about possibly becoming (Oyserman & Markus, 1990). This produces a discrepancy-enlarging feedback loop, that is, the more one moves away from the anti-goal, the bigger the discrepancy.

In his more recent work, Higgins (1997) proposed a similar distinction whereby ideal goals (hopes and aspirations) have a promotion focus, and ought goals (duties and responsibilities) have a prevention focus. Specifically, individuals with a promotion focus are concerned with advancement and accomplishments by attaining their hopes and aspirations, their ideals. Conversely, individuals with a prevention focus are concerned with protection and safety (i.e., preventing negative outcomes) by fulfilling their responsibilities and requirements, their oughts.

Lawrence, Carver, and Scheier (2002, p. 789) state, “People compare their present behaviour to their intentions, goals, or standards”. When there is a discrepancy between a perceived state and a desired state, it is hypothesized that individuals will alter their behaviour to minimize this discrepancy (Carver & Scheier, 1998, 1999; Lawrence et al., 2002). Specifically, if one’s progress toward a desired state is too slow, this leads to negative affect. However, this negative affect is accompanied by increased effort directed toward attaining the goal. Conversely, if an individual’s rate of progress toward a desired state is faster than needed, this leads to positive affect. However, this positive affect is accompanied by ‘coasting’ or a withdrawal of effort, a phenomenon that Carver and
Scheier (1999) call the Cruise Control Model. Research supporting this notion has shown that people in positive moods expend less effort on processing tasks than people in negative moods (e.g., Melton, 1995).

According to self-discrepancy theory (Higgins, 1987), when there is an actual/ideal discrepancy and a person’s actual self does not match the ideal self, the discrepancy is seen as a failure to achieve a positive outcome (e.g., not obtaining wishes or desires for the self). Such discrepancies are predicted to result in dejection-related affect such as sadness, disappointment, or dissatisfaction. When there is an actual/ought discrepancy and a person’s actual self does not match the ought self, the discrepancy is seen as the presence of a negative outcome (e.g., not obtaining a duty or obligation). Such discrepancies are predicted to result in agitation-related affect such as guilt, worry, and tension.

In a recent test of the role of the feared self within a self-discrepancy theory framework, Carver, Lawrence, and Scheier (1999) found that anxiety and guilt were strongly related to the feared self when individuals were close to the feared self. In such instances, discrepancies from the ought-self played no role. However, anxiety and guilt were strongly related to actual/ought discrepancies when individuals were farther from the feared self. This finding suggests that feared selves should moderate the relationship between actual/ought discrepancies. In other words, being close to the feared self will predict higher anxiety, but when the feared self is more remote, large discrepancies from the ought self should predict higher anxiety.

To return to the inconsistent findings found in the research on self-confidence-performance, it may be that our understanding of this relationship could be enhanced by consideration of the ideal, ought, and feared selves. The present study examined this proposal by testing four hypotheses. The first two examined the relationship between self-
confidence and performance. First, we examined the discrepancies of actual/ideal, actual/ought, and actual/fear levels of self-confidence and their relationship with sport performance. According to Bandura’s (1986) self-efficacy theory, athletes with high self-efficacy are more likely to try harder and choose challenging tasks. Consequently, individuals who are close to an ought or ideal self, and thus perceive themselves to have relatively high self-confidence, should outperform those who are far from an ought or ideal self, and thus perceive themselves to have relatively low levels of self-confidence. However, according to Carver and Scheier (1999), when there is a discrepancy between actual and ought or ideal levels of self-confidence, one will invest extra effort in the task to reduce that discrepancy, and should therefore outperform individuals who have little or no discrepancy. Second, we hypothesized an interaction between actual/fear discrepancies and actual/ideal or actual/ought discrepancies on performance. In other words, when performers are near their feared self, discrepancies from the ideal or ought self should be unrelated to performance. However, when performers are far from their feared self, discrepancies from the ideal or ought self should be the main predictor of performance.

The final two hypotheses examined the relationship between confidence discrepancies and affect. The third hypothesis tested the self-discrepancy theory prediction that actual/ought self-confidence discrepancies would correlate strongly with cognitive anxiety, especially when ideal discrepancies are controlled. Finally, in relation to previous research (i.e., Carver et al., 1999) the final hypothesis predicted that there should be an interaction only between actual/fear and actual/ought self-confidence discrepancies on cognitive anxiety, not between actual/fear and actual/ideal confidence discrepancies. More precisely, when performers are near their feared self, discrepancies from the ought self should be unrelated to anxiety. However, when performers are far from the feared self, ought discrepancies should be the main predictor of anxiety, with larger discrepancies predicting higher anxiety.
Method

Participants and Measures

Ninety-eight British slalom canoeists participated in this study. They comprised 23 premier division (15 M, 8 F), 53 first division (41 M, 12 F), and 22 second division (18 M, 4 F) slalom canoeists. The mean age was 22.5 years ($SD = 9.5$) and the mean competitive racing experience was 7.5 years ($SD = 6.3$). All participants gave informed consent prior to data collection.

The Competitive State Anxiety Inventory (CSAI-2). The CSAI-2 (Martens, Burton, Vealey, Bump, & Smith, 1990) was used to measure actual levels of self-confidence and cognitive anxiety. The inventory contains 27 items, 9 for each of the three subscales: self-confidence, cognitive anxiety, and somatic anxiety. The 27 items are measured using a Likert-type scale ranging from $1 = $ not at all to $4 = $ very much so. Thus the possible scores for each subscale range from 9 to 36. Examples of items include “I feel self-confident” (self-confidence), “I am concerned about this competition” (cognitive anxiety), and “My body feels tense” (somatic anxiety). The internal consistency for the three subscales has been demonstrated in several studies with alpha coefficients ranging from 0.79 to 0.90 (Martens et al., 1990). For the purpose of this study, only the data from the self-confidence and cognitive anxiety subscales were retained for analysis.

The Self-discrepancy CSAI-2. A modified version of the CSAI-2 was used to measure ideal, ought, and feared levels of self-confidence and cognitive anxiety (see Appendix A). The modified inventory was presented over two pages. The first page contained written instructions of how to fill out the modified inventory, followed by a description of the different selves which was adapted from the selves inventory used by Carver et al. (1999). It was also emphasized that although the same questions were asked three different times, they were asked in three different ways and the participants were encouraged to take their time when answering them.
The description of the three selves described on page 1 was as follows:

The Ideal Self: “Your ideal self is the kind of person you’d really like to be. It is defined by the characteristics you would ideally like to have. It’s not necessary that you have these characteristics now, only that you believe you want to have them.”

The Ought Self: “Your ought self is the kind of person you believe you have the duty or obligation to be. It is defined by the characteristics you think you ought to possess, or feel obligated to possess. It’s not necessary that you actually have these characteristics now, only that you believe you ought to have them.”

The Feared Self: “Your feared self is the kind of person you fear or worry about becoming. It’s defined by the characteristics you think you might have in the future but that you’d rather not become. It’s not necessary that you have these characteristics now only that you want to avoid having them.”

The Self-discrepancy CSAI-2 was presented on the second page. The inventory had the original 27 CSAI-2 questions down the left side of the page. Three titles were presented to the right of the questions: Ideal self; Ought self; Feared self. Below these titles were three subheadings: Ideally I’d like to be; I feel I ought to be; I do not want to be. The original Likert-type scale of 1 = not at all to 4 = very much so was presented for each of these subheadings for each of the 27 items. Participants then rated where they ideally would like to be (ideal self), where they think they ought to be (ought self), and where they did not want to be (feared self) for all 27 items. The three scales were presented in random order across participants to prevent any priming effects (see Appendix A for the Self-discrepancy CSAI-2 and Appendix B for the original CSAI-2).
Procedure and Performance

Data was collected over one competitive season covering eight race events. In canoe slalom, competitors are timed over two runs in one day, usually one in the morning and one in the afternoon. Participants completed the Self-discrepancy CSAI-2 approximately 3 hours before the run of their choice. Within half an hour before the competitive run, participants completed the original Martens et al. (1990) CSAI-2 (the actual self).

Canoe slalom performance consists of two timed runs down a course that has upstream and downstream gates, which are numbered in sequence. If competitors touch a gate with their paddle, buoyancy aid, helmet, or boat, they incur a 2-second time penalty; if they miss a gate, they are given a 50-s penalty; if they are judged to have deliberately moved a gate, they are also given a 50-s penalty. In the premier division the outcome of each competitor's place is decided by the combined times of both runs. In divisions 1, 2, 3, and 4, the outcome of the race is determined by the faster of the two runs. The performance measure (time), was taken from the race which the performer completed the CSAI-2, the first or second run.

Due to the nature of the penalty system it was decided to remove all participants who incurred a 50-s penalty on statistical grounds. This was because some races were won within a 90-s time limit, and race times that included a 50-s time penalty would vastly inflate performance times, thereby confounding any correlation-based analyses conducted on the data. Furthermore, due to the difficulty level and the nature and flow of the water changing with each race, and as the main performance focus in canoe slalom is (based on) speed, all technical errors (2-s penalties) were removed from the analysis, as they could also confound the results but were too few to analyze. This left 81 slalom canoeists for the final analysis. These comprised 21 premier division (14 M, 7 F), 44 first division (35 M, 9 F), and 16 second division (13 M, 3 F) slalom canoeists. The mean age of the performers
analyzed was 22 ± 9.1 years and the mean competitive racing experience was 7.8 ± 6.5 years.

Results

Reliability Analysis

Reliability analyses were run for actual and all modified CSAI-2 subscales. The internal consistency alphas for actual, ideal, ought, and feared self confidence subscales were .91, .69, .84, and .87, respectively. Actual, ideal, ought, and feared cognitive anxiety subscales were .85, .74, .70, and .76, respectively. Actual, ideal, ought, and feared somatic anxiety subscales were .90, .73, .76, and .88, respectively. These internal consistencies were considered adequate.

Self-Confidence Discrepancy Scores

The means for actual, ideal, ought, and feared self-confidence scores were 23.43 ± 5.57, 32.28 ± 3.58, 29.82 ± 4.43, and 14.64 ± 6.41, respectively. The means for actual, ideal, ought, and feared cognitive anxiety scores were 20.19 ± 5.68, 15.31 ± 4.01, 17.97 ± 4.51, and 28.92 ± 5.72, respectively. Self-confidence discrepancies were calculated by subtracting actual from ideal, actual from ought, and feared from actual confidence levels. The mean self-confidence of the sample was 8.85 ± 6.03 below their ideal self-confidence level, 6.39 ± 6.09 below their ought self-confidence level, and 8.79 ± 8.57 above their feared level of self-confidence. Independent t-tests were used to test for sex differences in ideal, ought, and feared discrepancies, as well as for differences in actual self-confidence and cognitive anxiety. Only one significant difference was revealed with women reporting a significantly higher ought discrepancy than men, t(79) = -2.46, p < .05.

In order to control for different course lengths and the different performance standards of the three divisions used, each individual’s performance data was standardized within race and all data were then collapsed across races. Race time was used as the performance
measure, with lower race times showing better performance. Furthermore, in order to control for gender differences we standardized all independent variables (actual confidence, cognitive anxiety, ideal, ought, and feared discrepancies) within each sex before collapsing across the sexes. Finally, due to high correlations between the independent variables (see Table 1), the combined use of variance decompositions and the condition index (Belsley, Kuh, & Welsch, 1980) was employed to detect for multicollinearity. Belsley et al. (1980) recommend that any independent variable that has a condition index of above 30 and contributes more than 50% of the variance to two or more regression coefficients should be excluded from that regression model. As the highest condition index was 4.8 in the present data, all independent variables were included in the analyses.

Table 1  Intercorrelations Between Self-confidence Discrepancies and Cognitive Anxiety

<table>
<thead>
<tr>
<th></th>
<th>Performance discrepancy</th>
<th>Ideal discrepancy</th>
<th>Ought discrepancy</th>
<th>Feared discrepancy</th>
<th>Actual confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Performance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ideal Discrepancy</td>
<td>.131</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ought Discrepancy</td>
<td>-.056</td>
<td>.735***</td>
<td></td>
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<tr>
<td>Feared Discrepancy</td>
<td>.140</td>
<td>-.371**</td>
<td>-.343**</td>
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<td></td>
</tr>
<tr>
<td>Actual Confidence</td>
<td>.045</td>
<td>-.812***</td>
<td>-.708***</td>
<td>.646***</td>
<td></td>
</tr>
<tr>
<td>Actual cog Anxiety</td>
<td>-.211*</td>
<td>548***</td>
<td>.481***</td>
<td>-.404***</td>
<td>-.517***</td>
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</table>

**Partial correlations**

<table>
<thead>
<tr>
<th></th>
<th>Actual cog anxiety</th>
</tr>
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<tr>
<td>Ideal discrepancy</td>
<td>.33**</td>
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<tr>
<td>Ought discrepancy</td>
<td></td>
</tr>
<tr>
<td>controlling for ought</td>
<td></td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ought discrepancy</td>
<td>.14</td>
</tr>
<tr>
<td>controlling for ideal</td>
<td></td>
</tr>
</tbody>
</table>

* p < .06. **p < .01. ***p < .001.
Hierarchical Multiple Regression Analysis

Hierarchical multiple regression analysis was used to test the first hypothesis that self-confidence discrepancies would significantly predict performance (race time) over and above actual self-confidence. Actual self-confidence was entered first into the regression equation while ideal, ought, and feared discrepancies were entered second as a block. Self-confidence did not significantly predict performance, $R^2 = .002$, $F(1, 79) = .161, p = .689$. However, the three discrepancies accounted for a significant proportion of performance variance over and above actual self-confidence, $R^2_{cha} = .111, F(3, 76) = 3.18, p = .029$.

Ideal discrepancies had a significant positive relationship with performance time, $\beta = .569, p < .01$, showing that the closer the participants were to their ideal level of self-confidence the better they performed. Neither ought discrepancies ($\beta = -.252, p = .136$) nor feared discrepancies ($\beta = .091, p = .550$) had significant beta coefficients (see Table 2).

Performance Moderated Hierarchical Regression Analysis

To test the second hypothesis that there would be a significant interaction between ideal and feared discrepancies (and ought and feared discrepancies) upon performance, we conducted a moderated hierarchical regression analysis with variables entered in the following order: (a) actual self-confidence; (b) feared and ideal discrepancies; (c) Feared $\times$ ideal discrepancies interaction. As in the previous analysis, actual self-confidence was not a significant predictor of performance, $R^2 = .002, F(1, 79) = .161, p = .689$. However, ideal and feared discrepancies significantly predicted performance over and above self-confidence, $R^2_{cha} = .085, F(2, 77) = 3.58, p < .05$. Finally, the product term (Feared $\times$ Ideal discrepancy) significantly predicted performance over and above the main effects, $R^2_{cha} = .09, F(1, 79) = 8.26, p < .01$ (see Table 3). When performers were near their feared self, discrepancies from the ideal self were relatively unrelated to performance. However, when performers were far from their feared self, the ideal self had a much larger effect on performance. Figure 1 depicts the nature of the interaction.
### Table 2. Hierarchical Regression Analysis Results

<table>
<thead>
<tr>
<th>Variables entered</th>
<th>$R^2$</th>
<th>$R^2_{cha}$</th>
<th>$F_{cha}$</th>
<th>$df$</th>
<th>$b$</th>
<th>SE</th>
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<tbody>
<tr>
<td><strong>Model 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual confidence</td>
<td>.002</td>
<td>.002</td>
<td>.161</td>
<td>1, 79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Model 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-.133</td>
<td>.087</td>
<td>-1.53</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual confidence</td>
<td>.113</td>
<td>.111*</td>
<td>3.18</td>
<td>3, 76</td>
<td>.222</td>
<td>.204</td>
<td>1.08</td>
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<tr>
<td>All Discrepancies</td>
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<td></td>
</tr>
<tr>
<td>Ideal discrepancies</td>
<td>.569</td>
<td>.171</td>
<td>2.71**</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ought discrepancies</td>
<td>-.252</td>
<td>.136</td>
<td>-1.50</td>
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<td></td>
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<td>Feared discrepancies</td>
<td>.091</td>
<td>.124</td>
<td>.600</td>
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</tr>
</tbody>
</table>

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

### Table 3. Moderated Hierarchical Regression Analysis Results: Self-Confidence, Ideal and Feared Discrepancies upon Performance

<table>
<thead>
<tr>
<th>Variables entered</th>
<th>$R^2$</th>
<th>$R^2_{cha}$</th>
<th>$F_{cha}$</th>
<th>$df$</th>
<th>$b$</th>
<th>SE</th>
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</thead>
<tbody>
<tr>
<td><strong>Model 1</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Actual self-confidence</td>
<td>.002</td>
<td>.002</td>
<td>.161</td>
<td>1, 79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Model 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual self-confidence</td>
<td>.087</td>
<td>.085**</td>
<td>3.58</td>
<td>2, 77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feared and ideal Discrepancies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Model 3</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-.043</td>
<td>.09</td>
<td>- .481</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual self-confidence</td>
<td>.356</td>
<td>.189</td>
<td>1.87*</td>
<td></td>
<td></td>
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<tr>
<td>Feared discrepancy</td>
<td>.170</td>
<td>.125</td>
<td>1.36</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Ideal discrepancy</td>
<td>.498</td>
<td>.161</td>
<td>3.09***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feared x ideal</td>
<td>.176</td>
<td>.09***</td>
<td>8.26</td>
<td>1, 76</td>
<td>.249</td>
<td>.087</td>
<td>2.87***</td>
</tr>
</tbody>
</table>

*Note.* Regression equation: $y = -.043 + .356x_1 + .170x_2 + .498x_3 + .249x_2x_3$ where $x_1 =$ actual self-confidence, $x_2 =$ feared discrepancy, and $x_3 =$ ideal discrepancy.

* $p = .07$. **$p < .05$. ***$p < .01$. 


The moderated hierarchical regression analysis testing the relationship between actual self-confidence and ought and feared discrepancies upon performance revealed no significant findings: actual self-confidence, $R^2 = .002$, $F (1, 79) = .161$, $p = .689$; ought and feared discrepancies, $R^2_{\text{cha}} = .026$, $F (2, 77) = 1.01$, $p = .367$; and the product term (Feared x Ought discrepancy), $R^2_{\text{cha}} = .03$, $F (1, 79) = 2.45$, $p = .122$.

![Regression slopes (± 1 SD) showing the interaction between feared and ideal self-discrepancies upon performance (time ± 1 SD; lower scores equals faster race times).](image)

Figure 1. Regression slopes (± 1 SD) showing the interaction between feared and ideal self-discrepancies upon performance (time ± 1 SD; lower scores equals faster race times).

Cognitive Anxiety Correlations

To test the third hypothesis that ought discrepancies are uniquely associated with agitation-related affect (i.e., cognitive anxiety), we calculated bivariate and partial correlations between all three discrepancies. Results showed that all three discrepancies were moderately related to cognitive anxiety: ideal discrepancy, $r = .548$, $p < .001$, ought discrepancy, $r = .481$, $p < .001$, and feared discrepancy, $r = -.404$, $p < .001$. According to self-discrepancy theory, actual/ought discrepancies should correlate strongly to anxiety when actual/ideal discrepancies are controlled. Furthermore, there should only be a minimum relationship between anxiety and actual/ideal discrepancies when ought
discrepancies are controlled. However, actual/ought discrepancies were no longer significantly related to cognitive anxiety when ideal discrepancies were controlled (partial $r = .14$, $p = .22$). Furthermore, ideal discrepancies were still moderately related to cognitive anxiety (partial $r = .33$, $p < .01$) when ought discrepancies were controlled (see Table 1).

Cognitive Anxiety Moderated Hierarchical Regression Analysis

To test the final hypothesis that there would be a significant interaction between feared and ought discrepancies upon cognitive anxiety, but not between feared and ideal discrepancies, we conducted two further moderated hierarchical regression analyses. The first analysis tested the hypothesized relationship between feared and ought discrepancies upon cognitive anxiety. Feared and ought discrepancies accounted for a significant proportion of the variance in cognitive anxiety, $R^2 = .296$, $F (2, 78) = 16.43$, $p < .001$. However, the product term (Feared x Ought discrepancy) failed to account for any further significant proportion of the variance, $R^2_{cha} = .013$, $F (1, 77) = 1.48$, $p = .23$.

Table 4. Moderated Hierarchical Regression Analysis Results: Cognitive Anxiety, Ideal and Feared Discrepancies.

<table>
<thead>
<tr>
<th>Variables entered</th>
<th>$R^2$</th>
<th>$R^2_{cha}$</th>
<th>$F_{cha}$</th>
<th>$df$</th>
<th>$b$</th>
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</thead>
<tbody>
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<td>Feared and ideal Discrepancies</td>
<td>.347</td>
<td>.347**</td>
<td>20.73</td>
<td>2, 78</td>
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<td>.034*</td>
<td>4.26</td>
<td>1, 76</td>
<td>-.188</td>
<td>.092</td>
<td>-2.04*</td>
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Note. Regression equation: $y = -.067 - .335X_1 + .395X_2 - .188X_1X_2$ where $X_1$ = feared discrepancy and $X_2$ = ideal discrepancy.

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

The second moderated hierarchical regression analysis examined the interaction between feared and ideal discrepancies upon cognitive anxiety. Feared and ideal discrepancies accounted for a significant proportion of the variance in cognitive anxiety, $R^2 = .347$, $F(2, 78) = 20.73, p < .001$. The product term (Feared x Ideal discrepancy) also accounted for a significant proportion of variance over and above the main effects, $R^2_{cha} = .034$, $F(1, 76) = 4.26, p < .05$ (see Table 4). Figure 2 depicts the nature of the interaction between feared and ideal discrepancies upon cognitive anxiety. When performers were far from the feared self, discrepancies from the ideal self were relatively unrelated to anxiety. However, when performers were close to the feared self, discrepancies from the ideal self had a much stronger effect upon cognitive anxiety. In other words, cognitive anxiety increased as the discrepancy from the ideal self increased, and this increase was greater when performers were close to the feared self.

![Figure 2. Regression slopes (± 1 SD) showing the interaction between feared and ideal self-discrepancies upon cognitive anxiety (± 1 SD; lower scores equals low cognitive anxiety).](image-url)
Discussion

Our results support the hypothesis that self-discrepancies in self-confidence are a stronger predictor of performance than self-confidence measures alone. Consistent with the first hypothesis, self-discrepancies predicted performance over and above actual levels of self-confidence. The results also partially supported the second hypothesis that there would be an interaction between positive self-guides (ideal or ought discrepancies) and feared discrepancies upon performance. However, only the interaction between ideal and feared discrepancies was significant. All three discrepancies significantly correlated with cognitive anxiety. However, counter to self-discrepancy theory predictions, ought discrepancies did not significantly correlate with cognitive anxiety when ideal discrepancies were controlled. Furthermore, ideal discrepancies were moderately correlated with anxiety when ought discrepancies were controlled. Finally, although ought and feared self-confidence discrepancies did not interactively predict cognitive anxiety, ideal and feared self-confidence discrepancies did significantly predict cognitive anxiety.

In support of the first hypothesis, self-confidence discrepancies significantly predicted (an extra) 11% of performance variance over and above that of actual self-confidence (Table 2). The beta coefficients indicated that only ideal discrepancies were significantly related to performance when the other discrepancies were controlled. In other words, the closer the participants were to their ideal level of self-confidence, the better they performed. As actual levels of self-confidence did not significantly predict performance (this finding is not new; see for example, Woodman & Hardy, 2003), these results strengthen the earlier argument that self-confidence measures alone may not always be sensitive enough to predict performance.

The results for the second hypothesis revealed that the interaction significantly increased performance variance over and above that of the main effects for ideal and feared
discrepancies by 9%. The interaction (see Figure 1) indicated that when performers were far from their feared self, discrepancies from the ideal self were more strongly related to performance times than when performers were close to the feared self. In other words, the closer participants got to their ideal self, the better they performed, thus supporting Bandura’s (1977, 1986) self-efficacy theory. However, participants who were usually close to the feared self outperformed those who are far from the feared self, suggesting that negative affect may also play a part in producing better performances, thus also showing some support for Carver and Scheier’s (1999) hypothesis.

The finding that ideal and not ought discrepancies were uniquely associated with cognitive anxiety can be explained in at least two ways. The original Selves Questionnaire (Higgins, Klein, & Strauman, 1985) asks individuals to create a list of 7 to 10 traits they think they actually have, ideally have, and ought to have. Discrepancies are then calculated by comparing the list for matches and opposites. This allows individuals to generate their own list of discrepancies. We restricted the responses of the participants to discrepancies in self-confidence levels only. Hence, in the analysis, the participants of this study could only have ideal, ought, and feared self-confidence discrepancies.

Previous research (Martens et al., 1990; Woodman & Hardy, 2003) has shown a moderate significant negative correlation between self-confidence and cognitive anxiety, so that any discrepancies in self-confidence whether from ought or ideal levels, might be expected to be associated with an increase in cognitive anxiety. In addition, according to Higgins (1999), the likelihood of finding specific affects with specific discrepancies depends on the significance of the discrepancy. This will include the magnitude, the accessibility, the relevance, and the importance of the self-discrepancy (see Higgins, 1999). Only magnitude was measured in this study, with the participants reporting an ought mean self-confidence discrepancy of 6.4 and an ideal mean self-confidence discrepancy of 8.8. According to
Higgins (1999, p. 1314), “the greater the magnitude of a particular type of self-discrepancy, the more strongly the person will experience the emotion associated with that discrepancy.” Therefore, if any discrepancy is likely to increase anxiety, the participants may have been merely responding to the discrepancy with the greater magnitude.

There was no support shown for the final hypothesis that there should be a significant interaction between feared and ought self-confidence discrepancies upon anxiety. However, feared and ideal discrepancies did significantly predict an additional 8% of the cognitive anxiety variance over and above that of self-confidence, with the interaction significantly predicting a further 3.4% of the variance (see Table 4). The nature of the feared/ideal cognitive anxiety interaction (see Figure 2) shows that when individuals were close to their feared self, the ideal self had a (much) stronger influence on cognitive anxiety than when they were far from their feared self.

An interesting pattern emerges when the two feared/ideal interactions are compared. In the cognitive anxiety interaction, when individuals are close to their feared self, the ideal self has a stronger influence on cognitive anxiety than when they are far from the feared self. However, the opposite results are shown in the performance interaction; that is, when participants are far from the feared self, the ideal self has a stronger influence upon performance than when they are close to the feared self. This adds further support to the findings that cognitive anxiety and self-confidence are meaningfully distinct constructs (Woodman & Hardy, 2003). Hardy (1996b) further states that future research should consider cognitive anxiety and self-confidence independently or as an interactive dyad, as good performance may be achieved when athletes are both high in cognitive anxiety and high in self-confidence.
A further point of interest throughout this study was the strength of the ideal discrepancy relationships with anxiety and performance, a finding that is contrary to the predictions of self-discrepancy theory. Recent research (Bruch, Rivet, Laurenti, 2000; Key, Mannella, Thomas, & Gilroy, 2000; Polasky & Holahan, 1998; Tangney, Niedenthal, Covert, & Barlow, 1998) has also found limited evidence for the specific predictions of self-discrepancy theory. Tangney et al. (1998) did not find the unique associations predicted by self-discrepancy theory between the type of self-guide (ideal or ought) and the specific type of affect (dejection or agitation). They found that only depression was associated with both ideal and ought discrepancies. Tangney et al. also noted that most of the people in their study did not easily distinguish well between ought and ideal discrepancies, which led the authors to suggest that the Selves Questionnaire may reveal a general type of discrepancy rather than two distinct “ought” and “ideal” selves. In support of this finding, throughout the present data collection some individuals also seemed to have difficulty making the distinction between an ideal self and an ought self - with particular reference to “what is an ought self?”

At a theoretical level, the results show that by more explicitly taking the “self” into consideration, we can predict more performance variance and negative affect than is possible with actual self-confidence measures alone. As the competition setting is essentially about ego threat, or threat to the self, it may be illogical to continue to ignore the self concept. Due to “ideal” discrepancies being particularly prominent throughout this study, it is important to understand which self-guides are important to different individuals and whether different domains play a moderating role in this. For example, Key et al. (2000) found that only the magnitude of the discrepancies was related to emotional discomfort in general.
Key et al. (2000) suggested that different types of discrepancy might be differentially important to various groups within the general population, and that different types of discrepancies may be linked to the specific types of affect (e.g., ideal discrepancy with dejection), but only under certain circumstances. Furthermore, Bruch et al. (2000) found that ought discrepancies were not related to agitation affects, and suggested that future research should explore the distinctiveness of different types of discrepancy in predicting negative affect relative to different domains of functioning. Higgins’s (1997) regulatory focus model may also help to explain these findings. In competition, athletes compete to win and achieve self-set goals. Thus they are more likely to focus on gains, wins, and achievements (a promotion focus) than on preventing negative outcomes such as loss (a prevention focus). Furthermore, this promotion focus may be the reason why the present results showed discrepancies from ideal selves to be more strongly related to affect and performance than discrepancies from the ought selves (we thank an anonymous reviewer for this suggestion). In other settings, for example health related exercise, this may not be the case.

The present results indicate that being far from an ideal self is associated with higher cognitive anxiety, especially when one is close to a feared self. Furthermore, being far from the ideal self is also associated with poorer performance, especially when one is far from the feared self. Coaches and sport psychologists should be aware of the nature of the self and be cognizant that self-reported self-confidence may not show the most complete picture of the performer’s self-confidence. Furthermore, some athletes may only be motivated to attain certain self-guides (ideals or ought). For example, according to Higgins (1996) living up to an ideal usually means attaining something desired. On the other hand, living up to an ought usually means doing something to avoid disapproval from the self or others. Athletes’ motivational reasons for participating in sport may strongly influence which self-guide, if any, they may want to attain.
To conclude, the findings reported here show that self-confidence self-discrepancies can predict significantly more performance variance than actual self-confidence (measures) alone. Of special interest was how “ideal” discrepancies were consistently related to performance and affect. In order to clarify these relationships, we need to consider other moderating variables such as motivation (reasons) or the performer’s environment. Finally, specific self-guides might determine the type of intervention used to modify discrepancies to enhance the quality of an athletes self-confidence.
Chapter 4

SELF-EFFICACY AND PERFORMANCE

The interactive effects of approach and avoidance goals, goal importance, and self-efficacy upon progress.

This research was presented at the Association for the Advancement of Applied Sport Psychology, Vancouver, September 2005.
Abstract

In the goal setting literature, a wealth of research has shown that if the necessary skills and incentives are present, self-efficacy will be positively related to goal progress. The present study explored the effects that goal polarity (approach vs. avoidance goals) and goal importance may exert upon the self-efficacy and performance relationship. One hundred and five undergraduate students completed a personal projects analysis which measured self-efficacy, goal polarity (approach and avoidance goals), goal importance and goal progress at the start of an academic semester and then at the end of the semester. Results revealed that significant progress occurred in all goal conditions. However, self-efficacy was not significantly correlated with the progress of important approach goals. Self-efficacy was, on the other hand, significantly related to the progress of important avoidance goals and unimportant approach and avoidance goals. Results suggest that important approach goals may invoke their own independent motivational force regardless of self-efficacy.
The pursuit of personal goals has received much empirical attention in recent years (Brunstein, 1993; Elliot & Thrash, 2002; Emmons, 1986; Little, 1989). Personal goals have been described as "consciously articulated, personally important objectives that individuals pursue in their daily lives; they are self-investments that provide individuals with a sense of purpose, structure, and identity" (Elliot, Sheldon, & Church, 1997, p. 915). In pursuing such goals individuals are thought to focus on positive outcomes where goal orientation involves trying to reduce a discrepancy between a present state and a desired end state (Bandura, 1991; Carver & Scheier, 1998). However, research also indicates that individuals may be motivated to increase a discrepancy between a present state and an undesired end state (Carver & Scheier, 1998; Elliot & Church, 1997). With this type of goal the motivational salience is avoidance based (King, Richards, & Stemmerich, 1998; Markus & Nurius, 1986). In recent literature, these two types of self regulation systems have generally been termed approach and avoidance goals (Dickson & MacLeod, 2004a; Elliot & Church, 1997; Elliot & Sheldon, 1998; Elliot & Thrash, 2002).

Research investigating how individuals adopt and pursue such goals has paid particular attention to self-efficacy theory (Bandura, 1986). Self-efficacy refers to the belief that one is capable of organising and executing the courses of action required to attain desired levels of attainment. Efficacy beliefs have been shown to influence the level at which goals are set (Waung, MacNeil, & Vance, 1995), the strength of commitment (Brown & Latham, 2002), the amount of effort mobilised in the endeavour (Bandura & Cervone, 1983), and the intensification of effort when accomplishments fall short of aspirations (Peake & Cervone, 1989). Research has also shown that individuals who have a strong belief in their capabilities tend to set higher goals and intensify their efforts until they succeed (Bandura, 1986).
Bandura (1997) further states that “people willingly adopt and stick to goals when their self-interests are linked to goal attainment” (p. 136). In addition, goal specificity, goal challenge, and goal proximity will also determine how strongly the self-system will become enlisted in any given endeavour. Further empirical research has also shown that competitive goals, goal value and success expectations can also influence goal commitment (Ingledew, Wray, Markland, & Hardy, 2005).

Surprisingly, the effects of goal importance upon effort and progress have generally been ignored in the self-efficacy literature. Goal importance has been shown to have positive effects upon performance in a number of studies that are independent from self-efficacy effects. For example, using a sample of sales persons, Hollenbeck and Williams (1987) found that goals high in self-focus and importance were associated with higher performance (increased sales). Also, Seijts, Meertens, and Kok (1997) found a significant interaction between goal level and importance with regard to public speaking. Unsurprisingly, they found that very high goals on an important task led to significantly higher performance than very high goals on an unimportant task. In a more recent study, Orbell, Johnston, Rowley, Davey, and Espley (2001) measured perceived self-efficacy, goal importance, and physical disability before and after joint replacement surgery. They found that when pre-surgery goal importance was high, it made relatively little difference to the extent of disability 9 months after surgery whether participants had high or low levels of self-efficacy (measured at 3 months post op).

Negative effects of self-efficacy upon performance have also been reported. For example, using a within subject design, Vancouver, Thompson, and Williams, (2001) found that previous performance was positively related to subsequent self-efficacy and goal level; however, subsequent self-efficacy and goal level were negatively related to future performance. In a follow-up study, Vancouver, Thompson, Tischner, and Putka (2002)
found that successfully manipulating self-efficacy on the same analytical game again had a detrimental effect on subsequent performance; furthermore, self-efficacy was also positively related to errors. Vancouver et al. (2002) suggested this negative effect of self-efficacy upon performance was due to high levels of self-efficacy leading to overconfidence and an increased likelihood of committing logical errors during the game.

Although research has shown that self-efficacy can predict life goal progress (Sheldon & Kasser, 1998), it has yet to examine the relationship between self-efficacy and performance in relation to avoidance life goals. That is, self-efficacy expectations with regard to discrepancy enlargement goals. In some circumstances, individuals seem to be motivated to avoid a feared self (Oyserman & Markus, 1990), or choose strategies that enable positive goal attainment based on avoidance of undesirable conditions (Higgins, 1996). Carver and Scheier (1998) state “when a person is too near a feared value, what matters is getting away from it” (p. 164). Research by King et al. (1998) found evidence to suggest that people sometimes consider it more important to avoid their worst fears than to achieve their life goals. Their explanation for this finding was that “it may be that life goals are more fluid than worst fears – that life goals are more likely to change in response to life circumstances, while worst fears remain the same” (p. 738).

Consequently, self-efficacy may play a greater role in progress away from avoidance goals than in the progress towards approach goals. For example, if an approach goal fails to come to fruition then the individual may still have made progress towards that goal and be “in a good place”. However, if an avoidance goal comes to fruition then the individual stands to be in a very bad place indeed. For this reason, individuals may rely more on self-efficacy in the progression of avoidance goals than approach goals.
Although self-efficacy research has generally shown positive effects upon goal progress under various situations (See Bandura, 1997), much less is known about how self-efficacy influences progress when individuals are faced with multiple goals. Independently of self-efficacy effects, research has shown that when faced with multiple and sometimes conflicting goals (e.g. approach and avoidance goals), individuals may prioritise goals based upon importance of the goal and/or the magnitude of the goal discrepancy i.e. goals with large discrepancies usually invoke more attention (Kernon & Lord, 1990). However, if discrepancies are perceived as too large, effort is likely to be withdrawn (Keman & Lord, 1988). Consequently, there may be a need to explore the effects that self-efficacy has upon multiple goal situations.

In order to further our understanding of the self-efficacy and performance relationship, the interactive effects of multiple goals, goal polarity (approach and avoidance goals), and goal importance should likely be considered. First, we explore goal progress across the course of an academic semester. According to previous research (Bandura, 1997; Kernon & Lord, 1990) individuals choose and pursue goals that are personally meaningful (i.e. personally important). Furthermore, according to Carver and Scheier (1998) and King et al. (1998) escaping from an avoidance goal may take precedence over the pursuit of approach goals, especially if one is close to an important avoidance goal. Therefore, we hypothesise that a three-way interaction should occur between goal polarity (approach and avoidance), goal importance (high and low), and goal progress over time. That is to say, significantly more progress should occur in the high important than the low important goal condition and significantly more progress should occur in the important avoidance goal, than in the important approach goal. When the goals are seen as unimportant, progress should be similar.
Secondly, as Bandura’s (1997) self-efficacy theory predicts actual performance if the necessary skills and incentives are present, we hypothesise that self-efficacy should correlate more strongly with progress on important goals (goals that are personally meaningful) than unimportant goals.

Third, according to King et al. (1998) if avoiding ones worst fears is important then self-efficacy may have a greater impact upon progress if the goal is seen as very important and avoidance based rather than if the goal is seen as very important and approach based. Consequently, we hypothesise that in the high important goal condition self-efficacy should have a significantly stronger correlation upon progress when the goal is perceived as avoidance based than if the goal is seen as approach based. However, if an individual perceives a goal to be unimportant, then the impact of self-efficacy upon progress should be similar for both approach and avoidance goals.

Finally, if importance exerts its own force upon behaviour, then it would be expected that goal importance would be significantly correlated with goal progress in important approach and avoidance goals but goal importance should not be significantly correlated with goal progress in unimportant approach and avoidance goals.

Method

Participants

One hundred and five 1st year university students (60 M, 45 F) volunteered to take part in the study. All participants (mean age = 19.00 years, SD = 1.93) gave informed consent prior to data collection.
Measures

The Personal Projects Analysis. A modified version of Little's (1983) Personal Project Analysis (PPA) was used to record approach goals, avoidance goals, goal importance, and goal progress. On the first page, the instructions for completing the PPA were slightly extended from Little (1983) and read “We are interested in studying the kinds of personal projects that people have at different stages of their life. All of us have a number of personal projects at any given time that we think about, plan for, carry out, and sometimes (though not always) complete. Some of these projects are approach projects, that is to say, they require us to get closer to some goal. However, some of us also have a number of personal projects that are about things we want to avoid or work away from (anti-goals)”. We then provided participants with some examples of approach goals (“Being more successful in my relationships”; “Finding a part-time job”) and avoidance goals (“Avoid doing badly in my exams”; “Avoid putting on weight”).

On the second page, participants were given ten minutes to write down any approach and avoidance goals that they were currently working on or thinking about working on in the near future. On the third page, they were instructed to write out five approach and five avoidance goals that they were most likely to engage in over the next two months. Alongside this, goal importance (“How important to you at the present time is each project?”) and goal progress (“How much progress have you currently made towards/away from the project?”) were measured. Responses to both these questions were made on a 10-point Likert scale (0 = not at all important/not at all successful, 10 = extremely important/extremely successful).

Personal Project Self-efficacy. Participants rated their self-efficacy regarding the attainment or avoidance of each approach or avoidance project, respectively. Participants were asked to rate whether they had the skills and resources to perform at 10 different
levels for each approach project (i.e., "I have the skills and resources to be 10% successful at achieving this goal"); "I have the skills and resources to be 20% successful at achieving this goal", etc). Similarly, participants were asked to rate whether they had the skills and resources to perform at 10 different levels for each avoidance project (i.e., "I have the skills and resources to be 10% successful at avoiding this goal"); "I have the skills and resources to be 20% successful at avoiding this goal", etc). Following recommendations from Lee and Bobko (1994), we measured magnitude and strength of self-efficacy. Self-efficacy magnitude was recorded by asking individuals to indicate (yes/no) whether they could successfully achieve each of the 10 levels of attainment. Therefore, a magnitude score of 0 to 100 (in increments of 10) could be recorded for each project (i.e., if an individual stated yes to the first 7 levels they were given a score of 70%). Self-efficacy strength was recorded by asking the participants to rate the degree of confidence they had in their ability to perform at each of the 10 levels (on a scale of 0-100%). A composite measure of self-efficacy strength was derived by summing the self-efficacy strength scores across self-efficacy magnitude levels that were answered yes (Lee & Bobko, 1994). Thus, a self-efficacy strength score of 0-1000% could be recorded for each goal. The composite measure of self-efficacy strength was used in all analyses. Participant’s most important approach goal, most important avoidance goal, least important approach goal, and least important avoidance goal were selected for subsequent analysis (see Appendix C for Personal Projects Questionnaire).

Procedure

Data were collected over one university semester for each participant, who completed Little’s (1983) modified PPA at the start of either their first or their second semester. In order to measure goal progress over time, goal progress was measured at the start and at the end of the academic semester. Self-efficacy and goal importance measured at the start of the academic semester (Time 1) were correlated with goal progress measured at the end of the
semester (Time 2) and goal progress measured at the end of the semester (Time 2) was used as the dependent variable in all subsequent ANOVA’s.

**Results**

**Goal Importance**

To check that goal importance at Time 1 was significantly higher for the most important (approach and avoidance) goals than for the least important (approach and avoidance) goals, a one-way ANOVA was conducted. Results revealed a significant difference in importance between goals $F(3, 416) = 141.48, p < 0.001$. Post hoc comparisons revealed that the most important approach goals ($M = 9.63 \pm 0.66$) and the most important avoidance goal ($M = 9.33 \pm 1.16$) were rated as significantly more important than the least important approach goal ($M = 6.81 \pm 1.47$) and the least important avoidance goal ($M = 6.55 \pm 1.97$). No other differences were significant.

**Approach and Avoidance Goal Progress over Time.**

To explore the hypotheses that most progress would occur in the high important goal condition and that significantly more progress should occur in important avoidance goal condition than the important approach goal condition, a three-way repeated measures ANOVA was performed between goal importance (high and low), goal type (approach and avoidance), and time (Time 1 and 2) upon goal progress. Results revealed significant main effects for goal importance $F(1, 103) = 25.78, p < 0.001, (\eta^2 = .200)$ goal type $F(1, 103) = 8.06, p < 0.01, (\eta^2 = .037)$ and time $F(1, 103) = 76.90, p < 0.001, (\eta^2 = .427)$ upon progress. In other words, participants made significantly more progress on important goals than unimportant goals, significantly more progress on avoidance goals than approach goals, and significant progress over time. There were no significant two-way interactions between goal importance and time $F(1, 103) = 0.73, p > 0.05, (\eta^2 = .007)$ or between goal type and time $F(1, 103) = 1.31, p > 0.05, (\eta^2 = .013)$. However, there was a significant
two-way interaction between importance and goal type $F(1, 103) = 6.87, p < 0.05, (\eta^2 = .063)$ and a marginally significant three-way interaction between goal importance, goal type, and time $F(1, 103) = 3.68, p = 0.058, (\eta^2 = .035)$.

To follow-up the three-way interaction, separate two-way ANOVAs between time (Time 1 and 2) and goal type (approach and avoidance) were conducted for least important goal condition and most important goal condition. Results for the least important goal condition revealed a significant main effect for time $F(1, 103) = 13.32, p < 0.001, (\eta^2 = .115)$ and a significant main effect for goal type $F(1, 103) = 28.66, p < 0.001, (\eta^2 = .218)$. The interaction between time and goal type was not significant $F(1, 103) = 0.44, p > 0.05, (\eta^2 = .004)$ (see Figure 1).

Results for the most important goal condition revealed no significant main effect for goal type $F(1, 104) = 0.23, p > 0.05, (\eta^2 = .000)$. However, there was a significant main effect...
for time $F(1, 104) = 43.85, p < 0.001, (\eta^2 = .297)$ and a significant two-way interaction between time and goal type $F(1, 104) = 4.54, p < 0.05, (\eta^2 = .042)$. Bonferroni corrected paired sample t-tests revealed that significant progress was made across time in both goal conditions; most important approach goal ($t = 6.05, p < .001$) and most important avoidance goal ($t = 3.29, p < .01$). However, there was no significant differences between progress of approach and avoidance goals at time 1 ($t = 1.07, p = .28$) or between approach and avoidance goals at time 2 ($t = 1.29, p = .19$) (see Figure 2).

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure2.png}
\caption{Progress over Time for Most Important Goals.}
\end{figure}

Due to the three-way interaction being only marginally significant and the follow-up tests failing to clarify the marginal interaction, the present results should be treated with caution as a type-1 error may have occurred. In light of these reservations, the significant two-way interaction between goal importance and goal type upon goal progress was explored (see Figure 3). Bonferroni corrected paired sample t-tests revealed that goal progress did not significantly differ between important and unimportant avoidance goals ($t = 1.62, p =$
However, progress was significantly higher for important approach goals than unimportant approach goals ($t = 5.69, p < .001$). There was no significant difference between important approach and avoidance goals ($t = .151, p = .881$), but unimportant avoidance goal progress was significantly higher than unimportant approach goal progress ($t = 3.65, p < .001$). In other words, no significant differences were found between most important approach and avoidance goals and least important avoidance goals but significantly less progress was made in the least important approach goal compared to every other goal (see Figure 3).

![Figure 3. Interaction between Goal Importance and Approach and Avoidance Goals upon Goal Progress.](image)

**Self-efficacy and Progress Correlations**

To test the second hypothesis that self-efficacy (measured at the start of the semester) would have a significantly stronger correlation with progress (measured at the end of the semester) when goals were perceived to be important than when they were perceived to be unimportant, Pearson's Product Moment Correlations were computed. Due to the content
of the goals being different and the repeated measures nature of the design, it was not possible to conduct moderated hierarchical regression analysis. Furthermore, in order to control for a type 1 error when conducting multiple correlations (Schutz & Gessaroli, 1993), an adjustment was made based on the number significant tests performed. Following recommendations by Dar, Serlin, and Omer (1994), we controlled for the error rate at the level of families of hypotheses. In other words, the multiple effects of the independent variables (self-efficacy and goal importance) were controlled upon each separate dependant variable (most important approach goal; most important avoidance goal; least important approach goal; least important avoidance goal). Therefore, any correlations that were below $r = .195$ would be deemed as insignificant (see Shavelson, 1988). In the most important goal condition, results revealed that self-efficacy strength was not significantly correlated with progress for important approach goals at Time 2 ($r = - .011, p > .05$). However, self-efficacy strength was significantly correlated with progress for most important avoidance goals at Time 2 ($r = .259, p < .001$). In the least important approach and avoidance goal condition, self-efficacy was significantly correlated with both least important approach goals at Time 2 ($r = .239, p < .01$) and least important avoidance goals at Time 2 ($r = .353, p < .001$). These results do not support the hypothesis that self-efficacy should be more strongly correlated with the progress of important goals than unimportant goals but do suggest that goal importance and goal polarity may moderate the role that self-efficacy plays in goal progress (see discussion and Table 1).

To test the third hypothesis that self-efficacy should have a significantly stronger relationship with progress when the goal is perceived as important and avoidance based than when the goal is seen as important but approach based, Williams (1959) test of significance between dependent correlations was used. As stated above, self-efficacy strength was not significantly correlated with progress for important approach goals at Time 2 ($r = -.011, p > .05$). However, self-efficacy strength was significantly correlated
with progress for important avoidance goals at time 2 ($r = .259, p < .001$). Consistent with the hypothesis, the results of Williams (1959) test showed that the correlation between self-efficacy and progress for important avoidance goals was significantly higher than the correlation between self-efficacy and progress for important approach goals at Time 2 ($t (101) = 2.20, p < .05$). Furthermore, Williams (1959) test for dependent correlations revealed no significant difference between the correlations of least important approach goal ($r = .239, p < .01$) and least important avoidance goal ($r = .353, p < .001$) ($t (101) = 1.14, p > .05$) (see Table 1).

**Goal Importance and Progress Correlations**

To test the final hypothesis that goal importance (measured at the start of the semester) would be significantly correlated with the progress (measured at the end of the semester) of important approach and avoidance goals but not with unimportant approach and avoidance goals, Pearson’s Product Moment Correlations were computed. In the most important goal condition, results revealed that importance was significantly correlated with progress for most important approach goals at Time 2 ($r = .219, p < .05$) and with progress for most important avoidance goals at Time 2 ($r = .242, p < .05$). In the least important approach and avoidance goal condition, importance was also (unexpectedly) significantly correlated with least important avoidance goals at Time 2 ($r = .336, p < .001$) but not with least important approach goals at Time 2 ($r = .179, p = .067$). These results provide partial support for the hypothesis that goal importance should be significantly correlated with the progress of important approach and avoidance goals but not with the progress of unimportant approach and avoidance goals (see discussion and Table 1).
Table 1  Correlations between Self-efficacy and Goal Importance upon Progress of Most Important Approach and Avoidance Goals and Least Important Approach and Avoidance Goals

<table>
<thead>
<tr>
<th></th>
<th>Most Important Goals</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Approach</td>
<td>Avoidance</td>
<td>(t)</td>
<td>(df)</td>
<td>(p)</td>
</tr>
<tr>
<td>Self-efficacy and progress</td>
<td>-.011</td>
<td>.259**</td>
<td>2.20</td>
<td>101</td>
<td>.014</td>
</tr>
<tr>
<td>Importance and progress</td>
<td>.219*</td>
<td>.242*</td>
<td></td>
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<table>
<thead>
<tr>
<th></th>
<th>Least Important Goals</th>
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<tr>
<td></td>
<td>Approach</td>
<td>Avoidance</td>
<td>(t)</td>
<td>(df)</td>
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</tr>
<tr>
<td>Self-efficacy and progress</td>
<td>.239*</td>
<td>.353***</td>
<td>1.14</td>
<td>101</td>
<td>.127</td>
</tr>
<tr>
<td>Importance and progress</td>
<td>.179</td>
<td>.336***</td>
<td></td>
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\*\(p < .05\); \**\(p < .01\); \***\(p < .001\)

Discussion

The present results showed that the relationship between self-efficacy and progress is stronger for important avoidance goals than it is for important approach goals. Conversely, when comparing unimportant avoidance goals and unimportant approach goals there is no difference in the strength of the relationship between self-efficacy and progress. Results also revealed a marginally significant three-way interaction between goal importance (high and low), goal type (approach and avoidance) and time (time 1 and time 2) upon progress across the semester. Contrary to our hypothesis, progress on important avoidance goals was not significantly greater than progress in important approach goals. In fact, almost the opposite was found. Due to the marginal nature of the significant three-way interaction and follow-up test being inconclusive, a type 1 error may have occurred. Consequently, the two-way interaction between goal importance and goal regulation was explored. Results revealed that goal progress for unimportant approach goals was significantly lower than all other goals. Furthermore, there was no significant difference between important approach and avoidance goals and unimportant avoidance goals upon progress. Finally, as
hypothesised, goal importance (measured at the start of the semester) was significantly correlated with both important approach and avoidance goal progress (measured at the end of the semester). Results also (unexpectedly) revealed that goal importance (measured at the start of the semester) significantly correlated with progress of unimportant avoidance goals (measured at the end of the semester).

It was hypothesised that self-efficacy would play a lesser part in predicting progress on important approach goals compared to progress on important avoidance goals. Although this hypothesis was supported it was unexpected that self-efficacy showed no significant relationship with progress on important approach life goals. This finding is even more surprising in that important approach goals made the most progress across time. This seems at odds with Bandura’s (1997) self-efficacy theory, which contends that self-efficacy should be positively related to progress, especially if the goal has personal meaning (i.e. is important). However, this finding of progress occurring in an important goal condition, regardless of self-efficacy, has been found in previous research (e.g., Hollenbeck & Williams, 1987; Orbell et al., 2001; Seijts et al., 1997). As previously mentioned, using moderated hierarchical regression, Orbell et al. (2001) found a significant interaction between goal importance and perceived self-efficacy upon recovery after joint replacement surgery. When pre-surgery goal importance was high (in terms of recovery), it made relatively little difference to the extent of disability 9 months after surgery whether participants had high or low levels of self-efficacy (measured at 3 months post op). However, when goal importance was low, self-efficacy at 3 months post-op was much more strongly related to levels of disability, with individuals high in self-efficacy being less disabled after 9 months surgery. According to Orbell et al. (2001), this suggests that pre-surgery goal importance moderates the impact of self-efficacy on rehabilitation progress. Consequently, with regard to the present findings and the findings of previous research, it seems that if a goal is perceived to be important then, due to the prioritising
nature of important goals and/or goal discrepancies (Kernon & Lord, 1990), people work significantly harder at such important approach goals regardless of self-efficacy.

It is also worth noting that the correlations between self-efficacy and progress on least important approach and avoidance goals ($r = .239$ and $r = .353$ respectively) were not hugely different to the correlation between self-efficacy and progress on most important avoidance goals ($r = .259$; see Table 1). This finding also seems slightly at odds with our hypotheses. It was expected that the self-efficacy and progress correlations for the least important goal condition would be significantly lower than the correlations between self-efficacy and progress in the most important goal condition. At least one possible explanation can be offered for this. The unimportant goals were not strictly unimportant. The mean importance ratings for unimportant approach goals and unimportant avoidance goals were 6.81 (± 1.47) and 6.55 (± 1.97), respectively on a scale of 1-10. Consequently, these goals can be interpreted as "mildly important" goals and may therefore have been important enough to have invoked attention (Kernon & Lord, 1990). For example, under multiple goal conditions, Kernon and Lord (1990) found that individuals allocated their resources to goals that had high goal valence (importance) coupled with high goal expectancy levels. In the present study, as all goals were perceived to be mildly important or very important, this may have contributed to the reason why significant progress occurred across the semester in all four goal conditions.

The present results also indicate that goal importance played a significant part in goal progress. Not surprisingly, goal importance (measured at time 1) was significantly correlated with progress of important approach and avoidance goals measured at the end of the semester. As hypothesised, importance was not related to progress in the least important approach goal condition. However, it was a little unexpected that goal importance was significantly correlated with the progress of least important avoidance
goals. Two interesting patterns emerge when the approach goal condition is compared to the avoidance goal condition. Results from the approach goal condition suggest that when the goal is important, self-efficacy appears to lose its influence over goal progress. However, when the approach goal is less important then self-efficacy appears to be the main influence over progress. In other words, it seems that importance may be the main force in driving progress when goals are seen as highly important, but when goals are less important then self-efficacy may be the main force in driving progress (see Table 1). This finding supports previous research indicating that self-efficacy and importance can exert independent effects upon progress (Orbell et al., 2001). Furthermore, results also appear to suggest that self-efficacy and goal importance are both important characteristics in progressing away from important and less important avoidance goals (see Table 1).

The finding that self-efficacy and importance were both significantly correlated with goal progress for both “mildly important” and “very important” avoidance goals highlights the importance that self-efficacy and goal importance play in the achievement of avoidance goals. This finding seems to support previous research in that avoiding ones worst fears may be more important than achieving life goals (King et al., 1998). For example, if an individual wants to “avoid doing badly in exams” or “avoid drinking excess amounts of alcohol” then these (dangerous) avoidance goals may need a constant amount of monitoring and reliance on self-efficacy if they are to be kept at a distance (as they are a constant possibility). Furthermore, the consequences of failure in avoiding these goals are relatively high (one might fail a degree or have serious health problems). Consequently, ensuring that these anti-goals never come to fruition may need constant monitoring, and in some cases, the motivation to avoid them may outweigh the motivation to achieve approach goals (see also King et al., 1998). This adds further support to the suggestion that increasing the distance from an anti-goal is just as important as reducing the distance to an approach goal (Carver & Scheier, 1998; King et al., 1998).
One interesting question that derives from these findings is what determined goal choice, and how does that influence effort, persistence, and progress? Locke and Latham (1990) state that "goal choice is a function of what the individual thinks can be achieved and what he or she would like to achieve or thinks should be achieved" (p. 122). Locke and Latham's (1990) review of 13 self-efficacy studies found that self-efficacy was significantly related to personal self-set goal level and also independently related to performance, in turn, goal level was separately related to performance. As previously mentioned goals that are important or goals that have large discrepancies between the present state and some desired state usually invoke attention (Kernon & Lord, 1990). The present findings also indicate that avoidance goals are equally attention grabbing as important approach goals.

Limitations of the present study are that the data presented here is just a snapshot of the participant's life goals. In other words, participants were already working on some of these life goals before the data collection took place. Consequently, some goals may have been near completion and hence progress towards or away from them may have been at a slower rate due to a 'coasting effect' (Carver & Scheier, 1999). In light of this argument a more accurate measure of the relationship that self-efficacy has upon progress of approach and avoidance goals and goal importance might be obtained by measuring goal progress at an earlier stage. Secondly, the request for individuals to provide a list of goals that they were most likely to engage with over the next month or two may explain why goal importance remained so high. In other words, it is unlikely that an individual would attend to and select goals that were low in importance. Third, there may have been some confusion amongst the participants when defining current progress and success. For example, participants were asked "How much progress have you currently made towards/away from the project?" but they were then asked to rate how successful they currently were i.e. "0 = not at all successful, 10 = extremely successful". Consequently success may have been interpreted in different ways across the sample. Finally, self efficacy expectations in regard
to goal attainment were only measured at the start of the study and may have significantly changed over the semester, which may have influenced its relationship with goal progress. However, the 10 week period used in this study was far shorter than the 6 month period used in Orbell et al’s. (2001) study.

It seems that the relationship between self-efficacy, goal polarity and goal importance upon progress appears more complex than at first realised. Although the present study found no significant relationship between self-efficacy and progress upon important approach goals, significant progress still occurred on these goals. It further appears that goal importance may have its own separate “force” over goal progress. To date, no other research has explored the relationship between self-efficacy, importance and progress of approach and avoidance life goals. These exploratory findings suggest that self-efficacy and goal importance can sometimes exert independent effects upon performance of approach goals. However, both goal importance and self-efficacy seem important variables in relation to progress of avoidance based goals. Future research in this area should consider when faced with multiple goals, how are goals prioritised? What relationship does self-efficacy have upon progress in goals that vary in difficulty, importance and polarity? Is it the case that goal importance can exert a separate force from that of self-efficacy upon goal progress? If this is indeed so, then may the force be with you!
Chapter 5

Summary, General Discussion, and Future Directions
Thesis Summary

This final chapter aims to briefly remind the reader of the research questions presented and to discuss the general findings from the three empirical chapters that contribute to the thesis. The results are then discussed in terms of theoretical and applied implications which leads to a discussion of the strengths and limitations of the thesis. Finally, recommendations for future directions in research are considered.

Chapter 1 highlighted some of the contradictory findings that have become apparent in mainstream/sport psychology research to date. Three areas of particular interest were: anxiety and performance research; self-confidence and performance research; and self-efficacy and progress towards life goals research. Contradictory findings were highlighted and alternative theories were proposed that could challenge current thinking.

Chapter 2 questioned whether anxiety induced performance catastrophes occur as a result of a complex interaction between cognitive anxiety and physiological arousal or a complex interaction between cognitive anxiety and effort required. Martens, Burton, Vealey, Bump, and Smith (1990) Multidimensional Anxiety Theory (MAT) proposes that cognitive anxiety has a negative relationship with performance, somatic anxiety has a curvilinear relationship with performance, and that, self-confidence has a positive relationship with performance. However, research has consistently failed to fully support the predictions of MAT (e.g., Burton, 1998; Raglin, 1992; Woodman & Hardy, 2003). Hardy (1990a) proposed the cusp-catastrophe model of anxiety and performance to address these somewhat erratic findings. Whilst MAT only made prediction about the separate effects that cognitive anxiety, somatic anxiety, and self-confidence had upon performance, the cusp-catastrophe model examined the interactive effects of these three components. One of the most interesting aspects of the cusp-catastrophe model concerns the hysteresis hypothesis. This hypothesis predicts that under conditions of high cognitive anxiety.
increasing levels of physiological arousal will have a beneficial role with performance, but only to a certain point. After which performance is predicted to make a catastrophic drop. Furthermore, it is only when physiological arousal has considerably decreased, will performers feel it worthwhile re-investing effort in the task. Hence, under conditions of high anxiety, the path that performance follows when physiological arousal is increasing is different to the path that performance follows when physiological arousal is decreasing. Previous tests that have supported the hysteresis hypothesis (Hardy & Parfitt, 1991; Hardy et al., 1994) have manipulated physiological arousal by means of physical effort (i.e., interval running). Consequently, some ambiguity exists about the precise nature of the asymmetry factor. The findings could reflect anxiety-induced physiological arousal, exercise-induced physiological arousal, exercise-induced effort, or anxiety-induced effort required to perform the task.

Chapter 2 presented two studies that examined this limitation by changing the asymmetry factor in the cusp-catastrophe model from physiological arousal to cognitive effort. Processing efficiency theory (Eysenck & Calvo, 1992) was used as a theoretical underpinning to the cognitive anxiety and performance relationship. PET predicts that worry or cognitive anxiety pre-empts some of the processing resources of the working memory system, thereby reducing the attentional capacity available to working memory. Consequently, any adverse effects of worry on task performance should be greater on tasks which exert large demands on working memory. However, anxious individuals who perceive that performance may be, or is, substandard can allocate extra effort to maintain performance, but this increase in effort will occur only if performers perceive themselves to have a moderate subjective probability of success (Eysenck, 1982). Results in both studies revealed the hypothesised significant three-way interaction between cognitive anxiety, task difficulty, and direction (i.e., difficulty increasing vs. difficulty decreasing). Follow-up tests showed mild support for the hysteresis hypothesis in study 1 and quite strong support
for the hysteresis hypothesis in study 2. The findings support a processing efficiency theory (Eysenck & Calvo, 1992) explanation of anxiety-induced performance catastrophes and suggest that Hardy and Fazey’s (1987) original catastrophe model might be better replaced by a cognitive anxiety and effort required model.

In a similar vein to Chapter 2, Chapter 3 attempted to address some of the conflicting findings found in the self-confidence and performance research (Woodman & Hardy, 2003). This chapter addressed the issue that previous research in self-confidence and sport performance only considered level of self-confidence (e.g., confidence measured within an hour of performance). Confidence research has generally ignored the nature of ‘self’ e.g., the ‘ideal’, ‘ought’ and ‘feared’ self (confidence). This chapter examined the role the self may play in self confidence and performance research. Using Higgins’s (1987) self-discrepancy theory (ideal and ought selves) and Oyserman and Markus’s (1990) definition of the feared self as a theoretical framework, athletes indicated ideal, ought, and feared levels of self-confidence and cognitive anxiety before a national ranking event. They also reported in the traditional manner where their actual self-confidence and cognitive anxiety levels were half an hour before the race. Results revealed that actual self-confidence did not significantly predict performance. However, when the nature of the self was taken into consideration, discrepancies from all three selves significantly predicted an additional 11% of performance variance. Beta weights revealed that the closer participants got to their ideal self-confidence levels, the better they performed. Moderated hierarchical regression analysis further revealed that when performers were near their feared self, discrepancies from the ideal self were relatively unrelated to performance. However, when performers were far from their feared self, the ideal self had a much stronger effect upon performance. Furthermore, when testing specific predictions of self-discrepancy theory, moderated hierarchical multiple regression analyses revealed that, contrary to the specific predictions of self-discrepancy theory, the interaction between ideal and feared discrepancies (not
ought and feared discrepancies) significantly predicted 3.4% of variance in performance anxiety over and above the main effects (34.7%).

Chapter 4 explored the common ground that appears to exist between the ideal self and approach goals, and the feared self and anti goals. The “ideal” self incorporates a discrepancy reducing loop much in the same way that approach goals do, that is, one wants to close the gap between a present state and a desired state. Similarly, the “feared” self seems to incorporate a discrepancy enlarging loop much in the same way as avoidance goals, that is, one wants to increase the gap between a present state and an undesired state. However, the relationship between approach and avoidance goals in the goal setting literature has generally been ignored despite the fact that empirical research has found that avoidance goals can in some cases take precedence over approach goals (e.g., King, Richards, & Stemmerich, 1998). Goal research has also been criticised in that it has tended to focus upon single goal situations, whereas most life settings contain multiple and often conflicting goals (e.g., Kernan & Lord, 1990). Furthermore, goal importance has shown to moderate the impact that self-efficacy has upon progress (Orbell et al., 2001). Chapter 4 examined the effect that self-efficacy has upon goal progress when goal type (approach and avoidance goals) and goal importance are taken into consideration. It was hypothesised that self-efficacy would have a significantly stronger relationship with progress when goals were important and avoidance based than when goals were important but approach based. If the individual perceives both approach and avoidance goals as unimportant then there should be little difference between the size of the correlations between self-efficacy and progress. Results supported the hypothesis that when the goal was perceived as unimportant there were no significant differences between the size of the correlations between self-efficacy and progress towards approach or avoidance goals. Furthermore, when the goal was seen as important the correlation between self-efficacy and progress of avoidance goals was significantly higher than the correlation between self-efficacy and
progress of approach goals. Interestingly, self-efficacy did not correlate with progress of important approach life goals despite the fact that important approach life goals made significant (and most) progress over the two-month period. Results also revealed that mean goal progress for unimportant approach goals was significantly lower than all other goals, whereas no significant differences occurred between important approach and avoidance goals and unimportant avoidance goals. Finally, goal importance was significantly correlated with progress of important approach and avoidance goals and unimportant avoidance goals, but not with progress of unimportant approach goals. The above finding indicates that goal importance can exert a separate force over goal progress to that of efficacy expectations.

Theoretical Implications

Catastrophe Models

Results in chapter 2 supported Hardy's (1999) hypothesis that previous performance catastrophes may have been due to a complex interaction between effort required and cognitive anxiety rather than between physiological arousal and cognitive anxiety. Theoretically, there may be two separate cusp-catastrophe models, one that accounts for the interactive effects of cognitive anxiety and physiological arousal upon performance and the other accounting for the interactive effects of cognitive anxiety and effort upon performance. However, due to the impressive amount of evidence in support of processing efficiency theory (Eysenck & Calvo, 1992), the cognitive explanation of the effects of anxiety upon performance seems more plausible, therefore supporting the second model. If two separate models do exist, then the type of task being employed may determine which model is more salient. For example, Hardy and Parfitt (1991) and Hardy et al. (1994) used a motor task to measure physical performance (i.e., basketball and crown green bowling). Chapter 2 used a cognitive task that induced high levels of cognitive effort to measure cognitive performance. Models that explore the interactive effects between cognitive
anxiety and physiological arousal upon performance may have weaker external validity when assessing performances that are heavily dependent upon cognitive abilities. Likewise, exploring the interactive effects of cognitive anxiety and effort required upon performances that are heavily dependent on physical abilities may also be limited.

In any case, it appears that cognitive anxiety plays an important part in the investment of effort and performance in both task types (Hardy & Parfitt, 1991; Hardy et al., 1994; Chapter 2). Previous research (Hardy & Hutchinson, in press; Mullen, Hardy, & Tattersall, 2005) has also found that cognitive anxiety is associated with extra effort investment in physical tasks such as rock climbing and golf putting. What was particularly interesting in Hardy and Hutchinson’s (in press) study is that due to the nature of the rock climbing task a high level of cognitive effort is also required to make important risk taking and technical decisions, whereas golf putting (Mullen et al., 2005) does not place heavy demands on working memory. Hardy and Hutchinson (in press) found only mixed evidence to fully support the tenet that cognitive anxiety is the causal link to increased effort. They also found evidence to suggest that somatic anxiety could lead to increased effort and performance in high grade leading rock climbers. Consequently, Hardy and Hutchinson suggested that anxiety induced effort may be “a strategic response to the threat that underpins the anxiety response rather than to the cognitive anxiety evoked by that threat”. They went on to suggest that the importance of the situational stressor may be the key determinant of both effort and anxiety. Having said all that, the research referred to above provides further evidence that cognitive anxiety (and under some circumstances, somatic anxiety) can lead to an increase of effort and hence performance in tasks that are both physical and cognitive in nature. Furthermore, by increasing the consequences of poor performance in Chapter 2, participants also seemed to invest extra effort, reflected by higher performance scores. This adds further evidence to support the view that cognitive anxiety may not always be debilitating to performance (Hardy 1997), even in tasks that
require either cognitive or physical effort. This is all in stark contrast to the predictions of multidimensional anxiety theory (Martens et al., 1990).

Results from Chapter 2 (together with the findings from Chapter 4) also suggested that the cusp-catastrophe model proposed by Carver and Scheier (1998) may be worthy of attention. In this model, Carver and Scheier proposed that self-confidence and task importance exert interactive effects upon task engagement/disengagement. More specifically, they propose that when task importance is low and confidence is low, then task engagement is likely to be low. However, when task importance is high and self-confidence is high then task engagement is likely to be high. Furthermore, when task importance is high, decreasing levels of self-confidence can lead to a catastrophic drop in task engagement/performance. Furthermore, once this catastrophic drop in task engagement/performance has occurred, a significant increase in self-confidence should be required before performers would perceive it worthwhile re-engaging with the task. This model seems worthy of further pursuit as it could help bring together a number of research areas presented in the present thesis. For example, Hardy (1996b), Hardy et al. (2004), and Woodman and Hardy (2003) found evidence to suggest that self-confidence can protect against the negative effects of anxiety. Results from Chapter 3 also found that smaller self-confidence discrepancies were associated with lower levels of cognitive anxiety. Seijts et al. (1997) found that task importance may moderate the influence that self-efficacy has upon progress. Results from Chapter 4 indicate that when approach goals are important then self-efficacy may lose its influence over progress as goal importance drives behaviour. Chapter 2 also found some evidence for Eysenck and Calvo’s (1992) PET proposal that anxiety may alert the individual to the importance of the task so that individuals may attempt to increase effort and thereby increase performance if they feel that performance is, or could be, sub-standard. However, according to earlier versions of the theory (Eysenck 1982) increased effort will only occur when individuals perceive themselves to have at
least a moderate subjective probability of success. Consequently, the interactive effects of
task importance, cognitive anxiety, effort and self-confidence upon task
engagement/performance seem to be an extremely promising area for future research.

Self-confidence and Discrepancies

Chapter 3 investigated discrepancies in self-confidence levels in relation to one's own
standpoint (i.e., actual/own versus ideal/own discrepancies). Higgins (1987) further makes
specific predictions about discrepancies in relation to a significant others' standpoint (i.e.,
actual/own versus ideal or ought/other; see Chapter 1). Although Chapter 3 explored
discrepancies in relation to one's own standpoint in slalom canoeists, discrepancies from
significant other's standpoints, (i.e., perceptions of how significant others e.g.,
coach/parent think you could be (ideal/other) or think you ought to be (ought/other)) may
also play an important role. For example, a coach's overly inflated belief in their athlete's
capabilities to perform a task may cause a discrepancy in the athlete's perception of their
self (confidence) compared to the ideal/ought perception of the coach e.g. "My coach
believes I am confident enough for this move, but I don't feel I am". This discrepancy may
be particularly dangerous in certain sports such as gymnastics where the athlete may be
pushed into a move that the coach perceives them to be confident in performing, but in
reality the gymnast is not. In fact, Hardy and White (1999) reported a case study where lost
moves in gymnastics were a possible cause of discrepancies (between the coach and the
athlete) brought about by a lack of understanding on the part of the coach regarding the
gymnast's state readiness to perform a move.

Kelly's (1955) theory of personal constructs proposes that individuals will vary in the way
that they interpret the same event. Based on Kelly's (1955) theory, performance profiles
(Butler, 1989; Butler & Hardy, 1992) have been shown to highlight discrepancies where an
athlete and their coach interpret the same situation differently (Dale & Wrisberg, 1996;
Performance profiles typically ask athletes to identify characteristics of an elite athlete in their sport and then rate themselves on those characteristics that they perceive are important for them. The coach can also rate the athlete upon those characteristics. This allows the athlete and coach to identify and reduce any discrepancies that may exist either within the athlete or between the athlete and their coach.

There appears to be a lot of common ground between Butler’s (1989) performance profiling and Higgins (1987) self-discrepancy theory as they both encourage the identification of discrepancies. However, there exists one important distinction. Self-discrepancy profiles ask individuals to write out a list of up to 10 traits from their own standpoint or that of a significant other, from their ideal perspective, and their ought perspective. Hence, self-discrepancy theory provides the individual with the opportunity to rate characteristics that they think are important to them (ideal and ought) from two different standpoints (own and other). Performance profiles require individuals to elicit characteristics that they consider are important to them in order to perform successfully in their sport (an elite counterpart in the athletes sport is usually applied when brainstorming for such characteristics). The athlete is then required to rate themselves on those qualities i.e. creating self-guides (Butler & Hardy, 1992). Performance profiles have been used in several different ways. For example, Butler and Hardy (1992) used the performance profile to compare an athletes’ present state to that of previous best performances, which provides the athlete and coach with immediate feedback to how the athlete views their present physical and mental condition. Not unlike self-discrepancy theory (Higgins, 1987), performance profiles have also been used to compare an athletes’ present state to that of an “ideal” state. This allows assessment of perceived strengths and weaknesses that the athlete perceives to have. However, some confusion concerning performance profiles may have transpired. For example, Dale and Wrisberg (1996) used the performance profile individually and collectively in a team of volleyball players to facilitate goal setting. They
asked athletes to rate themselves on the characteristics of an elite performer, but failed to ask athletes to select qualities to work on that were considered important for them. In essence, this ignores the characteristics that the athlete perceives would be important for them to be successful. For example, if an athlete profiles an elite counterpart high in arrogance, it does not mean that the athlete rates arrogance as an important characteristic to work on. Consequently, if not used correctly, the users of performance profiles may (to a certain extent) ignore the nature of the self. In any case, by extending the performance profile to take into consideration an athlete's actual, ideal, and ought characteristics that they perceive to be important to them from their "own" standpoint and to that of "significant others" (e.g. the coach) and their related affects, may provide a profitable area for future research and applied work.

The fact that the "ideal" self played such a prominent part throughout the findings in Chapter 3 deserves further comment. Higgins (1997) further developed self-discrepancy theory in that "ideal" selves (aspirations and accomplishments) have a promotion focus and that "ought" selves (responsibilities and safety) have a prevention focus. In other words, strong "ideal" selves and situations involving gain/non-gain induce a promotion focus, whereas strong "ought" selves and situations involving loss/non-loss induce a prevention focus. It was stated in Chapter 3 that the prominence of the "ideal" self throughout the findings may have been due to athletes focusing on promoting good performance rather than preventing bad performance.

It appears that there is some considerable overlap between approach and avoidance goals (Chapter 4) and Higgins (1997) promotion and prevention research (Chapter 3). For example, individuals with strong ideal selves (promotion focus) may be characterised with having approach goals. Consequently, individuals with approach goals would be hypothesised to be thinking about "gains and non-gains" in regards to performance.
Individuals with strong ought selves (prevention focus), may be characterised with having avoidance goals. Consequently, individuals with avoidance goals would be hypothesised to be thinking about “loss and non-loss” in regards to performance. It also seems that being close to a feared self is also associated with “prevention” and “loss and non-loss”.

Any future research investigating self-discrepancies should also consider Higgins (1987) proposal that self-discrepancy theory does not assume that all individuals will possess all types of discrepancies. Some may not be vulnerable to discrepancies of any type whereas others may be vulnerable to one or more types of discrepancies. However, even if a person is vulnerable to one or more self-discrepancies, the discrepancies do not necessarily produce equal amounts of discomfort. For example, according to Higgins (1999), the amount of discomfort felt will be in relation to; (a) the magnitude of the discrepancy; the greater the size of the discrepancy the more strongly the person will experience the emotion associated with that discrepancy; (b) the accessibility of the discrepancy; the strength of the emotion experienced will also depend on which discrepancies are more accessible; (c) the relevance of the discrepancy; the magnitude of each discrepancy will predict the relevant emotion when individuals imagine negative events happening to them; and (d) the importance of the discrepancy; the relation between discrepancies and emotions is stronger when individuals believe that possessing that self has important consequences. Taking these variables into consideration should improve any future discrepancy research.

**Approach-Avoidance Goals, Goal Importance and Effort**

As mentioned above, Higgins (1987) argues that the importance of the self-guide (ideal or ought) will also be related to the amount of discomfort felt. In Chapter 3, it was noted that the anxiety associated with the ideal self may have been due to the ideal self having the largest magnitude (p. 80). However, the ideal self (approach-promotion) may also have been perceived to be more important than the ought self (avoidance-prevention),
hence its relationship with cognitive anxiety (e.g., it is important for me to perform close to my ideal level).

Perceived importance certainly seemed to have a strong effect upon progress of life goals in Chapter 4. For example, one of the most interesting finding from Chapter 4 is that in the approach goal condition, self-efficacy appears to lose its influence over goal progress when goals are seen as very important. However, when goal importance diminishes, self-efficacy appears to regain its influence upon goal progress. Supporting previous research that goal importance may moderate the impact that self-efficacy can have upon goal progress (cf. Orbell et al., 2001). This may also go some way in explaining why the self-efficacy and performance relationship literature has shown some conflicting results.

Applied Implications

It is now well established that anxiety may not always have a detrimental effect upon performance and in some cases may even enhance performance through an increase of effort (e.g. Eysenck & Calvo, 1992; Hardy, 1997; Hardy & Hutchinson, in press). The present results also show that the combination of increasing task difficulty and high cognitive anxiety can also lead to sudden and dramatic drop in performance (especially in tasks that place excessive demands upon working memory). Therefore, sport psychologists and coaches should become aware of how and when cognitive anxiety may interfere with tasks that are cognitive in nature. Furthermore, in some circumstances, cognitive relaxation strategies may have to be used with some caution.

Sport psychologists should be cognizant that the nature of the self (Higgins, 1987) should be incorporated into any measure that takes the “self” into consideration. Simply asking an athlete to rate their actual self does not take into consideration where they are in relation to their self-guide. In order to more accurately measure “self”, discrepancies from the
athletes' own viewpoint and discrepancies between the athlete and coaches' viewpoint should likely be considered.

It seems that goal importance exerts a separate positive force upon goal progress to that of self-efficacy expectations. Findings from Chapter 4 indicate that both importance and efficacy expectations can lead to goal progress. Consequently, in order to maximise goal progress, interventions that increase efficacy expectations when efficacy is low and goal importance when perceived goal importance is low may be of beneficial use.

Strengths and Limitations of the Thesis

Strengths of this thesis include the incorporation of theories from mainstream psychology that could further explain some of the conflicting findings found in sport psychology research. The review chapter highlighted some of the limitations in recent research of the anxiety, self-confidence and self-efficacy relationship with performance. The chapter further proposed and reviewed theories from mainstream psychology that could account for such inconsistencies. Chapter 2 provided two studies that tested the hysteresis hypothesis as opposed to the one study tests that have preceded it (e.g. Hardy & Parfitt, 1991; Hardy et al., 1994; Woodman & Hardy, 2005). Chapter 3 took the nature of the self into consideration in self-report questionnaires. Although the present chapter criticised previous research utilising Marten's et al. (1990) CSAI-2, this criticism remains for any other self-report inventories that fail to take the nature of the self into consideration. Finally, Chapter 4 (to the best of the present authors' knowledge) is the first study to examine self-efficacy's relationship with goal polarity (approach and avoidance) and goal importance. Due to the often multiple and conflicting nature of approach and avoidance based life goals and goal importance, it is important to further our understanding of how self-efficacy interacts with such relationships. Chapter 4 has at least made a start in this area.
Limitations

Limitations of the thesis include the fact that it only contains one true experimental laboratory study and two non experimental field studies. Therefore, the candidate has (as yet) little experience of conducting qualitative or intervention studies. The major strength of quantitative methods are that “they produce factual, reliable outcome data that are usually generalizable to some larger population” (Steckler, McLeroy, Goodman, Bird, & McCormick, 1992, p. 2). Limitations include that questionnaires are limited to predetermined responses that may exclude other moderating variables. Whereas, the qualitative approach recognizes that “The challenge is to make sense of the 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” (Patton, 1990, p. 372; cf. Edwards, Kingston, Hardy, & Gould, 2002) the limitations of such an approach include weak causality and generalization, that it is lengthy, intrusive and open to individual interpretations. However, qualitative studies have provided useful insights into catastrophic performances and individuals’ associated thoughts, feelings and emotions when performance catastrophes occur (Edwards et al., 2002).

A number of smaller limitations in this thesis include that it does not follow the “traditional” approach adopted by many theses. Instead, the thesis has been written as a series of research papers. This encouraged the candidate to write for and submit his work to the scientific community. Therefore the thesis does not readily follow a single thread (where small steps are taken as study follows study), but instead uses a different approach to examine limitations in previous research. This approach has several advantages. Firstly, it trains the candidate to write and submit research papers for peer review which is extremely advantageous in the present ‘research climate’. Secondly, it allows for a broader range of research questions to be addressed, which also helps breaks the thesis down into manageable chunks. Third, ownership of the thesis is passed on relatively quickly to the
candidate where they are encouraged to think about and develop their own research question. This ultimately helps the candidate to engage in the research process and helps promote independent and critical thinking. Fourth, it allows the candidate to gain experience in a wider variety of research settings.

It is as yet unclear whether the performance catastrophes in the high anxiety condition reported in chapter 2 were a direct result of individuals actually withdrawing effort from the task (because they perceived further effort as futile), or that a continued high level of effort occurred and that anxious participants just did not have the processing resources to cope with such demands (cf. Hardy & Hutchinson, in press; Smith et al., 2001). In other words, it is as yet unclear whether performance catastrophes of this nature are due to a withdrawal of effort or an individual’s inability to cope with task demands. Other limitations of Chapter 2 include the fact that the validity of Martens et al. (1990) CSAI-2 has been questioned on a number of occasions. Unfortunately, the data collections, analysis and write ups of Chapter 2 and 3 occurred before the publication of Cox et al’s. (2003) revised CSAI-2R.

Furthermore, Chapter 3 only measured affect in relation to the “ought self” (i.e. cognitive anxiety) whilst testing the predictions of Higgins (1987) self-discrepancy theory. Consequently, the opportunity to explore what other affects (as predicted by self-discrepancy theory) may be related to self-confidence discrepancies and hence performance was not examined. Chapter 3 also only considered discrepancies in self-confidence levels prior to slalom racing (albeit self-confidence discrepancies explained 11% of performance variance), it is yet unclear what other “ideal”, “ought” and “feared” characteristics an athlete would want (or avoid) in order to achieve good performance. A final limitation of the thesis is that the Chapter 4 results are based on a correlational design and hence no causal effects were explored. Due to the content of approach and avoidance goals being
different and the repeated measures procedure adopted in the study, it was not possible to
fully examine the interactive effects of self-efficacy and progress of approach and
avoidance goals and goal importance. Future studies should incorporate designs that would
allow the use of moderated hierarchical regression analysis or structural equation
modelling to test for such relationships.

Future Directions

Below is a list of future directions that are worthy of future consideration;

1) It is as yet unclear whether performance catastrophes in the high cognitive anxiety group
were a direct result of effort being withdrawn from the task or that task demands simply
exceeded cognitive capacity (or both). To fully explore a processing efficiency theory
(Eysenck & Calvo, 1992) explanation of performance catastrophes the role of effort should be
measured in future studies. In reality, any study that examines the effects of anxiety upon
performance should also take the role of effort and cognitive load into consideration.

2) Future research may want to consider how self-confidence, cognitive and somatic anxiety
interact with effort required in cusp-catastrophe models. For example, Hardy et al. (2004)
found that self-confidence can protect against the potential debilitating effects of somatic
anxiety on tasks that are physical in nature (i.e. golf). Processing efficiency theory predicts
that highly anxious individuals will invest extra effort into a task if they feel moderately
confident. Therefore, what role does effort play under varying conditions of self-confidence,
somatic and cognitive anxiety? Is it the case that performance catastrophes are more likely to
occur under conditions of low-self confidence and high cognitive/somatic anxiety rather than
under conditions of high self-confidence and high cognitive/somatic anxiety? Could the same
be said for tasks that are both cognitive and physical in nature?
3) Effort also seems to interact with task importance and confidence in that effort is high when confidence and task importance is high. However, when task importance is low, is effort likely to be low regardless of self-confidence levels? Therefore, future research may want to consider the interactive role that self-confidence and task importance has upon task engagement as proposed by Carver and Scheier's (1998) catastrophe model.

4) Under what conditions does cognitive anxiety have a beneficial effect upon performance? Does cognitive anxiety alert the individual to the importance of the task as processing efficiency theory suggests? If so, then it may be perceived task importance that influences increased effort rather than feelings of anxiety. Or does cognitive anxiety indicate that an individual is near an undesired state, if so then being close to a feared self may enhance effort e.g. escaping from an avoidance goal/self is important especially if one is close to an important avoidance goal/self (Carver & Scheier, 1998). In other words, exactly when does anxiety lead to an increase in effort?

5) Any self-report measure that has a measure of "self" needs to take into consideration the nature of "self". As results from chapter 3 suggest that "actual" measures of self (confidence) may not always be sensitive enough to predict performance.

6) Chapter 3 explored actual/ideal, actual/ought and actual/feared discrepancies in relation to ones own self-confidence levels. In other words, the nature of self from ones own view point was focused upon. In other sports such as team sports, taking into consideration the nature of the "self" from a significant others view point (actual/own versus ideal/other; actual/own versus ought/other; actual/own versus feared/other) may also help to explain additional performance variance and associated affects.
7) Chapter 3 was limited in terms of testing the specific predictions of self-discrepancy theory (Higgins, 1987). In other words the only affect state measured had to do with the ought self; not the ideal self i.e. cognitive anxiety. Consequently, what role (if any) does the affect associated with self-discrepancies play in sport performance?

8) The ideal self was also particularly prominent throughout the findings in Chapter 3. Under what circumstances do ought selves play a particular role? Is it the case that self-directed behaviour promotes ideal selves (ideally I’d like to be…) and that other directed behaviour (e.g. the doctor says I should lose weight, therefore I ought to exercise) produces ought selves? What are the motivational reasons behind ideal and ought selves and how do they differ?

9) Chapter 3 was also limited in that self-discrepancies were only examined in terms of self-confidence levels. By examining other characteristics that an athlete would “ideally” like, “ought” to, and “fear” having in order to perform well seems worthy of future research. In other words, what characteristics does an individual believe is important for them to have (or avoid) in order to maintain high levels of performance? Furthermore, do discrepancies in these characteristics relate to high levels of anxiety and other related affects as proposed by Higgins (1987)? Combining performance profiling in sport (Butler & Hardy, 1992) with Higgins self-discrepancy theory could further our understanding of discrepancies and affect in sport.

10) Higgins (1997) regularity focus model may also be worthy of future research in sport. Higgins (1997) states that “ideal” selves have a promotion focus and that “ought” selves have a prevention focus. In other words, strong “ideal” selves and situations involving gain/non-gain induce a promotion focus, whereas strong “ought” selves and situations involving loss/non-loss induce prevention focus. In other words it seems likely that ideal selves are strongly linked to approach goals (promotion focus) and ought selves seem to be linked to
avoidance goals (prevention focus). Consequently, what kinds of sport situations are likely to lead to promotion focus and prevention focus?

11) Goal importance seems just as an important variable in relation to goal progress as self-efficacy does. However, the role of goal importance and progress seems to have been relatively ignored in previous sport and mainstream psychology. As goal importance has been linked to increased effort and performance (that are independent to self-efficacy effects) the positive effects of goal importance upon progress should be further examined.

12) Some individuals may be motivated to choose strategies that enable positive goal attainment based on avoidance of undesirable conditions (Higgins, 1996) e.g. “To obtain my PhD I need to avoid failing my viva”. Is this a healthy strategy to choose? If the pursuit of avoidance goals is negatively related to subjective well being (Elliot, Sheldon, & Church, 1997) then why would individuals choose to pursue (or avoid) such goals? Does being near the feared self; far from a feared self; close to an ideal self; or far from an ideal self influence goal choice?

13) The interaction between important and unimportant approach and avoidance goals and their relation to self-efficacy and progress has barely been touched upon. It seems that goal importance plays a larger part in goal progress than first thought and may even pre-empt the effects of self-efficacy. Avoidance goals also seem to need a constant amount of monitoring if they are to be successfully avoided. Further research is required in order to fully explore this interaction.
Summary

To conclude, the thesis addresses some of the contradictory findings in sport and mainstream psychology research in recent times. The thesis findings have provided some alternative explanations of limitations in previous research findings in cusp-catastrophe models of performance; self-confidence and performance relationship in sport; and the complex nature of goal importance and goal regulation upon the self-efficacy and performance relationship. The findings presented also offer exciting new prospects for future research.
References


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Appendix A

The Self-Discrepancy Competitive State Anxiety Questionnaire

(SD-CSAI-2)
INSTRUCTIONS

There are two questionnaires that you need to fill out over the duration of your race. Questionnaire 1 should be completed at least **three hours** before your race; questionnaire 2 should be completed within **half an hour** from the start of your race.

The first questionnaire has three subscales for each question. It is important that you circle one answer from each scale before you move onto the next question, i.e. in question 1 circle one answer for the ‘Feared scale’. One for the ‘Ought scale’, and one from the ‘Ideal scale’. Then repeat this for question 2 and so on.

**Use the following list as a guide when filling out the first questionnaire.**

The ‘Ought Self’: Your ought self is the kind of person you believe you have the **duty or obligation** to be. It’s defined by the characteristics you think you ought to possess, or feel obligated to possess. It’s not necessary that you actually have these characteristics now, only that you believe you ought to have them.

The Ideal Self: You ideal self is the kind of person you’d really **like** to be. It’s defined by the characteristics you would ideally like to have. It’s not necessary that you have these characteristics now, only that you believe you want to have them.

The Feared Self: Your feared self is the kind of person you **fear** being or **worry** about being. It’s defined by the characteristics you think you might have in the future but that you’d rather **not** become. It’s not necessary that you have these characteristics now only that you want to avoid having them.

**Questionnaire directions**

The effects of high competitive sports can be very powerful and very different among athletes. The inventory you are about to complete measures how you generally feel about competition. With reference to the above three descriptions circle the appropriate numbers to the right of the statement. Please work carefully through the questionnaire with reference to the above descriptions, and pause or rest if you feel a loss of concentration.
<table>
<thead>
<tr>
<th>Question</th>
<th>Very Much</th>
<th>Very</th>
<th>Quite</th>
<th>Somewhat</th>
<th>Not at All</th>
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<tbody>
<tr>
<td>1. I'm concerned about myself reaching my goals</td>
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<td>2. I feel mentally relaxed</td>
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<td>3. I'm concerned about my performance keep up</td>
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<td>4. My body feels relaxed</td>
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<td>7. I'm concerned that I may not do as well</td>
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<td>8. My body feels tense</td>
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<td>10. I'm concerned about losing self control</td>
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<td>12. I'm concerned about my peers</td>
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<td>13. I'm concerned about Choking under pressure</td>
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<td>14. My body feels stressed</td>
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<td>15. I'm concerned about the challenge</td>
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<td>20. I feel mentally relaxed</td>
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<td>21. I feel confident</td>
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<td>30. I'm concerned about losing self control</td>
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Ratings: All, Very, Quite, Somewhat, Not at All
TEXT BOUND INTO THE SPINE
Appendix B

Competitive State Anxiety Inventory-2 (CSAI-2)
Direction: A number of statements that athletes have used to describe their feelings before competition are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now—at this moment. There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer which describes your feelings right now.

1. I am concerned about this competition
2. I feel nervous
3. I feel at ease
4. I have self-doubts
5. I feel jittery
6. I feel comfortable
7. I am concerned that I may not do as well in this competition as I could
8. My body feels tense
9. I feel self-confident
10. I am concerned about losing
11. I feel tense in my stomach
12. I feel secure
13. I am concerned about choking under pressure
14. My body feels relaxed
15. I’m confident I can meet the challenge
16. I’m concerned about performing poorly
17. My heart is racing
18. I’m confident about performing well
19. I’m concerned about reaching my goal
20. I feel my stomach sinking
21. I feel mentally relaxed
22. I’m concerned that others will be disappointed with my performance
23. My hands are clammy
24. I’m confident because I mentally picture myself reaching my goal
25. I’m concerned I won’t be able to concentrate
26. My body feels tight
27. I’m confident of coming through under pressure
Appendix C

Life Goals Questionnaire
Personal Projects Analysis

NAME: 
AGE: 
GENDER: M / F 
DATE: 

We are interested in studying the kinds of personal projects that people have at different stages of their life. All of us have a number of personal projects at any given time that we think about, plan for, carry out, and sometimes (though not always) complete. Some of these projects are approach projects, that is to say, they require us to get closer to some goal. However, some of us also have a number of personal projects that are about things (anti-goals) we want to avoid or work away from.

Here are some examples of approach projects:

- Completing my module assignments on time
- Being more successful in my relationships
- Getting better at meeting new people
- Getting more outdoor exercise
- Doing well in my exams
- Taking a trip overseas
- Trying to be more organized.
- Finding a part-time job
- Redecorating my bedroom
- Improving my body image

Here are some examples of avoidance projects:

- Avoiding doing badly in my exams
- Trying to avoid being lonely
- Not putting on any weight
- Trying not to drink too much
- Not to be so judgmental of people
- Avoid being ridiculed in public
- Not to get into too much debt
- To avoid feeling like a failure
- Not being stuck in a job I hate
- To avoid confrontations with my parents

We are interested in finding out how people feel about these personal projects, and how much progress they have made on them. We would appreciate it if in the next ten minutes you could begin by just writing down as many personal projects as you can think of that you are engaged in or thinking about at the present time. Remember these are not necessarily formal projects, or even important ones, we would prefer you to give us more of the everyday kinds of activity or concerns that characterize your life at present.

On the following page please write down as many projects as you can in ten minutes.
List of Projects

Please write down as many as personal projects you can in ten minutes
Now copy the projects in as brief a form as possible below. Just make your description long enough to keep each project clearly in mind. As you can see, there is space for ten projects, (5 approach and 5 avoidance projects). If your initial list contains more than 5 approach and avoidance projects, select the 5 that you are most likely to engage in over the next month or two. If you wrote down fewer than 5 approach and avoidance projects, see if you can think of a few more, or break some of those you listed down to several small projects.

In columns 1 and 2 please rate each one of your projects using numbers from 0 to 10 (use '0' not important/no progress made to '10' very important/ almost achieved this goal).

1. Importance: How important each project is to you at the present time?

(0 = not at all important to you to 10 = extremely important to you).

2. Progress: How successful you have been in the project so far?

(0 = you have not been at all successful 10 = extremely successful).

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<thead>
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<th>List of Approach Projects</th>
<th>Importance (0-10)</th>
<th>Progress towards (0-10)</th>
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<th>List of Avoidance Projects</th>
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Personal Projects Self-efficacy Questionnaire

On the next few pages please write down your top ten projects again one at a time, and indicate the extent to which you think you will be able to achieve or successfully avoid this goal within the next few months. If it is an approach project please circle achieve, if it is an avoidance project (one you want to work away from) please circle avoid.

1. Can do (yes/no) particular project  Please state ‘yes’ or ‘no’ if you think you can attain each performance level.

2. Confidence% (0-100) each level of Please rate your degree of confidence in being able to attain project performance.

The next two projects are examples of how you should fill out the rest of the questionnaire.

EXAMPLE OF AN APPROACH GOAL

1) ________________________________  
Can do (yes/no)  Confidence % (0 to 100)

I have the skills and resources to be 10% successful at achieving/avoiding this goal
I have the skills and resources to be 20% successful at achieving/avoiding this goal
I have the skills and resources to be 30% successful at achieving/avoiding this goal
I have the skills and resources to be 40% successful at achieving/avoiding this goal
I have the skills and resources to be 50% successful at achieving/avoiding this goal
I have the skills and resources to be 60% successful at achieving/avoiding this goal
I have the skills and resources to be 70% successful at achieving/avoiding this goal
I have the skills and resources to be 80% successful at achieving/avoiding this goal
I have the skills and resources to be 90% successful at achieving/avoiding this goal
I have the skills and resources to be 100% successful at achieving/avoiding this goal

EXAMPLE OF AN AVOIDANCE GOAL

2) ________________________________  
Can do (yes/no)  Confidence % (0 to 100)

I have the skills and resources to be 10% successful at achieving/avoiding this goal
I have the skills and resources to be 20% successful at achieving/avoiding this goal
I have the skills and resources to be 30% successful at achieving/avoiding this goal
I have the skills and resources to be 40% successful at achieving/avoiding this goal
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I have the skills and resources to be 80% successful at achieving/avoiding this goal
I have the skills and resources to be 90% successful at achieving/avoiding this goal
I have the skills and resources to be 100% successful at achieving/avoiding this goal
1) ____________________________________________ Can do Confidence %
(Y/N) (0 to 100)
I have the skills and resources to be 10% successful at achieving/avoiding this goal
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I have the skills and resources to be 90% successful at achieving/avoiding this goal
I have the skills and resources to be 100% successful at achieving/avoiding this goal

2) ____________________________________________ Can do Confidence %
(Y/N) (0 to 100)
I have the skills and resources to be 10% successful at achieving/avoiding this goal
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I have the skills and resources to be 100% successful at achieving/avoiding this goal

3) ____________________________________________ Can do Confidence %
(Y/N) (0 to 100)
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<tr>
<th>Can do</th>
<th>Confidence %</th>
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<tr>
<td>(Y/N)</td>
<td>(0 to 100)</td>
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I have the skills and resources to be 10% successful at achieving/avoiding this goal
I have the skills and resources to be 20% successful at achieving/avoiding this goal
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I have the skills and resources to be 100% successful at achieving/avoiding this goal

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<th>Can do</th>
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<td>(Y/N)</td>
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<td>Can do</td>
<td>Confidence %</td>
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<td>(0 to 100)</td>
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### 7) **Cando Confidence%**

| I have the skills and resources to be 10% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 20% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 30% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 40% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 50% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 60% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 70% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 80% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 90% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 100% successful at achieving/avoiding this goal |   |

### 8) **Cando Confidence%**

| I have the skills and resources to be 10% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 20% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 30% successful at achieving/avoiding this goal |   |
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| I have the skills and resources to be 70% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 80% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 90% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 100% successful at achieving/avoiding this goal |   |

### 9) **Cando Confidence%**

| I have the skills and resources to be 10% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 20% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 30% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 40% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 50% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 60% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 70% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 80% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 90% successful at achieving/avoiding this goal |   |
| I have the skills and resources to be 100% successful at achieving/avoiding this goal |   |
10) ________________

Can do Confidence %

(Y/N) (0 to 100)

I have the skills and resources to be 10% successful at achieving/avoiding this goal
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I have the skills and resources to be 70% successful at achieving/avoiding this goal
I have the skills and resources to be 80% successful at achieving/avoiding this goal
I have the skills and resources to be 90% successful at achieving/avoiding this goal
I have the skills and resources to be 100% successful at achieving/avoiding this goal
In columns 3 and 4 please rate current progress towards or away from each one of your projects using numbers from 0 to 10 (use ‘0’ not important/no progress made to ‘10’ very important/almost achieved this goal).

1. Importance: How important each project is to you at the present time?
   
   (0 = not at all important to you to 10 = extremely important to you).

2. Progress: How successful you have been in the project so far?
   (0 = you have not been at all successful 10 = extremely successful).

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<tr>
<th>List of Approach Projects</th>
<th>Previous Importance (0-10)</th>
<th>Previous Progress towards (0-10)</th>
<th>Current Importance (0-10)</th>
<th>Current Progress towards (0-10)</th>
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<th>List of Avoidance Projects</th>
<th>Previous Importance (0-10)</th>
<th>Previous Progress away from (0-10)</th>
<th>Current Importance (0-10)</th>
<th>Current Progress Away From (0-10)</th>
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