

MOTIVATIONAL INFLUENCE ON THE
ATTENTIONAL PROCESSES OF
COMPETITIVE GOLFERS

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requirement of the University of Greenwich for the
Degree of Doctor of Philosophy

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DECLARATION

“I certify that this work has not been accepted in substance for any degree, and is not being submitted for any degree other than that of Doctor of Philosophy being studied at the University of Greenwich. I also declare that this work is the result of my own investigations except where otherwise identified by references and that I have not plagiarised the work of others”.

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To my wife Kerry and daughter Holly...

...we did it!

ABSTRACT

The main aim of this thesis was to gain a greater understanding of how a golfer's attentional focus may be related to their achievement motivation and competence striving during competitive performance. It was anticipated that if such relationships were established in competitive contexts, findings would enhance understanding of the underlying mechanisms that contribute to attention explanations of diverse performance outcomes under perceived pressure.

There has been debate regarding the most accurate and useful definitions of performance outcomes such as 'clutch' performances and 'choking' under pressure, with a requirement acknowledged for research to get closer to these disparate performance experiences. Caution has, however, been encouraged with dichotomous attentional explanations of skill breakdown (i.e. self-focus and distraction theories) that are considered to oversimplify the issue.

An individuals' goal and performance expectations have been posited as contributing to attentional focus choices. Achievement goal theories propose that an individual will define competence in response to motive disposition and environmental cues. Whilst the achievement goal construct is considered orthogonal at the dispositional level there is contention as to whether multiple goals can be adopted during performance. Performing under pressure in sport presents opportunities and threats to goal striving, therefore, the goal that a sportsperson engages in during skill execution may elicit attentional processes that explain adaptive and maladaptive performance outcomes.

Three studies were designed to determine if there was a relationship between achievement motivation and attentional processes during performance under pressure and if so, how definitions of competence influence attention and performance outcomes. A mixed-methods approach enabled data collection from purposive samples of golfers, who had experience of performance decrement under pressure. In Study 1, golfers provided verbal reports during a competitive performance and took part in a post round semi-structured interview. In Study 2 golfers reported their propensity to reinvest conscious, explicit, rule based knowledge and their achievement motives prior to competing and in Study 3, the motivational climate was manipulated to assess the influence of achievement goal adoption on cortical efficiency and golf putting performance.

All three studies report findings that provide support for the relationship between achievement motivation and self-focused attention. The findings suggest that golfers consider multiple goals prior to skill execution which create parameters within which attention has the potential to shift. Golfers' evaluation of competence in line with these goal intentions reveals both underlying valued achievement motives and influences perceptions of performance. The measurement of achievement goal involvement was found to have a different relationship with performance depending on whether performance was defined in terms of a discrete golf skill (i.e. putting) or absolute performance measure (gross score) and also whether goals were self-reported or evoked through manipulation of the motivational climate. Results revealed that elite golfers performed better in a putting task under pressure and with greater psychomotor efficiency when adopting other-based achievement goals that reference interpersonal standards of competence striving. The theoretical and practical implications of the findings are discussed.

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1. INTRODUCTION

“Maybe I'm going to blow it but I'm going to enjoy it even if I do.”

(Jean van de Velde on his five-shot lead after the third round of the Open Championship at Carnoustie. Independent online, December, 1999).

1.1 Chapter overview

Research reported in this thesis looks at the relationship between achievement motivation and attention during competitive performance. The purpose of this introductory chapter is to provide the overarching aims, and objectives of the research, the structure of the thesis and an understanding of contemporary definitions relating to performance under pressure and that are associated with competitive performance. The review of literature pertaining to performance under pressure in this chapter creates a foundation with which to explore the proposed contributing processes and underlying mechanisms of achievement motivation and attention control which are the focus of this thesis.

This thesis takes a social/cognitive and neuro-psychological approach to understanding golfers' motivational and attentional experiences of performing under perceived pressure. Three studies are reported in Chapters 5, 6 and 7 and specific aims and research questions are detailed therein. Each study, however, has been designed to collectively provide knowledge to address one main aim of the research, which is to establish if there is a relationship between achievement motivation and attention during performance under pressure and if so, to answer the main research question which is:

How does achievement motivation influence attention during performance under pressure?

This question has consequently generated the following specific research objectives:

1. To gain greater understanding of the cognitive experiences of golfers performing in perceived pressure situations.
2. To address identified methodological shortcomings of research in this area and utilise methods that get as close to the performance under pressure experience as possible.

3. To enhance current operational definitions of performance under pressure in sport.
4. To provide knowledge of the role that achievement goals play in directing attentional processes posited to contribute to performance decrement under pressure.
5. To propose developmentally apposite interventions and strategies that encourages adaptive attentional focus.

The main aim, research question and research objectives of the thesis detailed above are addressed through three studies reported in this thesis that answer the following research questions:

Study 1 (Chapter 5)

1. What are the motivational and attentional cognitive experiences of golfers performing under pressure?
2. Are golfers involved in multiple goals during performance under pressure?

Study 2 (Chapter 6)

1. What is the relationship between propensity to reinvest (disposition) and achievement goal orientation (disposition)?
2. Can goal involvement (situational) be predicted from goal orientation (disposition) and the propensity to reinvest (disposition)?
3. How do dispositional achievement motivation and reinvestment, together with achievement goal involvement predict performance and how is any performance relationship affected by skill level?

Study 3 (Chapter 7)

1. How does achievement goal involvement affect golf putting performance?
2. How does achievement goal involvement affect cortical efficiency?
3. What are the effects of cortical efficiency on golf putting performance?
4. How do achievement goals and markers of psychomotor efficiency interact to affect golf putting performance?

The focus in this thesis is on exploring how underlying motivational mechanisms that contribute to both positive and negative performance outcomes, relate to attentional processes under pressure in golf. Through mixed methods, the experiences of elite and amateur golfers have been studied when performing in competitive environments and an

understanding sought of the factors that contribute to the successful and unsuccessful execution of skills. A review of the performance under pressure literature (detailed later in this chapter) reveals difference in both the experiences and the processes that purport to explain a range of performance outcomes for novice and expert sportspeople. These include 'clutch' performances, optimal performance, under performance, sub optimal performance and 'choking'. Attentional focus explanations and specifically self-focus and distraction, have consistently been posited as the most plausible explanation of these differences (e.g. Hill, Hanton, Matthews & Flemming, 2010; Masters and Maxwell, 2008) and as a result, together with achievement motivation, form the theoretical base to this thesis.

The aim in this thesis is to add to the current knowledge of three specific areas relating to performance under pressure, achievement motivation and attentional focus. These three areas are explored in studies reported in Chapters five, six and seven. Studies one and two (Chapters 5 and 6) look to build on current definitions of performance outcomes under pressure and explore the orthogonality of achievement goals at the situational level. Study three (reported in Chapter 7) utilises findings from the previous two studies and assesses how achievement goals influence the self-focus processes that have been proposed in the extant literature to disrupt elite performers. The three studies within this thesis address a current gap, specifically in the performance under pressure and achievement goal literature, but also extends recent study of reinvestment, by employing methods that capture data immediately prior to and during competitive performance.

My experiences as a tournament professional golfer and as a technical coach, to players of all abilities, created an interest in the psychological demands of the game and posed questions as to why some golfers are able to excel in perceived 'pressure' environments, whilst others are unable to maintain 'normal' performance standards. This experience has guided research as an undergraduate when looking at the role of skill acquisition and learning, in performing under pressure and, as a postgraduate when exploring transferrable life skill development in sport. A more complete account of my orientation can be found in Chapter 4 (4.1.3) in order to make explicit the motivation for my research in this area and the specific knowledge that is brought to analysis.

1.2 Performance under pressure

Identifying the qualities, characteristics and skills that separate the amateur sports performer from the professional athlete and those that compete from those that dominate their sport is a quest of coaches, athletes and sports scientists alike. Whilst many sportsmen and women are capable of executing complex skills and demonstrating excellence in certain environments it is those that can maintain those standards when it matters most, in the face of their having an anxious desire to perform at the very highest level, that are considered to have ultimately met the demands of their game (Hardy, Mullen & Jones, 1996). The performances of sports people have been evaluated and characterised by the media and researchers in ways analogous to a continuum that encompasses ‘clutch’ and ‘choking’ performances. These include, for example, sub optimal, sub-standard, underperformance, standard and optimal performances. Whilst an intention of players, coaches and researchers is to understand and promote optimal performance, the extant literature has sought this understanding through the study of inferior performance under pressure and particularly paradoxical performance effects commonly referred to in the sporting world as ‘choking’ (e.g. Baumeister, 1984; Masters, 1992; Beilock & Carr, 2001; Hill et al., 2010a).

This thesis does not address specific questions relating to ‘choking’, but instead pursues understanding of how achievement motivation and attention are related to explain a range of performance outcomes. Current knowledge of the ‘choking’ phenomenon, however, provides an important foundation and rationale for the exploration of a motivation-attention relationship. This is based on the premise that a greater understanding of the influencing factors can help to lessen negative performance experiences and enable sports people to realise their performance potential when they are most motivated to do so. The review of literature in this chapter will first outline a definition of positive performance under pressure through ‘clutch’ performance before focus is given to the development and refinement of definitions of ‘choking’.

1.2.1 Defining the ‘clutch’ performance.

Pressure has been defined as “any factor or combination of factors that increases the importance of performing well” (Baumeister, 1984, p.610) and in these situations there have been many notable occurrences of skill breakdown and reduced performance levels. However, as Otten (2009) points out, there is evidence to suggest that some

performers appear to thrive under pressure conditions and actually perform better than usual (e.g. Baumeister & Showers, 1986; Hardy & Parfitt, 1991; Hardy, 1997). This has been termed a ‘clutch’ performance defined by Otten as:

“any performance increment or superior performance that occurs under pressure circumstances” (Otten, 2009, p.584).

Otten (2009) suggested that the appraisal of the competitive situation by an athlete is central to the prediction of performance outcomes and that rather than pressure inducing anxiety in all competitors, some may perceive pressure cues as facilitative rather than debilitating or as a challenge as opposed to a threat (e.g. Hardy, 1997; 1998; Hardy & Hutchinson, 2007; Jones, Hanton & Swain, 1994). Hibbs (2010) sought to refine the ‘clutch’ definition and establish how such performers and performances could be identified. It was recognised that statistical analysis served as a dominant and insufficient tool determining ‘clutch’ performers, particularly in sports such as baseball (e.g. Fraleigh, 1985; Martin, 1985) although definitions contained qualitative elements from the debates on statistical analysis that ensued. Where Fraleigh suggested that ‘clutch hitting’ (baseball) should be considered as a specific instance that is indicative of a more general ability to perform well in pressure situations, Hibbs cautioned that distinction should be made between the concepts of ‘clutch’ ability and ‘clutch’ performances.

Hibbs (2010) conceptual analysis of ‘clutch performances’ proposes that a critical competitive situation is necessary and that the specific circumstances that precede skill execution within the event will determine whether the performance can be defined as a ‘clutch’. A further delineation is, therefore, warranted of ‘clutch’ situations that need to be evident for ‘clutch’ performances to occur. A ‘clutch’ situation is, defined by Hibbs as:

“A point in a competitive sport where the success or failure of the participants has a significant impact on the outcome of the contest” (Hibbs, 2010, p.48).

The author further noted that that ‘clutch’ performances might be incorrectly identified retrospectively because ‘clutch’ situations are often only established after the completion of a competitive event. For example a penalty that is scored in soccer at the start of a game or a birdie putt holed at the beginning of a final round may on reflection, have had an impact on the success of the team or individual but at the time the

individual may not have been aware that they were in a ‘clutch’ situation. As such Hibbs initially defined a ‘clutch’ performance as having occurred when:

“a participant in a competitive sport succeeds during a ‘clutch’ situation (Hibbs, 2010, p.49)

Hibbs made seven iterations to his initial conceptual analysis and original ‘clutch’ performance definition that considered; 1) the competitive relevant challenge of the task, 2) the awareness of the performer that they are in a ‘clutch’ situation, 3) the motivation to succeed and 4) possibility to experience failure, 5) the role of luck in explaining performance and 6) the absence of cheating to gain a competitive advantage. As a consequence a ‘clutch’ performance has now been defined by Hibbs (2010) as:

When a participant in a competitive sport succeeds at a competition-related, challenging task (*CRCT*) during a ‘clutch’ situation (*CS*), is aware that the performance occurs during a *CS*, possesses the capacity to experience *CS*-related stress, cares about the outcome of the contest, and succeeds primarily due to skill rather than luck or cheating (Hibbs, 2010, p.55).

The presence and awareness of a genuine psychological challenge is central to this definition and although sports people may overcome these challenges on single occasions this should not, in Hibbs opinion, be sufficient to warrant the distinction of being a ‘clutch’ performer. Jackson (2013, p.3) highlights the strength of the definition as being its avoidance of ‘logical circularity’ in that it should not, as in the definition of any phenomenon, propose any of the processes that could potentially explain it.

1.2.2 Defining ‘choking’ under pressure in the media

Sportspeople that fail to sustain previously high performance levels often do so under the observation of spectators and various media that include newspapers, magazines, social networks and sporting commentators. These observers have popularised the term ‘choking’ to explain the often-dramatic decrease in performance of individuals across sports (Gucciardi, Longbottom, Jackson & Dimmock, 2010). ‘Choking’ is a largely derogatory label that describes sub-optimal levels of mental and physical performance of a sportsperson in pressure situations. However, there is a lack of consensus on a clear definition that addresses the specificity of performance decrement to encompass the full ‘choking’ experience (Mesagno & Hill, 2013). Current debates continue to acknowledge a discrepancy between media and research definitions of ‘choking’

(Baumeister, 1984; Beilock & Gray, 2007; Buszard, Farrow & Masters, 2013; Gucciardi & Dimmock, 2008; Hill, Hanton, Matthews & Flemming, 2010; Jackson, 2013; Mesagno & Hill, 2013a; Mesagno & Hill 2013b). Such is the familiarity in the sporting world with term ‘choking’ under pressure that individual sports have adopted derivatives specific to their sport that describe skill breakdown under pressure and that are used interchangeably with ‘choking’, for example, ‘dartitis’ in darts, ‘icing’ in basketball and the ‘yips’ in golf (Milne & Morrison, 2015). This manifestation of performance failure has led to world darts champions like Eric Bristow being unable to let go of the dart, bowlers in cricket being unable to release the ball (Bawden & Maynard, 2001) and golfers to making involuntary physical movements upon impact with the ball (McDaniel, Cummings & Shain, 1989; Roberts, Rotheram, Maynard, Thomas & Woodman, 2013). Research suggests that these experiences may have influences from either movement impairment or performance anxiety (see chapter 1.2.4).

Mesagno and Hill (2013) suggest that media definitions of ‘choking’ assume an acute and dramatic performance failure, whereas research into ‘choking’ experiences has often considered *any* performance decrement. The media, however, do not have to work to a universal definition when applying the ‘choking’ label and so many athletes, teams and sporting moments have been categorised as such, despite numerous contextual differences. Popular ‘choking’ examples include performance decrement that is visible and dramatic such as that of Jana Novotna in tennis, who when leading the 1993 Ladies Wimbledon Final 4 – 1 in the final set, proceeded to serve three consecutive double faults together with a number of unforced errors on route to defeat by Steffi Graf (Thornley, 1993). The ‘choke’ can also be attributed to a particular isolated incident or players can be referred to as having a propensity to ‘choke’ in pressure situations as in the case of snooker player Jimmy White who failed to win in six World Championship final appearances. In 1992 Jimmy White led Stephen Hendry by six frames before losing ten frames in a row. Two years later, tied at 17 – 17 and in the middle of building a match winning break, he missed what would ordinarily have been a routine black, off the spot and the opportunity to win a major trophy.

Golf has provided a number of examples that meet the varied and simplistic media definitions of ‘choking’ over the last 50 years but as each experience appears to have different antecedents, duration and consequences, questions remain over what actually constitutes a ‘choke’ so that it can be accurately identified. Disruption to normal routines epitomise many of the examples of skill breakdown. For example, Doug

Sanders in the 1970 British Open required two putts from 30ft to beat Jack Nicklaus and claim his first major trophy. Having putted down to inside three feet, he broke his routine to remove something on his line and never regained composure. When Scott Hoch lost in a playoff for the 1989 US Masters to Nick Faldo he took nearly two minutes to settle over what would have been his Major winning two foot putt, before missing and then losing on the next hole.

From the protracted conversations with his caddie, indecision appeared to play a part in Colin Montgomerie's failure to hit the final green at the 2006 United States Open (US Open) and successfully achieve his first major title. An eight-time winner of the European Tour Order of Merit, Montgomerie's ability to perform on the biggest stage was more than evident, yet in pursuit of an honour that had eluded him for so long, he changed his mind on club selection in the middle of the 18th fairway and uncharacteristically missed the green, taking four more shots to complete the hole. Greg Norman has also been associated with a number of 'choking' episodes; most notably when he turned a six shot lead into a five shot defeat over 18 holes at the 1996 US Masters; his final round score of 78 epitomising the level of performance decrement when compared with his opening round of 63.

'Choking' incidents in golf are associated with both high profile tournaments such as Major Championships and also stages of the tournament in which winning and losing become more salient. Mark Calchaveccia lost a four hole match play lead with four holes to play in the 1991 Ryder Cup, Dustin Johnson was disqualified from the 2010 PGA Championship for grounding his club in a hazard on the last hole and he also had a closing round of 80 in the US Open of the same year. Other incidents highlight how the 'choke' could be determined over different periods of time. For example Rory McIlroy failed to win the US Masters in 2011 despite having a four shot lead going into the final round with sub-optimal performance evident throughout the five hours and 18 holes of golf. In the 1999 Open Championship, French golfer Jean Van de Velde, having led the tournament for nearly four days and 71 holes, arrived at the 18th hole with a three shot lead over the field. It took him over 30 minutes to complete the final hole, producing wayward shots that were uncharacteristic of the round to that point, eventually taking seven shots that put him in a playoff that he would go on to lose.

All of these examples have been referred to in the media as evidence of 'choking' under pressure; however, whilst there are similarities in as much as the salience of winning and losing appears to exist to provide the pressure situation, many differences are also apparent. The oft-cited example of Greg Normans' collapse in the 1996 Masters

(Moran, 2004; Gucciardi et al, 2010) and Rory McIlroys 2011 Masters experience took place over 18 holes and nearly 5 hours of golf. Jean Van de Velde's 'meltdown' was one hole, lasting thirty minutes and in the case of Scott Hoch in the 1989 US Masters, Doug Sanders in the 1970 British Open Championship and Bernhard Langer in the 1991 Ryder Cup, it was suggested that one shot was enough to have demonstrated a 'choke' under pressure.

In Hibbs (2010) conceptualisation of the 'clutch' performance, he cautioned against identifying performances in retrospect and instead suggested that it is fundamental that the performer should be aware that they are in a 'clutch' situation. This arguably should be a consideration for the identification of potential 'choking' situations. In the case of Doug Sanders and Scott Hoch defeat was not confirmed by the incident defined in the media as a 'choke' but in the case of the former this was highlighted following ultimate defeat in an 18-hole playoff. Scott Hoch actually holed a longer putt in what one may assume would have continued to be a pressurised situation, to take his playoff to an extra hole where eventually he was defeated by the good play of his opponent. A similar point is often lost in the case of Jean van de Velde who despite his challenges on the 18th hole managed to get the ball up and down from a greenside bunker, holing a seven foot putt to get himself in the playoff.

Despite victory not being grasped in these specific moments, defeat was also not confirmed and this was not a state from which these individuals could not and did not recover when measured by technical and sporting performance (e.g. skill execution and score). It may be the case however, that the consequence of not securing victory when the possibility presented itself had a secondary or delayed deficit that minimised the potential for future 'clutch' performance rather than instigating a full 'choking' experience. My final reflection on Hibbs definition is that the examples described above could be defined as 'choking' and not 'clutch' situations depending on the difficulty of the task. If for example there is an awareness of a 'clutch' situation and the task is considered easy or not challenging then a 'clutch' performance is not deemed possible whereas the potential to 'choke' is. Objective assessment of the difficulty of the above cases is, however, difficult to ascertain.

1.2.3 Defining 'choking' in research.

Debate in a special issue of the *International Journal of Sport Psychology* (IJSP, August, 2013) has attempted to establish common ground for the development of an

operational definition of ‘choking’ to enable researchers to establish the phenomena’s underlying mechanisms and moderators and to develop interventions for use by applied sport and exercise psychology practitioners (Mesagno & Hill, 2013a). The most contentious points of debate during are highlighted below (i.e. Buszard, Farrow & Masters, 2013; Jackson, 2013; Mesagno & Hill, 2013a and Mesagno & Hill, 2013b). Hill, et al. (2010) suggest that if definitions determine the direction and nature of on-going legitimate research then it is a priority to ensure that these accurately reflect the experiences of performers in order for theoretical clarity to be achieved. There remains disagreement regarding an acceptable definition of ‘choking’ with attempts over the past three decades unable to accurately include criteria that distinguishes the phenomenon from other examples of performance failure. The review of literature in this section details the evolution of the ‘choking’ definition that has sought refinement and greater operationalisation of previous attempts, up to that which is currently offered by Mesagno and Hill (2013a) who suggest the choke to be:

‘an acute and considerable decrease in skill execution and performance when self-expected standards are normally achievable, which is the result of increased anxiety under perceived pressure’ (Mesagno & Hill, 2013a, p.9).

Early conceptualisations of ‘choking’ epitomise the broad range of performance antecedents and consequences that could be included in such explanations and as a result these have not been widely adopted in research. For example “the inability to perform up to previously exhibited standards” (Daniel, 1981, p. 70) and “the failure of normally expert skill under pressure” (Masters, 1992, p. 344), are considered by Mesagno and Hill (2013a), to not adequately consider the multiple potential contributions to an athletes’ inferior performance under pressure. Jackson (2013) emphasises the requirement of a definition to be separated from underlying causes and criticises the dismissal of Masters’ definition, in particular, on these grounds.

The desire to perform as well as possible in high stakes situations is thought to create performance pressure (Baumeister, 1984; Beilock & Carr, 2001; Hardy, Mullen & Jones, 1996) and this motivation for optimal performance is a component of the more readily adopted ‘choking’ definitions posited by Baumeister; “performance decrements under pressure situations” (1984, p. 610) and Baumeister and Showers; “the occurrence of inferior performance despite striving and incentives for superior performance” (1986, p.361). In their examination of ‘choking’ in sport Hill, et al. (2009) warned that

although researchers must resist the temptation to redefine terms in response to the use within the media, the initial attempts by Baumeister (1984) and Baumeister and Showers (1986) and more recent expansions that suggest ‘choking’ to be performing worse than expected given one’s skill level (Beilock & Carr, 2001; Beilock & Gray, 2007), may not accurately and fully reflect the dramatic nature of performance deterioration in sport. As a consequence, Mesagno and Hill (2013a) contend that contemporary research may be considering any deterioration in performance as a ‘choke’ and that traditional definitions lack necessary distinct observable elements.

In response to suggestion by Jackson, Ashworth and Nosworthy (2006), Hill et al. (2009) attempted to develop a more ecologically valid definition of ‘choking’ by moving away from experimental approaches that had dominated contemporary research. With a purposive participant selection of four applied sport psychologists, the researchers had a sample that had a comprehensive theoretical and applied knowledge of the ‘choking’ phenomenon. They sought to revisit operational definitions of ‘choking’ and determine characteristics so that ‘chokers’ could be identified. Hill et al.’s aims were to inform the development of interventions that would help performers resist the debilitating effects of the ‘choke’. Participants who had all published extensively within the stress and anxiety literature first took part in a focus group discussion followed by an interview where ideas were initially developed and then subsequently expanded upon. The focus groups comprised six sections in which participants discussed: contemporary definitions, the ‘choking’ process, consequences of ‘choking’, possible moderating factors, potential interventions and the identifiable characteristics of a ‘choker’. The principle outcomes of the study that took a grounded theory approach (Glaser & Strauss, 1967) were the formulation of an operational definition that was considered to better reflect the ‘choking’ experience. All participants endorsed the following definition:

“Choking in sport is a process whereby the individual perceives that their resources are insufficient to meet the demands of the situation, and concludes with a significant drop in performance – a choke” (Hill et al., 2009, p. 206).

The ‘choking’ process was considered by the focus group to comprise a stress response in which pressure demands are appraised as being beyond an individual’s capability to cope. Secondly for ‘choking’ to be experienced the athlete must be striving for success in a situation that is valued and subjectively perceived as important to them. Thirdly the ‘choking’ experience was believed to elicit high state anxiety in the athlete together with elevated physiological arousal and ultimately expectations of failure. All

participants agreed that a considerable drop in performance compared with normal standards epitomised the main consequence of the 'choke' and further findings posited that the 'choke' could only occur during skill execution or during the time the task should have been completed. Consequently Hill et al. suggested that 'choking' could be identified through primary and secondary indicators. Primary Indicators are characterised by a catastrophic drop in performance from expected normal standards. Secondary Indicators are: (i) a critical moment determined as a situation deemed important to the athlete in which they are striving for success; (ii) a stress response that renders them unable to cope with the pressure situation; (iii) individual characteristics of low mental toughness, self-confidence, poor functional thinking and a lack of sport/life perspective and (iv) future consequences that result in the athlete experiencing both short and long term negative effects from the choke.

The 'choking' process outlined above was said by the participants in the focus group, to typically culminate in a discrete singular choke that could be protracted if athletes continued to perceive resources as insufficient to meet the demands of the task. Hill et al. (2009) considered that the consequent negative psychological effects that include, lowered self-confidence and dysfunctional thinking had an impact on performance both short and long term, with participants believing that a return to 'normal' skill level would be unlikely during that same performance event, although differences could be expected as a function of both individual differences (e.g. mental toughness) and the duration of the sport. With regard to the latter potential difference; golfers, who are the focus of the research in this thesis, are afforded a longer period of time in which to recover from any performance decrement than, for example, an athlete competing in a 100m track event. Equally this additional time could be allocated to rumination over discrete performance failures and have consequent impact on the same performance. This process could magnify the negative experience for golfers in comparison with athletes performing in other domains. Finally the psychological impact of the 'choking' experience upon one aspect of performance was expected by Hill et al. to affect other elements of the game, for example, the golfer who experiences severe performance decrement in putting would likely produce sub-optimal performance in driving and or chipping.

Consistent with the experimental literature, findings from qualitative investigation have shown 'choking' to be a complex interplay of a number of cognitive, attentional, emotional and situation factors (e.g. Gucciardi et al., 2010). Hill et al. (2010b) sought to

address these complexities in their exploration of the impact of influencing variables upon both the likelihood and mechanisms of 'choking'. The research by Hill et al. (2010b) responded to recommendation to study athletes who had real life experience, with the purposive sampling of three groups comprising: six elite golfers who expressed the belief that they had 'choked' under pressure, five elite golfers who had consistently excelled under pressure and four professional golf coaches who had worked extensively with elite players. This approach enabled Hill et al. (2010b) to carry out a comparison of the 'choking' experience with successful performance under pressure. Participant selection and semi-structured interview guides were informed by the earlier findings of Hill et al. (2009) that established characteristics that could identify 'chokers'. These consisted of five sections that explored antecedents, mechanisms, consequences, influencing variables and strategies used to prevent 'choking' and were used as a framework for presenting findings as an overview of 'choking' in sport.

Achievement motivation, central to the studies in this thesis, together with event importance, high expectations, evaluation apprehension, unfamiliarity and overload were reported as the main stressors and antecedents of 'choking' episodes and posited as an explanation of performance differences. Performers that excelled under the pressure of pursuing outcome goals did so through the adoption of a task-orientated approach, for example the use of process goals rather than maintaining an outcome focus. Further differences were evidenced by the dependence of 'chokers' on avoidant strategies when experiencing overload or unfamiliar stressors together with the negative interpretation of anxiety.

Underlying mechanisms of 'choking' were dominated by reports of distraction that included fear of negative evaluation, fear of failure, negative cognitions and poor shots with additional themes of anxiety, perceived control, inadequate coping, self-focus and lowered expectations (Hill et al., 2010b). Consequences of choking were considered to be a significant drop in performance, players being highly self-critical, lowered self-confidence and a damaging effect on future performance with influencing variables of self-confidence, preparation, perfectionism, mental toughness, self-consciousness and life/sport perspective. Finally the authors suggested that pre-shot routines, cognitive restructuring, imagery, simulated practice and an abstract holistic swing feel were perceived by participants as being able to prevent 'choking' and encourage optimal performance under pressure.

In contrast to the extant ‘choking’ literature, distraction rather than self-focus was reported as the predominant mechanism of choking in the elite sample. The authors acknowledge that the recollection of complex cognitive processes may not have been possible through retrospective interview and also suggest that performance decrement may be a result of a combination of distraction and self-focus. It may be therefore, that there is an over-reporting of distraction through the recall of influencing events and feelings at the expense of rich detailed cognitions during skill execution that would support self-focus and conscious processing explanations of skill breakdown. The studies in this thesis aim to get a greater temporal understanding of the cognitive representation of achievement motivation posited by Hill et al. (2009) as being an antecedent of ‘choking’ and to assess the attentional processes of elite and recreational golfers during performance.

Bernier, Codron, Thienot and Fournier’s (2011) research attempted to address the inconsistencies of attentional explanations by exploring more precisely the attentional focus of expert golfers in natural situations. Eight male participants in the study met expertise criteria of firstly being good amateur players prior to turning professional, being selected at least once to play on the nation team to play in an international tournament and that secondly they all had to play on a professional tour. The study was conducted in two phases. The first phase involved filming participants individually for one hour in a winter (pre-season) training session as they worked on different specific exercises and drills relevant to their programmes (e.g. putting mechanics, full swing posture, green reading exercises). Five months later participants were once again videoed, this time, during a competitive performance and subsequently took part in self-confrontation interviews which required them to respond to interviewer questions whilst watching back performance footage. Participants were encouraged to recall and describe thoughts relating to attentional focus that they were experiencing whilst watching the video recordings with the researcher. These procedures have been found to support the recall of cognition and emotion which is often a criticism of retrospective accounts (e.g. Hanton, Mellalieu & Hall, 2004) and the authors believed this to be a compromise in gaining access to thoughts during skill execution.

Categorisation of the self-confrontation interview data was determined through inductive content analysis, which revealed that each element of attentional focus could be defined by either content or by different characteristics. The former included the process (e.g. the swing or the movement); the result (e.g. outcomes of the movement or process) with two-subcategories that differentiated between outcomes relevant to the

ball and to the score; psychological state (emotional and motivational); and environment which again were bifurcated by definition of task-related foci and elements that were not directly related to the golf task. Characteristics provided explanation of how attentional focus arose or how it was used by the golfer. They were categorised as sense (e.g. I look at the right hand / I focus on the impact noise), reliability which distinguished between concrete objects that golfers could attend to and those created by mental imagery, or deliberateness that represented focus controlled by the golfer from more spontaneous thoughts beyond conscious control. These categories were found to emerge differently across training and competitive contexts with higher incidence of process and kinaesthetic foci in training and result, environment, visual and psychological state foci in competition.

The dynamic nature of attention was observed through sequences of attentional foci that illuminated shifts in golfers' attention over short periods of time commensurate with content specificity of pre and post shot routines. This latter finding offers an important challenge to the often static and dichotomous position adopted by experimental approaches that compare not only one attentional style over another but alternative mechanistic accounts such as anxiety (debilitative/facilitative) and coping (emotion/problem focused). An understanding of what may influence these attentional shifts and which ultimately initiates skill execution during performance would therefore be an important research progression in order to develop appropriate intervention.

Gucciardi, Longbottom, Jackson and Dimmock (2010) proposed a temporal aspect to the 'choking' experience and highlighted the need to extend research into the full psychological 'choking' experience (i.e. cognitions, feelings and behaviours). The authors suggested that a greater holistic approach to understanding the phenomenon would provide greater insight into why some athletes are susceptible to the phenomenon and others are not. In turn, a clearer knowledge would emerge of underlying mechanisms and enable practitioners to develop more effective multimodal interventions. Rather than test theory the authors drew on a personal construct psychology perspective (Kelly, 1991) to explain participants' subjective experience. Such an approach was considered complimentary to holistic research aims as it holds the meaning that individuals attach to events as being the factor that 'distinguishes the troubled from the untroubled' (Gucciardi et al., 2010, p.63). Essentially Kelly (1991) proposed the unit of experience as a cycle, through which individuals anticipate, encounter and reflect on the event in order to revise and elaborate construct systems.

In order to get closer to the experience and advance the work of Hill et al. (2009), Gucciardi et al. (2010) approached golf coaches to identify players that they believed had choked under pressure. From an initial twenty-seven nominations the authors purposefully sampled twenty-two experienced golfers all of whom maintained a handicap of less than 5 over the previous two years. The researchers adopted Beilock and Gray's (2007) 'choking' definition in selecting participants ensuring that each satisfied the three characteristics within their self-confessed reports of 'choking' and that they had both recall of between three and six instances in the last two years, with the most recent being within one month of the study. A semi-structured interview provided foundation for the focus groups and the one-to-one interview and was developed in consideration of the five-phase cycle of experience proposed by Kelly (1991). After initial coding and axial coding in which relationships and explanations of the data were established, deductive analysis informed by personal construct psychology provided a framework for conceptualisation, producing themes of; antecedents, personal investment, 'choking' event, consequences and learning experiences.

Golfers reported a number of antecedent factors to the 'choking' event including; internal and external perceptions of pressure, directional interpretation of anxiety, perfectionist tendencies, fear of failure, loss of emotional control and a loss of attentional control. The degree and type of personal investment reported by participants was considered to have implications for the impact the encounter would have on experience and was characterised by sub-themes of personal meaning and personal improvement. Reduced attention and emotional control were themes evident prior to and during the 'choking' event together with departure from normal routines. Physiological symptoms and consequences were reported such as, a loss in confidence and trust in ability, emotional distress, suboptimal performance and a loss of enjoyment. Finally, despite the evident negative thoughts and feelings evoked by the 'choking' experience, each participant offered ways in which it had enabled them to be better equipped to meet similar demands in the future. The importance of maintaining a consistent pre-shot routine, having trust in a game plan and physical ability, taking confidence from previous experiences, maintaining perspective and investing in the process and not the outcome were all suggested as positive learning experiences, with the latter posited as having a significant contribution to the 'choke' as contained within other sub themes of the experience cycle (Gucciardi et al., 2010).

Gucciardi et al. (2010) highlight key components of attention and cognition they identified throughout the entire ‘choking’ experience and suggest that emotional processes provide a major contribution to understanding the phenomena. In addition, golfers in the study reported a shift in their interpretation of anxiety symptoms in which a degree of anxiety, generally perceived as facilitative, changes to debilitating prior to a ‘choke’. The authors recognised that the ‘choking’ definition posited by Beilock and Gray (2007) was unsurprisingly supported as it was used to select their purposive sample. However, through themes that encapsulate the experience cycle, greater understanding of factors contributing to perceptions of pressure and incentives to perform were presented. The reported differences between the temporal experiences of participants in the study by Gucciardi et al and the characteristics of the original definition consequently encouraged amendment and an additional definition of the ‘choking’ phenomenon:

“Heightened levels of perceived pressure and where incentives for optimal performance are at a maximum lead to acute or chronic forms of sub-optimal performance or performing more poorly than expected given one’s skill level and self-set performance expectations” (Gucciardi et al., 2010, p.79).

Support for the important role of anxiety is found in the definition offered by Mesagno and Mullane-Grant (2010) that explains ‘choking’ as:

“A critical deterioration in skill execution leading to substandard performance that is caused by an elevation in anxiety levels under perceived pressure at a time when successful outcome is normally attainable by the athlete” (Mesagno & Mullane-Grant, 2010, p. 343).

The explicit reference to anxiety as a cause of ‘choking’ in the definition by Mesagno and Mullane-Grant and the suggestion by Mesagno and Hill (2013) ‘choking’ cannot occur without heightened anxiety is in conflict with Jackson’s (2013) insistence that such circular reasoning must be avoided so that definition can be separated from explanation. Unlike Baumeister and Showers (1986), Gucciardi et al. (2010), Mesagno and Mullane-Grant do not emphasise the role of motivation and goal striving as either being a descriptive component of ‘choking’ or contributing to either perceptions of pressure or the ‘choking’ experience.

Whilst distinction has been made between certain aspects of performance decrement such as panic, the ‘yips’ and slumps (see 1.2.4) characteristics of ‘choking’ need to be established in parallel to an agreed definition. This will ensure accurate examination of individuals that have ‘choked’, as opposed to those that have simply experienced lower

levels of performance when pressurised (e.g. Wang Marchant, Morris & Gibbs, 2004; Wilson Smith & Holmes, 2007) or produced outcomes that ultimately were not successful but possible considering their skill level. An example is the definition of ‘choking’ used by Jordet and colleagues in research into football penalty shoot-out performance (e.g. Jordet, 2009; Jordet, Hartman & Vuijk, 2012) in which failure to score either by missing the goal or the penalty being saved by the goalkeeper constituted a ‘choke’ as defined by a significant drop in performance. Buszard et al. (2013) emphasise the importance of clarity relating to this latter scenario as skill failure or performance decrement should be determined as a result of uncharacteristic individual mistakes and not a factor of an opponent’s actions. This problem is confounded as in many sports as one player gets worse the other gets better, however, this may be negated in golf where a players actions and skill execution do not have a direct effect on opponents performance but may impact psychological momentum.

Although the Hill et al. (2009) definition was the first to represent ‘choking’ as ‘a considerable, extreme and dramatic failure in athletic performance’ (p. 5) it was later considered by Mesagno and Hill (2013a) to comprise ambiguous terms such as ‘resources’ and ‘demands’ which reduces its utility in quantitative research. In an attempt to address these concerns and the perceived lack of necessary observable elements in alternative definitions (e.g. Gucciardi et al., 2010; Mesagno & Mullane-Grant, 2010) they proposed the most recent conceptualisation of the ‘choke’ to be:

‘An acute and considerable decrease in skill execution and performance when self-expected standards are normally achievable, which is the result of increased anxiety under perceived pressure’ (Mesagno & Hill. 2013a, p.9).

The inclusion of ‘increased anxiety’ and ‘considerable decrease in skill execution and performance’ within the definition, attempts to define ‘choking’ through observable features. This appears to maintain the circular reasoning violation concerns put forward by Jackson (2013) by proposing possible underlying causes. In response Mesagno and Hill (2013b) contend that the sole intention of the definition was to state the necessary components of the ‘choke’ so that it may be more consistently identifiable and not to infer underlying processes. They further posit that the exclusion of anxiety and performance decrease would inhibit the accurate development of a ‘choking’ definition. Mesagno and Hill (2013a) fundamentally believe ‘choking’ to be qualitatively and quantitatively different from other performance failures and distinguishable by the magnitude of decrement, negative cognitive appraisal and anxiety, a perceived lack of

control and self-presentation concerns and in addition there will be differences in cognition, emotions and consequences.

The requirement to distinguish between levels of performance decrement that have been used in research into performance under pressure to date, including moderate under performance and major underperformance (Jackson, 2013) and significant, acute and dramatic performance decrement (Mesagno & Hill, 2013) is an agreed priority of experts in the field (Mesagno & Hill, 2013b) although there remains a lack of clarity as to how this should be achieved. The extant quantitative literature assumes 'choking' to have occurred when a statistically significant decline in performance has been observed. Whilst a suggestion from Jackson (2013) to reduce alpha levels (e.g. $p < .05$ to $p < .01$) would enable distinction between, for example, moderate and major underperformance, Buszard et al. (2013) remind us that this does not explain the size of the difference. A further contention relates to the duration or instances of performance failure that will constitute a 'choking' experience. Mesagno and Hill (2013a) question the attribution of the 'choking' label to a single discrete performance failure, particularly those that do not conform to definitions that include 'chronic forms of sub-optimal performance', 'critical deterioration' or 'a considerable, extreme and dramatic failure' (e.g. Jordet, 2009). However Jackson (2013) suggests that this may be determined on a single event if there is sufficient information (data) that characterises the athletes' 'normal' level of performance.

Jackson (2013) suggests that additional definitions of performance failures are essential in order to test Mesagno and Hill's implicit hypothesis that the processes underlying moderate under performance differ from those of major under performance. Buszard et al. (2013) raise further questions that need to be addressed if there is to be a universal definition of 'choking' applicable across sports and to a range of abilities. First, how can measurement of performance decrement (e.g. acute, sub-standard) be comparatively applied to expert performers who demonstrate relatively consistent performance and to novice athletes whose performances are typically more variable? Second, will a definition be able to distinguish between poor skill execution that has effective outcomes and effective executions that result in negative outcomes? Further discussion has focused on universal explanation of these performance failures and their underlying mechanisms. Although Jackson is in agreement with Mesagno and Hill that there will be mechanistic differences between extreme failures and less extreme performance failures, Buszard et al. (2013) believe that they are likely to be the same due to the overlap in theoretical explanations (i.e. self-focus and distraction; see Chapter 2) and

urge caution in treating ‘choking’ as a separate phenomenon in response to the emotive connotations and attention that these supposed episodes receive in the media.

1.2.4 Panic, the ‘yips’ and performance slumps.

This past research lends strong support for greater understanding of differences in performance decrement (e.g. Buszard et al., 2013; Mesagno and Hill, 2013b) however, ‘choking’ under pressure has been distinguished from some forms of performance failure such as the ‘yips’, panic and performance slumps. Clark, Tofler and Lardon (2005) suggest that the ability to make rational decisions when selecting the correct plan of action as a fundamental difference between ‘choking’ and an athlete whose performance deteriorates through panic. Furthermore their inability to execute the skill in the ‘choking’ experience is because of intervening psychological factors. A sportsperson who panics when in a pressure situation will engage in illogical decision making as a result of their inability to think rationally and this can subsequently lead to skill breakdown and performance failure.

The most visible example of ‘choking’ under pressure within golf has been studied in players’ experiences of the ‘yips’ (Clarke, Sheffield & Akehurst, 2015; Roberts, Rotheram, Maynard, Thomas & Woodman, 2013; Sachdev, 1992; Smith, Adler, Crews, et al., 2003; Smith, Malo, Laskowski et al., 2000; Stinear, et al., 2006). This particular performance deficit epitomises the failure to maintain performance levels in pressure situations as it is witnessed in the majority of cases, on completion of a hole, when a player is chipping or putting. This phenomenon is characterised by excessive involuntary muscle activity and high somatic anxiety, that can result in unwanted movement or an inability to initiate the putting stroke or chipping action (Stinear et al., 2006) and when exploring the discourse of the individuals that have experienced such decrements in performance, a fuller picture starts to emerge. Contrasting descriptions of the ‘yip’ experience that include; a jerky, uncontrollable swing with the putter, flinching on impact and freezing on short putts, a lack of confidence particularly on short putts, nervousness and tight feeling in the body prior and during the putt and tension and jumpiness, suggest that these maybe symptoms of very different problems (Clarke et al., 2015; Smith, et al., 2003). With the assistance of a physiologist and neurologist an interdisciplinary understanding can be found of a movement disorder that may find better definition on a continuum from the neurological disorder of dystonia (McDaniel, Cummings & Shain, 1989) to the psychological disorder of ‘choking’ (Baumeister &

Showers, 1986; Masters, 1992; Klampfl, Lobinger & Raab, 2013). As a result a better appreciation of the role of performance anxiety in all those that suffer from the ‘yips’ may be gained.

The skills of putting and chipping satisfy the requirements of dominant upper limb involvement, highly repetitive movements, extreme motor precision and interplay with feedback-related modulation that represents task specific limb dystonia that is also experienced by writers and musicians. Poor putting performance in the form of the ‘yips’, has also been associated with increased frontal theta, left hemisphere alpha, and beta electroencephalography (EEG) activity (Crews, Lutz, Nilsson & Marriott, 1999) and to the acquired deterioration in the function of motor pathways involving the basal ganglia, that are accentuated when physiological and stress thresholds are exceeded.

McNaughten and Gray (2000) suggest that this anxiety and specifically fear, is controlled by the amygdala and that by studying the reaction of the hippocampus, in approach-avoidance situations, through EEG, we will observe increases in theta waves. Crews and Landers (1993) propose that both successful and non-successful putters experience anxiety, but that the former group are able to stop analysing movement and restrict the EEG activity of both hemispheres in the three seconds prior to the execution of a stroke. Animal experimentation has yielded promising effects of anxiolytic drugs in reducing the perception of threat; however, in the world of sport, where the use of drugs to aid training and performance are prohibited, alternative strategies need to be sought. As fear is considered a major factor in accounts of the ‘yips’ this activation of the amygdala and the subsequent release of corticosteroid posits a useful, though complex, example of possible neurophysiological interaction.

Physiological understanding of the ‘yips’ is helped by observation of increased heart rate, grip pressure and muscle activity in wrist flexors and extensors (Bennett, Hays, Lindsay, Olusoga & Maynard, 2015; Boutcher & Zinsser, 1990; Smith, et al., 2000; Stinear et al, 2006). Golfers who report the ‘yips’ as manifestations of a movement disorder as opposed increased anxiety, (dystonia; Type I, rather than ‘choking’; Type II) also experienced increased heart rate and it is currently unclear whether this heart rate increase is an antecedent or a symptom of increased anxiety. Neurological research recognises the debilitating role of anxiety in other disorders as it is observed to worsen involuntary movements in Parkinsons and Tourettes syndrome (Smith et al., 2003).

Current neurological, physiological and psychological evidence supports the possible beneficial effects of promoting a task–approach involvement between caddy and player,

(a mastery climate), as opposed to performance or avoidance goals, for those type II golfers that experience 'yips' as excessive performance anxiety or 'choking'. Kristiansen, Roberts and Abrahamsen (2007) found that athletes that remained task rather than ego involved were able to make use of more adaptive coping strategies that aid performance in competition. Support from physiological and neurological research disciplines would complement our understanding of the appropriate interventions required for greater efficacy by diagnosing players 'yip' experiences on a continuum.

Finally, performance slumps are characterised by an extended period of low level performance which is not necessarily induced by a pressure situation (Grove, 2004) and so identifying an experience as a 'choke' is of paramount importance if the underlying mechanisms and moderators are to be understood. Symptoms that define and characterise the 'choke' include those similar to many anxiety disorders or arousal states including tense muscles, shaking limbs, increased heart and pulse rates, shortness of breath, butterflies in the stomach, racing thoughts and feelings of panic (Moran, 2004). In addition the sportsperson will tend to believe that the harder they try the worse the problem becomes and that it is difficult to perform skills that have previously been automatic for them (Lavalley, Kremer, Moran & Williams, 2012). Qualitative research into 'choking' (e.g. Hill et al, 2010b; 2011) has identified that athletes may have different perceptions of cognitions, emotions and consequences between 'choking' and under performance or slumps.

1.3 Chapter summary

This introductory chapter has outlined the structure and specific aims of this thesis and detailed current conceptualisation of performance outcomes under pressure. Definitions of 'clutch' and 'choking' experiences provide a foundation for this research that intends to provide understanding of how achievement motivation influences attention during competitive performance and performance under pressure. Reviews and debate (Buszard et al., 2013; Hill et al., 2010; Jackson, 2013; Mesagno & Hill, 2013a; 2013b) have concluded that whilst contemporary research has provided an in-depth appreciation of the 'choking' phenomenon, there remains a lack of consensus over a precise definition and detailed understanding of the underlying mechanisms and potential moderators. Consequently it is of paramount importance that future studies address the current paucity of research that examines 'choking' in those that have evidently experienced it (Mesagno & Hill, 2013). The phenomenon of 'choking' in sport received greatest attention due to its dominance in the extant performance under

pressure literature, however, multiple performance outcomes are considered of interest to the studies in this thesis. Whilst the three studies do not specifically intend to observe incidents of ‘choking’, participants who self report experience of this performance decrement are of interest, so that the role of achievement motivation may be assessed in a population that has this propensity.

In addition efforts need to be made to get closer to the performance experience ‘at the very moment each performance occurred’ (Buszard et al., 2013, p.280) as previous research has relied heavily on the recall of these experiences through interviews and focus groups (e.g. Gucciardi, Longbottom, Jackson & Dimmock, 2010; Hill et al., 2009). The qualitative studies that have contributed to the understanding of performance under pressure in sport outlined in this chapter have responded to a need for greater ecologically valid research design. There has been intent to investigate participant experiences of lived ‘choking’ episodes (e.g. Gucciardi & Dimmock, 2008; Mesagno, Merchant & Morris, 2009) and to adopt methods that address challenges of unreliable and incomplete accounts collected through retrospective interviews.

The ‘choking’ under pressure debate has highlighted a number of specific areas to which the current research intends to contribute. The first relates to the perspective from which the ‘choke’ is defined and identified. As Hibbs (2010) acknowledged when conceptualising ‘clutch’ performance it is only the intrinsic features that are of interest and not what might cause observers to believe that a performance was a ‘clutch’. This suggests that ultimately an individual’s awareness of the situation is a critical determinant of whether a clutch definition can be attributed. Currently it is unclear whether the same distinction is necessary for ‘choking’ experiences as there have been increased efforts to include observable elements that enhance accurate classification but that exclude intrapersonal factors that may infer underlying causes.

On a second related issue it appears necessary to not only obtain clarity over the required level of performance decrement to constitute a ‘choke’ but to also establish what aspects of performance need to have been affected. In some definitions performance is referred to in a ‘global’ sense (e.g. Baumeister, 1984; Gucciardi et al., 2010) and in recent derivations skill execution has been included and separated from ‘other’ performance (e.g. Mesagno & Mullane-Grant, 2010, Mesagno & Hill, 2013). Such clarification will speak to the concerns of Buszard et al. (2013) who suggest that a definition should account for combination of effective and ineffective skill execution and outcomes. The third area of interest is to assess the proposed necessary experience

of anxiety as either a cause or identifiable feature in the ‘choking’ experience and to explore whether alternative explanations and characteristics (i.e. achievement motivation) may have greater utility. Motivational components are both implicitly and explicitly allied to definitions of ‘choking’; (i.e. Baumeister & Showers, 1986; Gucciardi et al., 2010; Hill et al., 2009). If success striving is central to the ‘choking’ experience through either primary or secondary indicators then it would appear equally important to determine an individuals’ perceptions of success and competence before either a potential ‘choking’ situation or ‘choking’ experience can be established.

1.4 Structure of thesis

A number of research areas provide background to the thesis. The focus in this introductory chapter has been on paradoxical performance effects in which clarity regarding a definition of the ‘choking’ phenomenon and the applicability to the sporting domain has been outlined. Particular attention was paid to the relevance of gaining increased understanding for golfing populations who are the focus of the studies in this thesis. The structure of the remainder of the thesis is described below.

In Chapter 2 the underlying mechanisms of ‘choking’ are discussed with dominant attentional theories that explain performance decrement in elite and novice sportspeople presented. Specifically the conscious processing hypotheses, reinvestment theory and processing efficiency theory provide a theoretical foundation for the studies in this thesis. These positions consider how self-focused attention and distraction impact working memory during skill execution. The factors believed to moderate ‘choking’ in sport are examined in turn before an evaluation is made of interventions and strategies that have been empirically tested for their efficacy in reducing skill breakdown under pressure.

In Chapter 3 the review of literature focuses on how golfers define success and perceive competence in achievement situations specifically through the adoption of achievement goals. The antecedents and consequences of goal adoption are then outlined with self-focus and distraction put forward as possible additions. The association of the two theoretical positions of attentional focus and achievement motivation are posited to provide an explanation of performance under pressure outcomes.

Chapter 4 describes the mixed methods used in this thesis and their appropriateness in addressing the specific research questions relating to each of the three studies. Qualitative enquiries makes use of semi-structured interviews and think aloud techniques which provides methods for getting as close to the psychological experience of performance under pressure as possible. The measurement of achievement goals and inference of attentional processes are then detailed with presentation of the inventories used in Study 2. Research into skill breakdown in laboratory settings, the manipulation of pressure and advances in recording of electroencephalography (EEG) in sport are then explored to inform the design of Study 3.

Chapters, 5, 6, and 7 report the individual studies that make up this thesis. Each begins with its own introduction, specific methods and results are then reported and each chapter concludes with a discussion of findings and a summary that informs the next study.

Chapter 5 reports the first study in this thesis that explores the motivational and attentional cognitions of competitive golfers. Qualitative methods employ think aloud and semi structured interview techniques of data collection and a thematic analysis provides insight into the ‘real time’ performance experience of golfers with regard to achievement motives and attentional focus. This study addresses the first three thesis objectives to gain greater understanding of the cognitive experiences of golfers performing in perceived pressure situations, to address identified methodological shortcomings of research in this area and utilise methods that get as close to the performance under pressure experience as possible and to enhance current operational definitions of performance under pressure in sport. In doing so the study answers the following research questions: (1) What are the motivational and attentional cognitive experiences of golfers performing under pressure? (2) Are golfers involved in multiple goals during performance under pressure?

Chapter 6 reports the second study in this thesis that examines the relationship between dispositional reinvestment and achievement goals at the dispositional and situational levels. These antecedent variables are further assessed for their utility in predicting performance outcomes in competitive golfers. Study 2 also utilises methods that get as close to the performance under pressure experience as possible and meets the thesis objective to provide knowledge of the role that achievement goals play in directing attentional processes posited to contribute to performance decrement under pressure. In meeting these objectives this study answers the following three research questions: (1)

What is the relationship between a golfers' propensity to reinvest and achievement goal orientation (2) Can goal involvement be predicted from goal orientation and a golfers' propensity to reinvest (disposition)? (3) How do dispositional achievement motivation and reinvestment, together with achievement goal involvement predict performance and how is any performance relationship affected by skill level?

Chapter 7 reports the final study in this thesis that assesses the effects of achievement goal involvement on putting performance and cortical efficiency in elite male golfers. The purposive sample in this final study reported experience of 'choking' under pressure and consistent underperformance in the skill of putting. The impact of achievement goals, therefore, on neuropsychological indicators of reinvestment and outcome measures of performance, is investigated. This study also meets the objectives of getting as close to the performance experience as possible and provides knowledge of the role that achievement goals play in directing attentional processes posited to contribute to performance decrement under pressure. In addition the study was designed to meet the final thesis objective of proposing developmentally apposite interventions and strategies that encourages adaptive attentional focus. The final study reported in this chapter answers the following research questions (1) How does achievement goal involvement effect golf putting performance? (2) How does achievement goal involvement effect cortical efficiency? (3) What are the effects of cortical efficiency on golf putting performance? (4) How do achievement goals and markers of psychomotor efficiency interact to effect golf putting performance?

Chapter 8 provides a general discussion of the findings from the three studies reported in this thesis. The unique contribution of these findings and this thesis to the literature is proposed with specific reference to, achievement motivation and attentional focus. Future directions for research, are suggested, with regard to performance and 'choking' under pressure that are posited be of greater utility to applied sport psychology and intervention design. This research has implications for golfers of all ages and abilities, for coaches, parents, caddies and all key individuals in a player's support network and has application in training and development programmes operated by, golf clubs and academies. The identification of achievement goals most appropriate to skill level when performing under pressure could influence the use of mental skills such as positive self-talk, can guide coaches in appropriate feedback and reinforcement, and educate parents and caddies so that they can create appropriate motivational climates for golfers to maintain optimum performance levels.

2. COGNITIVE MECHANISMS UNDERPINNING PERFORMANCE UNDER PRESSURE

2.1 Chapter overview

The previous chapter highlighted the challenges in defining a range of sport performance outcomes with a focus on the phenomenon of ‘choking’ under pressure in sport. To enable more accurate identification of ‘choking’ episodes, and promote relevant research and empirical study of this performance experience, Mesagno and Hill (2013a) proposed ‘choking’ to be:

‘An acute and considerable decrease in skill execution and performance when self-expected standards are normally achievable, which is the result of increased anxiety under perceived pressure’ (Mesagno & Hill. 2013a, p.9).

The focus in this chapter is on providing a review of the literature pertaining to theoretical explanations of successful skill execution and of why some golfers experience under-performance or ‘choking’ under perceived pressure. The role of attention represents the dominant area of research into the mechanisms underpinning performance decrement and as a consequence is given appropriate consideration in this review. Specific focus is given to how perceptions of the performance environment and/or increased anxiety initiate cognitive mechanisms and attentional processes that are posited to represent current scientific understanding of performance decrement.

In this chapter a brief historical overview is first presented that clarifies how a research focus on the mechanisms underpinning successful and unsuccessful performance has evolved. The specific role of anxiety and arousal, although not central to the studies in this thesis, are first outlined to provide understanding of how attentional theories developed in response to gaps in knowledge that these theories provided. The intention is to gain additional understanding of performance beyond, and separate from, that which is known of the relationship with anxiety. The following review, therefore, demonstrates, from the outset, the ubiquitous association between attention and motivation that is the foundation of this thesis.

Past theoretical explanations of performance outcomes under pressure in sport and golf are outlined and supported by empirical evidence. The chapter provides a rationale for the examination of how attention and motivation relate, to explain performance outcomes and informs the design of studies within this thesis that attempt to get closer

to the performance experience. The three aims of this chapter are first, to discuss the underlying cognitive mechanisms of ‘choking’ under pressure in sport, highlighting two dominant positions (self-focused attention and distraction) that explain ‘choking’ in elite and novice sportspeople. Second, moderators of performance outcomes under pressure are presented including a review of how pressure has been defined and manipulated in the literature. Finally interventions that promote adaptive attentional responses are explored with achievement goals posited as a potential addition to be studied.

2.2 Drive and arousal

Psychology has defined a drive as an aroused state brought about by a physiological need, however, Hull (1943), outlines a difference between a ‘need’ (e.g. hunger) as a physiological state of deprivation and a ‘drive’ which is a psychological state that is based on, but not the same as, a physiological need. Cashmore (2008) posited two types of drive; the first that arises from the pursuit of basic biological needs such as eating and drinking or restoring the internal equilibrium of the body (homeostasis), and secondary drives which contain the motivational characteristics that are contained within primary drives, but are conditioned or learnt over time, such as earning money or winning titles. From a learning theory perspective, an imbalance in the homeostatic mechanisms of the body creates a psychological state of arousal known as a ‘drive’ that forces the organism to take ameliorative action.

Supporters of drive theories hold that the performers’ level of arousal is a key determinant of performance (Baumeister & Showers, 1986). The desire to perform well under pressure can increase levels of arousal or drive which can subsequently have detrimental effects on performance (Cashmore, 2008; Hull, 1943; Spence & Spence, 1966). An initial application of drive theory to the sporting context suggested a positive and linear relationship between arousal and performance; the more aroused the sportsperson is the better their performance will be (e.g. Oxendine, 1984). Although support was initially offered, such a relationship appears problematic when you consider the athlete that may be overly ‘*psyched up*’ prior to a race resulting in a false start as was the case for Olympic gold medallist Usain Bolt in qualifying for the 2011 World Championship finals.

2.2.1 Inverted U Model.

The Yerkes- Dodson law (Yerkes & Dodson, 1908) or inverted U model represented an alternative explanation of the arousal performance relationship and is widely cited in sports psychology, although its origins lie in research into animal behaviour in the early part of the twentieth century. Based on findings that rats learn to discriminate ‘safe’ from ‘unsafe’ areas most quickly when intermediate shock levels are used as punishment, conclusions about human behaviour were drawn. Proponents suggested that individuals’ performance on skilled tasks would be better with intermediate levels of arousal and that as this arousal either increased or decreased from this optimum level, performance would deteriorate as a consequence. In addition, it was proposed that as the complexity of the skill increases, the amount of arousal required for optimal performance decreases; again suggesting that an increase in arousal levels beyond the intermediate level would result in inferior performance when performing difficult tasks (Teigen, 1994).

This non-linear relationship between arousal and performance is the basis of the ‘inverted U hypothesis’ (Oxendine, 1984); a curvilinear representation of anxiety and performance in which increased arousal is postulated to improve skilled performance but only up to a certain point after which further increases could in fact impair it. This suggests that physical arousal and anxiety alone are not predictive of performance and that those athletic performances that occur under intermediate levels of arousal should be superior to those in which an individual has low arousal or is over aroused. This places an importance on understanding an athlete’s unique optimal arousal state in order to best prepare for performance or to manage arousal levels during competition.

Despite support from Klavora (1978) who found higher level performances were displayed by high school basketball players who reported moderate levels of somatic anxiety, the tenets of the inverted U hypothesis and the Yerkes-Dodson principles are very difficult to test empirically. Researchers have had difficulty in defining and agreeing upon a satisfactory independent measure of the arousal construct, therefore, determining whether a given arousal level is too low or high for an athlete is problematic. Second, ethical considerations that did not restrict the early studies involving electric shocks (e.g. Yerkes & Dodson, 1908) have led to disagreement about appropriate methods for inducing arousal. Finally, Neiss (1988) posits an inherent flaw in that researchers are unable to predict in advance the specific point at which an

increase in arousal leads to diminishing returns; consequentially the law is immune to falsification.

Despite the lack of empirical evidence in the sporting domain, the plausibility of the inverted U hypothesis as an explanation of performance decrement has led to its dissemination by many sport psychologists as fact (Moran, 2004). However, the failure to provide an understanding of the theoretical mechanisms which may account for the relationship between arousal and performance, mean that fuller explanation of the processes that may lead to optimal performance and ‘choking’ are required (Beilock & Gray, 2007). Baumeister and Showers (1986) opine, drive theories are predominantly descriptive models that do not attempt to explain actual processes that underlie the arousing stimulus with the individuals’ performance; the drive approach “does not speak to the processes that debilitate performance” (p. 364).

2.2.2 Dominant Response Theory.

Dominant response theories posit that with increased drive comes the likelihood that the dominant response will occur. A popular incarnation of this theory is Zajonc’s theory of social facilitation (1965) that explains why improvements can be seen in the performance of well-learned tasks in the presence of an audience and deterioration in performance on poorly learned tasks in athletes of different skill levels. An increase in drive is presumed to accentuate a dominant response of success on a well-learned task and failure on an unfamiliar or poorly learned task. Baumeister and Showers (1986) highlight the challenges that the dominant response theory has in explaining the ‘choking’ phenomenon suggesting that it is inadequate as a general model that accounts for only some examples of ‘choking’. Broen and Storms (1961) earlier interpretation of dominant response theory was suggested to better account for the ‘choking’ phenomenon in proposing that each response has a ‘response potential ceiling’ and that increasing drive increases the likelihood of a dominant response but only up to a certain point; the ceiling. Increases in drive beyond that point are directed toward the activation of other responses and so the possibility of elicitation of non-dominant responses is increased. Baumeister and Showers (1986) whilst recognising the improved explanatory capabilities of dominant response theory, caution at the increase in vagueness and the inability to adequately test the model in the sporting context as both drive and response potential ceilings are difficult to operationalise. In addition, dominant response theory again fails to explain the psychological processes that lead to performance failures and

skill breakdown under pressure (Baumeister & Showers, 1986; Beilock & Gray, 2007; Hill et al. 2010a).

2.2.3 The Easterbrook Hypothesis.

The Easterbrook hypothesis (Easterbrook, 1959) represents an early association of drive theories with attentional explanations of ‘choking’ (Baumeister & Showers, 1986; Hill et al., 2010a) in suggesting cognitive processes as underlying the inverted U effects. It has advantages over previous theories outlined in that it both explains and makes predictions about improvements and failures caused by performance pressure (Bruning, Capage, Kozuh, Young & Young, 1968). The Easterbrook hypothesis explains inappropriate levels of drive as a factor leading to attentional disturbances and skill failure (Hill, et al., 2010a). Specifically there is increased concentration on task relevant cues up to a point, when irrelevant cues are disregarded. Attentional focus is consequently so narrow beyond this point that even task relevant cues begin to be ignored (Baumeister & Showers, 1986). Easterbrook, together with later developments by Spence and Spence (1966), and Broadbent (1971) signalled a move towards more attentional and process orientated explanations of ‘choking’.

2.2.4 Multidimensional Anxiety Theory and the Cusp Catastrophe Model.

Theorists referred to so far consider anxiety to be a one-dimensional construct with both psychological and physiological parameters having an undesired impact on performance. In contrast, multidimensional theories of anxiety represented a logical extension (Martens, Vealey & Burton, 1990) in conceptualisation of cognitive and somatic anxiety. Morris, Davis and Hutchings (1981, p.451) suggested that the former could be explained as “negative expectations and cognitive concerns about oneself, the situation at hand and potential consequences” and the latter as “one’s perceptions of the physiological-affective elements of the anxiety experience which are indications of the autonomic arousal and unpleasant feeling states such as nervousness and tension”. Such an extension is of relevance to the studies in the current thesis as cognitive representations of competence striving, in the form of achievement goals, are posited as influencing attentional processes suggested to underpin performance decrement. The studies in this thesis do not manipulate or measure performer anxiety, however, negative expectations and consideration of consequences share components of goal striving (see Chapter 3 for review) and therefore present possible conceptual overlap

between cognitive anxiety and achievement motivation that warrants further investigation.

Multidimensional anxiety theorists do not make predictions about the combined effects of cognitive and somatic anxiety but do posit that cognitive anxiety has a negative linear relationship with performance, whereas somatic anxiety has an inverted U relationship with performance. In response to inconsistent and contradictory findings that failed to support both predictions, the Cusp Catastrophe Model (CCM) was developed in recognition of the fact that cognitive anxiety does not always have a debilitating effect on performance and in fact, some sportspeople perform to their potential despite experiencing high levels of cognitive anxiety. Secondly it was noted that the influence of over anxiety often leads to a dramatic slump to very low levels of performance from which it is difficult to recover (e.g. Hardy & Parfit, 1991; Woodman & Hardy, 2003).

A central postulate of Cusp Catastrophe Theorists (e.g. Hardy, 1996) is the assumption that arousal may have different effects on sporting performance depending on the prevailing level of cognitive anxiety in the athlete as a function of either individual differences or the performance context. A further development from earlier multidimensional theories (Martens et al., 1990) is that the model allows for the possibility that performance may be influenced by physiological arousal both directly and indirectly. As a result of this assumption predictions are now possible that suggest that cognitive anxiety does not always hamper performance. Firstly, the interaction of physiological arousal and cognitive state anxiety will determine sporting performance to a greater degree than the absolute value of either alone; at low levels of physiological arousal, high cognitive anxiety should enhance performance but will be detrimental at relatively higher levels of arousal. A second prediction posits that when a sportsperson experiences high cognitive anxiety, the arousal performance curve should follow a different path under conditions of increasing versus decreasing physiological arousal (hysteresis effects; Hardy & Parfit, 1991).

Hardy (1996) proposed that one of the most important factors of the model was the attempt to describe the combined effects of cognitive anxiety and physiological arousal upon performance. Multidimensional anxiety theory (Martens et al., 1990) in comparison set out to explain an association between cognitive anxiety, somatic anxiety and performance through a series of two dimensional relationships. Where predictive similarities are present in the physiological arousal – performance relationship and the inverted U hypothesis this is only with low levels of athlete worry defined as cognitive

anxiety. After an arousal threshold is reached, a dramatic decline in performance (catastrophe) is experienced as opposed to the steady decline observed in the inverted U.

Hardy (1996) acknowledged that the lack of empirical study testing the predictions of the Cusp Catastrophe Model (CCM) may be a result of the complexity of the model itself; complexity that has led some researchers to question its value (e.g. Gill, 1994; Tenenbaum & Becker, 2005). Although support is evident of the model's predictions (Krane, Joyce & Rafeld, 1994; Edwards, Kingston, Hardy & Gould, 2002; Vickers & Williams, 2007) the originator himself has conducted or been involved in many of the studies (Edwards & Hardy, 1996; Hardy, 1996; Hardy & Parfit, 1991; Hardy, Parfit & Pates, 1994).

2.3 Distraction and cognitive interference theories

Optimum performance is dependent on certain information, processes and behaviours being attended to by the performer rather than other factors (Baumeister, 1984). Attentional theories explain 'choking' under pressure as an interference with the performers' attentional processes which result in alterations to cognitive processing and attentional focus which can subsequently lead to decrements in performance. Attention theories have been postulated largely in response to the limitations of drive theories and are divided fundamentally into two types that overlap in places: distraction (e.g. Carver & Sheier, 1981; Eysenck & Calvo, 1992) and self-focus theories (Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992; Masters & Maxwell, 2008). The two positions explain seemingly competing processes one dependant and one independent of working memory. Theories of attention explain the impact that pressure has on performance in different ways with the suggestion that there may be more than one attentional mechanism and that the cognitive demands of the task or skill may facilitate the prediction of how and if it will be vulnerable to failure (Beilock & Gray, 2007).

Maxwell, Masters and Eves (2003) suggest that the availability of working memory is only crucial to motor performance when the learner has come to rely on its use, which has implications for how golfers acquire information during skill acquisition and the role that a coach has in the dissemination of knowledge. Working memory maintains a limited amount of information that is of immediate relevance to the skill or task and is a short-term memory system (Kane & Engle, 2000). Pressure is proposed by distraction theories to influence the performance of a task by compromising individuals' working

memory capacity resources because of the creation of a distracting environment. Consequently, any inability to maintain task focus may then lead to performance decrements (Beilock & Gray, 2007; Hill et al., 2010).

In sport and competitive settings, worries about performance and/or its consequences can create a performance pressure that shifts attentional focus to task irrelevant cues, occupying the athletes' working memory, thus altering what was a single task performance into a dual task situation. The concerns and pressure-induced anxiety compete with information required for skill execution within the limited working memory resources available to the performer (Sarason, 1988). Cognitive anxiety and thoughts that arise from worry are believed to interfere with the mental processes that support performance, as the appropriate attention cannot be directed at task relevant information (Kahnemahn, 1973; Sarason, 1984; 1988). Complex and attentionally demanding tasks that rely on working memory capacity for the temporary storage and manipulation of decision and action relevant information are more sensitive to breakdown under pressure (Wilson, 2008).

Evidence that supports the suggestion that pressure compromises working memory resources comes largely from research involving academic test anxiety (Wine, 1971; Eysenck, 1979; Ashcraft & Kirk, 2001). Individuals who become highly anxious when taking school exams are thought to divide their attention between task relevant and irrelevant thoughts to a greater level than those who do not become highly anxious and consequently experience suboptimal levels of performance. Baumeister and Showers (1986) suggest that this educational context is complimentary to sport research into 'choking' as it 'usually presumes a test taker who wants to do well but fails under pressure' (p. 366) an assumption shared by those participating in competitive sport. Individual differences in the predisposition to worry about tests and performance may explain the differences in why some people 'choke' when others maintain performance and even excel. As Wilson (2008) cautions, however, it is important to acknowledge findings that challenges the prediction of a negative influence of cognitive anxiety on performance (e.g. Carver & Scheier, 1998; Clark, 2002; Sanders & Baron, 1975) and that have also demonstrated distraction as not always adversely affecting performance.

Beilock and Gray (2007) draw attention to the fact that not all tasks rely heavily on working memory. Whilst there is evidence that pressure to perform in sport can compromise working memory resources which in turn can lead to the breakdown of skills that rely on them, more explanation is needed to understand why skills that operate outside working memory are also susceptible to the effects of pressure (Fitts &

Posner, 1967; Proctor & Dutta, 1995; Beilock & Carr, 2001). The literature focuses on skills that are specifically high level motor skills such as golf putting (Masters, 1992) and baseball batting (Gray, 2004) which are thought to become proceduralised with practice and do not require constant online attentional control. The propositions of distraction theory should be ineffective with such skills as they will be robust to conditions that expend working memory resources, therefore, explanation may derive from sensitivity to other attention-induced disruptions under pressure (Beilock & Gray, 2007).

2.3.1 Processing Efficiency Theory.

Processing Efficiency Theory (PET; Eysenck & Calvo, 1992) is most relevant to skills and tasks that have high cognitive demands in settings in which evaluation and social comparison are prevalent, although it is intended to have general performance applicability (Wilson, 2008). It was developed in an attempt to explain many of the discrepancies between performance-anxiety theories and actual research findings and was influenced primarily by cognitive interference theory (CIT; Sarason, 1972, 1984, 1988) and Schonflug's (1986) model of behaviour economy. Whilst sharing the tenets of CIT regarding worry pre-empting resources of working memory, Eysenck and Calvo (1992) argued that Sarason's theory exaggerated the role that worry played. They sought to emphasise the role played by effort in determining the level of performance and the relationship between these levels of effort, performance and costs associated with increases in effort (e.g. fatigue).

Cognitive anxiety influences performance in two ways according to Processing Efficiency Theory (Eysenck & Calvo, 1992). First, performance decrements are observed as worry (cognitive anxiety) and are assumed to pre-empt storage and processing resources from working memory and second, worry is suggested to have a motivational function (Wilson, 2008). In the case of the latter, additional processing resources are introduced in the form of effort in response to concerns held by the individual over sub-optimal performance or alternative processing strategies are introduced in an attempt to maintain performance levels. PET highlights an important distinction between performance effectiveness which refers to the quality of the task performance and processing efficiency which represents the relationship between this effectiveness and the effort or processing resources invested (Eysenck, 1992). Moreover a fundamental prediction of Processing Efficiency Theory is that the detrimental effects

of anxiety on performance effectiveness are often less than those on processing efficiency as cognitive anxiety's impact on the availability of attentional resources may be in part or entirely compensated for by increased effort (Calvo, 1985).

Cognitive psychology has provided the main body of research in support of PET with only recent studies providing a sport specific focus and particularly golf performance. Wilson, Smith and Holmes, (2007) for example, found support for the prediction that anxiety typically impairs processing efficiency more than performance effectiveness for mid handicap golfers in a putting task. The observation that highly anxious performers report higher levels of subjective effort than low anxious performers on tasks in which their performance is comparable has been a consistent finding (e.g. Behan & Wilson, 2008; Janelle, 2002; Nieuwenhuys, Pijpers, Oudejans & Bakker, 2008). It is not possible to always compensate for the pre-emption of processing resources caused by anxiety simply by increasing effort; any adverse effects are therefore, predicted to become stronger as task demands on working memory capacity increase.

2.3.2 Attentional Control Theory.

In an attempt to address some of the limitations of Processing Efficiency Theory, Attentional Control Theory (ACT; Eysenck, Derakshan, Santos & Calvo, 2007) has been posited to provide further explanation of how anxiety affects performance; making more specific predictions regarding lower level functions of the central executive in working memory (Baddeley, 2001; 2007). Supporters of ACT propose that during an anxious experience when a salient valued goal is threatened, attention is directed to identifying the source of the threat and deciding on an appropriate response strategy (Wilson, 2008). Subsequently it is expected that processing resources are more likely to be diverted from task relevant to task irrelevant information irrespective of whether these are internal stimuli in the form of worrying or anxious thoughts or external environmental distractors (Eysenck, et al., 2007). Comparisons are made by the authors with the balance of goal directed (top down) and stimulus driven (bottom up) attentional systems (Corbetta & Shulman, 2002), where anxiety is generally associated with an increased influence of the stimulus driven attentional system and a decreased influence of the goal directed attentional system (Eysenck et al., 2007).

Within PET, the processing efficiency of the central executive in working memory is impaired by anxiety, ACT is more precise about the specific functions that are affected; the 'inhibition' and 'shifting' functions (Miyake et al., 2000) and in doing so addresses

previous deficiencies in precision and explanatory power (Wilson, 2008). The inhibition function makes use of attentional control to resist interference from task irrelevant stimuli (negative control), whereas the attentional control is used to shift the allocation of attention to remain focused on task relevant stimuli (positive control) through the shifting function.

The central prediction of Processing Efficiency Theory, that anxiety has a greater impact on processing efficiency than performance effectiveness is shared within ACT. However, the processing inefficiency resulting from disruption to inhibition and shifting functions within the central executive does not lead to inevitable performance decrements provided that responses of anxious performers make use of compensatory or alternative processing strategies (Eysenck et al., 2007).

2.4 Self-focus theories of attention

Explicit monitoring or execution focus theories (Beilock & Carr, 2001) are more concerned with attention to the actual execution of the skill and are referred to as self-focus theories of attention (Baumeister, 1984; Masters, 1992). The role of distraction in the 'choking' literature is consistently recognised as an alternative explanation of skill breakdown that sometimes overlaps with self-focus theories. Baumeister and Showers (1986) presented five models of how self-awareness can be detrimental to performance and further acknowledge the competing explanation of distraction as being evident in three of the cases. The first, that performance-contingent reward causes the performer to think about victory before it is achieved, as in the case of the golfer who might perform poorly on the last hole or round when winning becomes more salient. The second suggests that the athlete is distracted by a self-focused fear of failure and emphasises worry about, for example, not performing up to expectations. As supported by Duval and Wicklund (1973) the third posits that attention to self is, by definition, a distraction as it, together with attention to the environment, are mutually exclusive. The final two models of self-awareness are not explained by distraction; in the first it is suggested that skilful performance is achieved if executed automatically, through processes not available to consciousness (Baumeister, 1984), meaning that attempts to control these movements consciously will disrupt the quality of the performance. Carver and Scheier (1981) offer an alternative explanation of skill breakdown that holds consciousness as having the requisite knowledge to respond correctly but that it also considers alternative

responses. The additional time it takes to consider and reject maladaptive responses lead to performance decrements.

Beilock and Carr (2001) suggest that although theories of distraction and self-focus may appear to be competing in their proposed mechanisms they may be applicable in different domains and therefore act as complementary explanations of performance decrement. Skill breakdown under pressure according to distraction theories hold that mechanisms of ‘choking’ operate on task control structures that are attended to during execution; therefore, this is most likely to be evident in skills that are reliant on working memory, which will be susceptible to corruption, and forgetting as a result of dual task interference. The mechanisms of ‘choking’ explained by Explicit Monitoring Theory on the other hand, operate on task control structures that are proceduralised and run mainly unattended outside of working memory ‘and might best remain outside the scrutiny of introspection’ (p. 701).

Self-focus and distraction theories are associated with the theoretical stages of learning and it is widely accepted that in developing a skill, an individual will pass through cognitive, associative and autonomous phases (Fitts & Posner, 1967; Masters, 1992; Hill et al., 2010a). Performance is slow, erratic and requires effort in the cognitive phase as knowledge is explicit and rule based, this becomes smoother in the autonomous phase and performance appears effortless and fast, as knowledge is implicit and unable to be verbalised. Masters (1992) highlights that this early model is evident in more recent theories; when ‘cognitive phase’ is replaced by ‘declarative stage’ and ‘autonomous’ becomes ‘procedural’, similarities are evident with Anderson’s Adaptive Control of Thought theory of skill acquisition (1982). If the term ‘declarative stage’ was replaced with ‘controlled processing’ and ‘autonomic processing’ was in place of ‘procedural stage’ the basis of a structure posited by Schneider and Fisk (1983) would emerge. Most researchers in the skill learning domain believe that acquisition commences with declarative, explicit encoding of knowledge and ends with procedural implicit encoding with demands on cognitive processing starting high and becoming low (Masters, 1992).

Irrespective of the terminology used, Masters (1992) proclaimed that one of the principle characteristics epitomising expertise was its automatic, effortless and implicit nature. Deikman (1969) first highlighted ‘deautomatisation’ (an undoing of automaticity) as being possible because of reinvestment and attention to specific components of the

skill. This opinion was shared by researchers across disciplines such as Eysenck (1982) who drew parallels with a well learnt skill that one might take for granted, for example walking:

If you think too deeply about the leg movements involved in walking down a flight of stairs, you may well finish in a heap at the bottom of the stairs (p.13).

A similar suggestion was made of skills that are more complex, such as playing musical instruments. For example, it was found that by asking a pianist to describe the movements of the hands when playing, it initiated a focus on specific finger movements that was detrimental to performance (Schmidt, 1982). Masters (1992) saw a comparison between the musician and the sport performer who executes skills outstandingly in practice but poorly in competition as a result of thinking about how they are executing that skill; a reinvestment of conscious processing. According to Masters, increased state anxiety that can accompany competitive performance plays an important role in this 'deautomisation' and can induce conscious control (Conscious Processing Hypothesis; CPH) to disrupt automatic task processing (Mullen & Hardy, 2000). Masters proposed that if the amount of explicit knowledge available to the learner were reduced as they passed through the developmental phase it would result in lower incidence of skill breakdown when under pressure.

2.4.1 Conscious Processing and the Theory of Reinvestment.

Of the most recognised self-focus theories, the Conscious Processing Hypothesis and the Explicit Monitoring Hypothesis make similar assertions but are defined by one important conceptual distinction relating to the extent and specificity of effects. Jackson, Ashford and Nosworthy (2006) suggest that there are general disruptive effects on performance as a result of the explicit monitoring of the step by step process of the skill, whereas, the conscious control of movements and skill execution as posited by the Conscious Processing Hypothesis will have additional detrimental effects. Jackson et al. noted additive effects of an attention manipulation to skill focus and increased pressure and proposed that it is the skill focused instruction that elicits explicit monitoring; however, it is the addition of pressure perceptions that motivates the performer to consciously control the movements that are being explicitly monitored. Of specific relevance to the current thesis is the role of achievement motivation in both heightening perceptions of pressure in the performance environment and inducing conscious processing over explicit monitoring.

Jackson et al. (2006) have highlighted that the application of the term 'explicit monitoring' to explanations of 'choking' could be misleading as this may not be sufficient to be responsible for skill breakdown in the absence of conscious control of movement. Explicit monitoring would, therefore, also be an equally misleading term to describe all self-focus theories, as it is possible that the performer could be attending to and explicitly monitoring environmental stimuli and as such would be more representative of theories of distraction (Masters & Maxwell, 2008). The self-focus process originally conceptualised within Fitts, Bahrack Noble and Briggs' (1961) progression-regression hypothesis was later referred to by Masters (1992) as reinvestment. Masters (1992) attempted to unite many of the views regarding the subsequent conscious control of movements elicited by self-focus with the umbrella term 'reinvestment'. Reinvestment was defined in individual difference terms as "the propensity for manipulation of conscious, explicit, rule based knowledge, by working memory to control the mechanics of one's movements during motor output" (Masters & Maxwell, 2004, p.208). Masters believed that performers with more explicit knowledge (higher self-focused attention) were more susceptible to skill breakdown under pressure and that this vulnerability would lead to performance decrement if the performer reinvested this explicit knowledge.

Much of the evidence supporting the concept of reinvestment has examined the relationship between conscious (motor) processing and performance under pressure (Mullen, Hardy & Oldham, 2007; Mullen & Jones, 1996) with the majority of studies demonstrating that performers experience a drop in performance when encouraged to consciously attend to their movements by pressure manipulations or self-focus instructions. The association with the use of declarative knowledge has been studied in order to gain insight into reinvestment, although as Masters and Maxwell (2008) recognise, the relationship with motor processing is not entirely clear. The inducement of psychological pressure, altered equipment (Beilock & Carr, 2001), self-focused attention (Koedijker, Oudejans & Beek, 2007; Liao & Masters, 2001) and an individual's self-reported inclination to reinvest have all been associated with the accumulation of task relevant declarative knowledge deemed to be disruptive to the automatic processes associated with expert performance.

Masters (1992) hypothesised that learning a skill explicitly rather than implicitly would result in an increased likelihood of 'choking' as the explicit learning group would have access to and be able to reinvest explicit rule based information to perform the task that would not be available to the implicit learners. Findings supported the performance

decrement predictions of the explicit learning group when performing a golf-putting task under pressure and actually revealed performance enhancement of the implicit learners under pressure. Not all research has been fully supportive of Masters' findings and some have suggested a methodological flaw as contributing to the results (Mullen & Hardy, 2000; Gucciardi & Dimmock, 2008). Whilst the explicit learning group developed the putting skill from an instruction manual, the implicit learning group learnt to putt without instruction and engaged in a secondary task to minimise hypothesis-testing which it was considered to lead to explicit knowledge generation. The release from the learning phase secondary task in the pressure trials could have contributed to these significant findings. Both Hardy et al. (1996) and Bright and Freedman (1998) replicated Masters (1992) study with the former introducing an implicit learning group that had to perform during the stress trials with the secondary task.

The authors predicted that it would only be the group that were released from this task that would demonstrate performance improvements, however both the implicit learning groups improved in the pressure phase supporting Masters Theory of Reinvestment. Whilst Bright and Freedman (1998) reported only performance gains for participants released from the secondary task and advanced performance gains when the complexity of this secondary task was increased, there were fundamental differences in their replication of the original Masters (1992) study. Masters, Maxwell and Eves (2000) note the importance of novice participation in the implicit learning group to ensure that residual explicit rules are not attended to, however, in the Bright and Freedman study only a 12 month abstinence from golf was requested and further design critiques highlighted concerns over differences in the pressure manipulations and the number of trials used in the learning phase. Further replication that sought to address these issues has subsequently found support for Masters (1992) initial position that when motor skills are acquired through implicit practice conditions they are less susceptible to decrement under pressure (e.g. Mullen & Hardy, 2000; Mullen, Hardy & Oldham, 2007).

Psychological pressure is considered to be a dominant antecedent of reinvestment (Masters & Maxwell, 2008), as the emotions associated with the pressure experience, such as negative affect can modify the attention of the sport performer in their attempts to maintain the efficiency of their performance. Jackson and Beilock (2008) describe this as a paradox of control as efforts to enhance performance instead have the opposite effect. In addition boredom and the availability of too much time have been found to

encourage sports people into ‘a cycle of movement hypothesis testing’ (Maxwell & Masters, 2008, p. 171) with golfers found to use more time consuming and less efficient strategies under pressure (Wilson, Smith & Holmes, 2007). Potter (1947) first intimated that ‘gamesmanship’ could increase reinvestment in others by suggesting that praising an opponent’s performance can create a self-consciousness which in turn disrupts movement. Inadvertent gamesmanship against oneself may be responsible for catastrophic performance failures as players question, when in a flow state (Csikszentmihalyi, 1990), how they are performing so well, leading to a ‘conscious flow’ that Masters and Maxwell (2008) suggest is broken flow. Other influences on reinvestment include injury or accident (Laufer, Roten-Lehrer, Ronen, Khayutin, & Rozenberg, 2007), unexpected events prior to or during performance such as being dropped or sub-optimal performance at key moments (Rotherham, Thomas, Bawden, & Maynard, 2007), performance history (Gray, 2004) and the need for players to adapt to different conditions (Beilock & Carr, 2001). In golf this latter contingency is evident when players change equipment or make swing changes with a coach when previously performing at optimum levels.

The performance decrement of skilled participants has dominated the research supporting self-focus theories, whereas novice participants’ reliance on declarative knowledge and working memory manipulations mean that they should be unaffected by pressure-induced attention to the step by step process of skill execution (Beilock & Carr, 2001). Instead distraction provides a more consistent explanation of skill failure in novice groups as the requirement to process task relevant information results in additional pressure demands exceeding their capacity to cope. There is evidence, however, that suggests ‘choking’ is experienced by novice performers through self-focus (e.g. Pijpers, Oudejans, Holsheimer & Bakker, 2003) as anxiety evokes a temporary regress of movement control to an earlier stage of motor learning. The performance of novices has been typically found to be maintained and even improve when they explicitly monitor their skill under dual-task conditions (Beilock, Wierenga, & Carr, 2002; Mullen & Hardy, 2000). A number of studies have supported Masters’ (1992) hypothesis that posits that pressure induced self-focus will lead to a performance regression in not only sport (e.g. Lam, Maxwell & Masters, 2009; Liao & Masters, 2001; Mullen & Hardy, 2000; Mullen, Hardy & Tattersall, 2005) but also music (e.g. Wan & Huon, 2005) and medical surgery (e.g. Malhotra, Poolton, Wilson, Ngo & Masters, 2012).

The learning paradigm adopted by Masters and others in early examination of the Conscious Processing Hypothesis (e.g. Hardy et al., 1996; Masters, 1992) was extended by Hardy, Mullen and Martin (2001) to the use of a performance paradigm as this was considered to more accurately represent performers' regression to conscious processing and resultant skill breakdown under pressure. Hardy et al. (2001) studied twelve national female trampolinists who executed their voluntary routines in competition with and without shadowing coaching cues in both low and high anxiety conditions. The coaching cues were task relevant technical cues that represented explicit knowledge and were designed to promote conscious processing. Consistent with the Conscious Processing Hypothesis, performance decrement was evident in the high anxiety condition whereas similar deficits were not present under low anxiety with or without shadowing cues or when anxious but without the presence of shadowing cues. Hardy et al. suggested that the Conscious Processing Hypothesis did not provide an adequate explanation of these findings and proposed an alternative; the Attentional Threshold Hypothesis (ATH).

The Attentional Threshold Hypothesis proposed that performance decrements observed in the trampolinists may have been a consequence of exceeding a threshold of attentional capacity through increased state anxiety accompanied by the presence of the coach shadowing cues. Although anxiety related cognitions (e.g. worry) and the explicit coaching cues do not individually have a negative impact on performance, working memory capacity is reduced by both the maladaptive cognitions and the coaching instructions. Together they are said to have "operated additively and depleted the attentional resources available to maintain performance" (Hardy et al., 2001, p. 946).

Golfers were used in three studies that sought to compare the Attentional Threshold and Conscious Processing Hypotheses (Gucciardi & Dimmock, 2008; Mullen & Hardy, 2000; Mullen, Hardy & Tattersall, 2005). Mullen and Hardy (2000) observed 18 experienced golfers in a putting task and asked them to verbalise explicit instructions, generate random letters and to putt in conditions of low and high state anxiety. Mullen, Hardy and Tattersall (2005) replaced the random letter generation condition with a tone counting task as there were difficulties experienced by participants in the previous study with verbalisation. In these studies the Conscious Processing Hypothesis would predict the random letter generation task and the tone counting task to prevent golfers from attending to explicit knowledge, whereas the verbalisation of explicit cues should elicit conscious control of movement. The Attentional Threshold Hypothesis, in contrast suggests that the random letter generation and tone counting tasks in both studies

require the assistance of working memory and combined with anxiety would exceed attentional capacity, consequently depleting attentional resources. Results from the former study supported the Conscious Processing Hypothesis as performance deteriorated under the explicit instruction during increased state anxiety whereas participants in the random letter generation condition appeared to maintain sufficient attentional resources to successfully execute the dual task, as performance was not affected. The second study however, raises questions over whether performance decrements observed under increased anxiety could be attributed to a single mechanism and Mullen et al. (2005) put forward conscious efforts to control movement and reduced attentional resources as contributory factors to the impaired putting performance observed in both the explicit knowledge and task irrelevant cues (tone counting).

Gucciardi and Dimmock (2008) conducted a third study that intended to employ more ecologically valid experimental manipulations. Twenty experienced golfers completed 10 putts in each of three conditions under two levels of anxiety (low/high). An explicit knowledge condition in which participants generated three cue words pertaining to the specific components of their technique, a task irrelevant condition in which three cue words classified by the researchers to belong to a consistent category (e.g. colour; red, blue and green) and a swing thought condition in which golfers were asked to formulate a swing thought that encapsulated the mechanical processes of their putting movement (e.g. easy, smooth). In all conditions participants were instructed to focus on the cues relevant to the condition and to avoid thoughts not specific to the task. Performance decrement was only observed when golfers attended to explicit cues during increased state cognitive anxiety and not in the task irrelevant knowledge condition leading Gucciardi and Dimmock to conclude support for the Conscious Processing Hypothesis and that an Attentional Threshold Hypothesis explanation was unlikely. In addition, regardless of the anxiety level, the swing thought condition yielded better performance outcomes than the explicit and task irrelevant knowledge conditions, although it was acknowledged that this condition required participants to attend to one cue word compared with three in the other conditions and so future research should consider both the amount of conscious processing elicited by the cue words and the content.

2.4.2 Dispositional reinvestment.

In this thesis the relationship between achievement motivation and reinvestment is explored with reinvestment measured at the dispositional level in Study 2 (Chapter 6) and at the situational level (during skill execution) in Study 3 (Chapter 7). In the

following section I discuss how measurement has developed in these areas with specific methods of data collection detailed in Chapter 4.

Masters, Polman, and Hammond, (1993) proposed that reinvestment could be subject to individual differences and as such a characteristic of personality. Researchers have therefore, attempted to identify those individuals who are more likely, in pressure situations, to adopt maladaptive behaviours that lead to performance decrement. Baumeister (1984) suggested that individuals who scored highly on the Self-Consciousness Scale (Fenigstein, Scheier & Buss, 1975) and who were, therefore, more self-conscious were less susceptible to ‘choking’ under pressure as they were more familiar with performing in a self-aware state. This was supported by Lewis and Linder (1997) who found that competitive performance under pressure was maintained when the training environment acclimatised participants to high self-consciousness. Conversely recent research has found the role of dispositional self-focus to have a detrimental effect on performance (Wang, Marchant, Morris & Gibbs, 2004). In their study of basketball free throw performance, private self-consciousness and somatic trait anxiety were the best predictors of ‘choking’. The self-focus / performance decrement relationship has been supported in studies with golfers (Bawden, Maynard & Westbury, 2001); hockey (Jackson, Ashford & Nosworthy, 2006) and motorists, who were found to engage in more risky driving behaviours when they were being evaluated (Maxwell, Masters & Poolton, 2006).

Masters et al. (1993) initially developed the Reinvestment Scale to encompass three psychological components of ‘slips of action’, ‘rehearsal’ and ‘self-awareness’ and from existing scales that they considered relevant to the processes underlying reinvestment. These consisted of; twelve items from the private self-consciousness and public self-consciousness subscales of the Self-Consciousness Scale (Fenigstein et al., 1975), seven items from the rehearsal dimension of the Emotional Control Questionnaire (Roger & Nesselrover, 1987), and one item from the cognitive failures questionnaire (Broadbent, Cooper, Fitzgerald & Parkes, 1982). Initial testing failed to show performance decrement under pressure in either low or high reinvestment groups (Masters et al., 1993), however this was attributed to the low difficulty of the task as in a more complex golf putting task high Reinvestment Scale scores were associated with a decrease in performance levels under pressure. In a final study Masters et al. also found that university tennis and squash players identified as high reinvesters were rated by coaches and team captains as being susceptible to ‘choking’ under pressure.

Jackson et al. (2006) challenged the validity of the scale, despite the evidence that supported its use, suggesting, “the scale does not attempt to measure the process of reinvestment directly but instead aims to bring together conceptually linked items that predict this process” (p.65). In an attempt to directly specify movement and to address other methodological issues Masters, Eves and Maxwell (2005) developed the Movement Specific Reinvestment Scale (MSRS) which altered items such as ‘I reflect about myself a lot’ to ‘I reflect about my movement a lot’. The final scale consisted of two factors; movement self-consciousness and conscious motor processing. These subscales identify two types of conscious processing which Malhotra, Poolton, Wilson, Omuro and Masters (2015a) suggest could have different influences on performance and in different ways. Conscious motor processing depicts an individual’s propensity to consciously control the fundamental mechanics of movement, whereas, concern regarding the style of movement is central to movement self-consciousness. It has further been proposed that movement self-consciousness describes conscious monitoring in which attention is directed consciously to movement but without an intention to control that movement, whereas, the conscious motor processing subscale encapsulates conscious control (Malhotra, 2015a).

The importance of making a good impression, when executing the movement, suggests that an awareness of ‘others’ is central to those that score highly on the movement self-consciousness subscale of reinvestment. How an individual defines the importance and meaning of the performance context may therefore, interact differently with high reinvesters on each subscale to influence performance. Malhotra et al. (2015a) propose that as conscious processing has been defined by two different types of movement specific reinvestment it may be that they would be expected to influence performance through different mechanisms. In Chapter 3 (this thesis) social cognitive processes of achievement motivation are posited as potential contributing variables to attentional choices during performance under perceived pressure.

The negative association between reinvestment and performance has been consistently demonstrated, however, there has been limited empirical research that has looked at the specific influence of the conscious motor processing and movement self-consciousness dimensions of the MSRS. Initially research focused on clinical populations. Stroke patients (Orrell, Masters & Eves, 2009) and Parkinson’s disease patients (Masters, Pall, MacMahon & Eves, 2007) for example, scored higher on the MSRS than age matched controls and in studies that identified elderly people who had fallen as scoring higher on both factors of the scale than those who had not (Wong, Masters, Maxwell &

Abernethy, 2009). It was unclear, however, which factor (conscious motor processing/movement self-consciousness or skill breakdown) is responsible for which meaning that higher scores may be responsible for performance decrement or experience of skill breakdown may lead to higher scores (Masters & Maxwell, 2008). More recent research has explored the roles of the two dimensions on performance in laparoscopic surgery (Malhotra, Poolton, Wilson, Fan & Masters, 2014) but also golf (Malhotra et al. 2015a; Malhotra, Poolton, Wilson, Uiga & Masters, 2015b). The complexity of the task has been found to determine when movement self-consciousness (conscious monitoring) and conscious control occur. In the less demanding surgical task (Malhotra et al., 2014) movement self-consciousness was positively associated with completion times and in on a more demanding laparoscopic task, conscious motor processing was positively associated with completion times.

The pervasive maladaptive view of the reinvestment – performance relationship has been challenged not only by the findings of Malhotra et al. (2014) detailed in the previous section but others (e.g. Chell, Graydon, Crowley & Child, 2003; Jackson et al., 2006; Jackson, Kinrade, Hicks & Wills, 2013) with the suggestion that there are occasions when conscious monitoring may be advantageous. Such circumstances include, when subtle changes are required to well learned techniques (Carson, Collins & Richards, 2014; Toner & Moran, 2014) or in earlier stages of learning when reinvestment may facilitate an individual's identification of appropriate solutions to motor challenges (e.g. Berry & Broadbent, 1988; Masters & Poolton, 2012). Malhotra et al. (2015a) found that golfers that scored high on movement self-consciousness and conscious motor processing subscales performed well early in practice of a golf putting task but that conscious motor processing was not associated with improved putting performance later in the study. The authors concluded that a higher propensity for conscious motor processing assisted performance (putts holed and kinematic variability) in earlier stages of practice as participants were more quickly able to identify the components important to successful putting (i.e. impact velocity and putter face angle) and made attempts to control these factors.

Explanation of the positive relationship between movement self-consciousness and performance at this stage was harder for Malhotra et al. to determine, with participants' greater awareness of movement posited to enable efficient use of visual, audio and tactile feedback in assessing any discrepancy between the actual and desired state. In summary movement self-consciousness has been shown in the studies by Malhotra et al. (2014; 2015a; 2015b) to be induced in both high and low demanding performance

contexts and conscious motor processing has been found to be more likely evoked in contexts that heighten performance demands.

To gain further understanding of how both dimensions of the Movement Specific Reinvestment Scale (MSRS) influence performance in demanding contexts Malhotra et al. (2015b) studied golfers in low and high anxiety conditions of a putting task. Movement self-consciousness was again associated with putting proficiency in the low anxiety condition and as expected there was not an association with conscious motor processing at this lower level of performance demand. Conscious motor processing was also not associated with performance in the high anxiety condition. Instead the anxiety manipulation, which the authors acknowledge may not have been severe enough to evoke conscious processing, resulted in an increased effort that enabled the maintenance of performance standards; findings that find greater accord with distraction theories of attention-performance (e.g. Processing Efficiency Theory, Attention Control Theory). Researchers have suggested that increased effort can lead to conscious motor processing but that other important factors including motivation, a concept central to the studies in this thesis, might determine when this may occur (Edwards, Kingston, Hardy & Gould, 2002; Eysenck, Deraksham, Santos & Calvo, 2007). Movement self-consciousness or conscious monitoring, has gained increasing research support for its adaptive qualities in low attention demanding contexts, however Malhotra et al. (2015a) encourage caution with interpretation of trait measures of reinvestment as it is not possible to ascertain what participants were doing during the task. Instead more reliable state measures of movement specific reinvestment are encouraged such as the use of electroencephalography that is central to the design of Study 3.

2.4.3 Cortical efficiency and reinvestment.

The development of sporting skills typically progresses through a steep performance curve during the early period of practice that reduces and is thought to be reflective of a progression through what is initially a verbal-cognitive stage towards an autonomous stage of learning (Fitts & Posner, 1967; Anderson, 1982). In this early stage the learner is coming to terms with the numerous components of the task and in order to ascertain the most appropriate motor solution, will test various hypotheses signifying a higher degree of conscious involvement (Zhu, Maxwell, Zhang, Lam, Poolton & Masters, 2010). Verbal-cognitive involvement becomes less attention demanding and decreases as preferred solutions are adopted and the learner moves towards expertise in the

autonomous stage. Zhu et al. (2010) suggest that changes in cortical activity should be expected simultaneously with the rapid observable performance improvements that typify early stages of development and that this can be assessed through the real time recording of electrical activity in the brain; electroencephalography (EEG). Yarrow, Brown and Krakauer (2009) suggest caution in the interpretation of automaticity, however, as it is not indicative of skill but the level of skill at which automaticity is achieved. In this regard Yarrow et al. posit that automaticity can 'represent a false ceiling, not a measure of excellence' (p.7).

In an attempt to better understand the neurocognitive elements of skill execution, electroencephalography (EEG) features prominently in the literature on athletic performance (Hatfield & Hilman, 2001). Sports including; archery (Landers et al., 1994; Salazar, et al., 1990), rifle and pistol marksmanship (Hatfield, Haufler, Hung & Spalding, 2004; Hatfield, Landers & Ray, 1984; 1987; Hatfield, Landers, Ray & Daniels, 1982; Konttinen & Lyytinen, 1992; Konttinen, Landers & Lyytinen, 2000; Loze, Collins & Holmes, 2001), karate (Collins, Powell & Davies, 1990) and golf putting (Babiloni et al., 2011; Baumeister, Reinecke & Liesen, 2008; Crews & Landers, 1993) have demonstrated that skilled motor performance is not only determined by biomechanical and metabolic proficiency but also by neural efficiency. The study of these particular sports represent an emphasis that has been given to self-paced tasks, demanding visual-motor coordination and sports skills that have a motionless preparatory period. The task of golf putting has been as used as an appropriate skill to assess cortical efficiency as the action minimises movement related artefact that challenges accurate recording of EEG. Hatfield et al. (2004) suggest that elite sportspeople provide the opportunity to observe and understand stable cortical patterns as they have developed over a long period of time and these include specific allocation of processing resources, recognisable patterns of cortical activation and cortico-cortical communication between specified topographical regions.

It is widely accepted that the left temporal region of the brain is associated with verbal-analytical processes and language processing and that the frontal midline region is the premotor area of the cortex responsible for planning and movement (see Hatfield, et al., 2004 for review). Spectral power analysis quantifies the relative contribution of a frequency to a particular EEG signal and is used to measure cortical activation at specific regions in the cerebral cortex (see Chapter 4 for detailed EEG recording procedure). Previous studies have identified differences relating to skill level and stage of skill execution. For example in support of the idea that as competence in skill

execution develops there is a decrease in cognitive processes and withdrawal of verbal-analytical effort, an increase in alpha power has been consistently observed in the left temporal region (T3) during movement initiation (e.g. Hatfield, Landers & Ray, 1984; Haufler, Spalding, Santa Maria & Hatfield, 2000). The suggestion is that there is a suppression of attention to irrelevant information in more skilled sportspeople and that this is represented by a reduction in non-essential cortical resources (Hatfield & Hillman, 2001).

The preparation period in a number of sports such as rifle and pistol shooting, archery, darts and golf is considered to be a time where attention to the target is of great importance in order to achieve consistent optimum performance. Research into the neural activity during this pre-performance period has yielded elite – novice differences in event related desynchronisation (ERD) characterised by a decrease in alpha and beta band oscillations over sensorimotor cortical areas in athletes of superior ability (Pfurtscheller & Lopes da Silva, 1999). For example Haufler et al. (2000) observed less cortical activation in marksmen than non-athletes during the aiming period of shooting in the left central-temporal-parietal area and rifle shooters were found by Janelle et al. (2000) to have an increase in left hemisphere together with a decrease in right hemisphere alpha and beta power immediately prior to the shot.

In addition to changes in activation in localised brain regions, experts are observed to demonstrate greater ‘psychomotor efficiency’ characterised by a decrease in the use of non-essential brain functions and a reduced communication (coherence) between verbal analytical regions of the left hemisphere (T3) and the motor planning frontal region (Fz) of the right hemisphere (Hatfield & Hillman, 2001). The communication between these two regions of the left and frontal hemispheres was assessed in skilled darts players when they were placed under psychological stress (Hung, Lin, Lo, Kao, Hung, Chen & Lai, 2005). Hung et al. observed increased coherence between the T3 and Fz regions and interpreted this as verbal analytic interference with motor planning and support for the Theory of Reinvestment (Masters & Maxwell, 2008). Anxiety was seen to induce conscious motor processing that in turn disrupted the automaticity of the movement. Crews and Landers (1993) showed, however, that experts did receive input from verbal-analytical regions of the left hemisphere prior to initiating movement but importantly not during the movement. Crews and Landers suggested that in instances of skill breakdown these verbal-analytical regions might remain active. This is consistent with the concept of automaticity attributed to expert skill execution (Hatfield et al., 2004) as

the implication is; there is less conscious control of movement (reinvestment) in expert performers.

The Theory of Reinvestment proposes, “relatively automated motor processes can be disrupted if they are run using consciously accessed, task relevant declarative knowledge to control the mechanics of the movements on-line” (Masters & Maxwell, 2008, p. 160). In addition, individuals identified as high reinvesters through dispositional measures (i.e. MSRS) have reported significantly more about the mechanics of a golf putt after learning than low reinvesters (Maxwell, Masters & Eves, 2000; Maxwell, Masters & Poolton, 2006). Consequently Zhu, Poolton, Wilson, Maxwell, and Masters (2011) proposed that novice golfers with a high propensity to consciously control their movements would exhibit more T3-Fz coherence than golfers with low scores on the MSRS and that this would be representative of the different tendencies to employ verbal analytical control when executing skills. Support was found for this prediction with high reinvesters (identified as scoring high on the conscious motor processing subscale of the MSRS) displaying higher alpha2 T3-Fz coherence than low reinvesters. In a second experiment by Zhu et al. (2011) support was found for the benefits of implicit learning in resisting conscious processing as implicit, errorless learners had lower alpha2 T3-Fz coherence and reported less declarative knowledge than explicit learners and this increased under pressure for this group. The authors concluded that such findings represented the first psychophysiological evidence for the Theory of Reinvestment and additional support for the validity of the Movement Specific Reinvestment Scale (Masters et al., 2005).

2.4.4 Summary.

There remains contention as to the best theoretical explanation of performance decrement under high pressure situations, with experimental approaches that manipulate attention conditions unable to clarify which attentional focus is automatically activated under perceived pressure (Englert & Oudejans, 2014). Qualitative research has also yielded mixed findings with distraction posited as explaining ‘choking’ in cricket bowlers (Mesagno, Marchant & Morris, 2008) and golfers (Gucciardi, Longbottom, Jackson & Dimmock, 2010), whereas, self-focused attention has been reported by basketball players (Mesagno, Marchant & Morris, 2009). Englert and Oudejans (2014) investigated the attentional focus of semi-professional tennis players under high perceived pressure and revealed a statistically significant negative relationship between anxiety and performance (serve accuracy), a relationship that was found to be fully

mediated by reported levels of distraction. The reported level of self-focus did not mediate the anxiety performance relationship leading the authors to conclude support for distraction theories of 'choking'. An aim of their research was to clarify which focus of attention is activated automatically by the pressure context as opposed to experimental manipulation; however, assessment was not made within a tournament and so a greater understanding is still required of the pressure cues attended to during actual competitive situations.

Additional hypotheses have been proposed that challenge the notion of a single dichotomy explanation of performance decrement under pressure. These predictions propose both distraction and reinvestment theories as viable explanations of 'choking', and support Masters and Maxwell's (2004) efforts to establish a common ground in working memory based explanations of 'choking' (Nieuwenhuys & Oudejans, 2012). Beilock, Kulp, Holt and Carr (2004) acknowledge the intuitively appealing explanation of performance decrement under pressure by distraction, for tasks that engage attention and that place increased demands on working memory and through explicit monitoring (conscious processing, reinvestment) for skills that have become more automated through practice and expertise. They along with Buszard, Farrow and Masters (2013) caution against both the oversimplification of dichotomous explanations of novice and elite 'choking' experiences and of separating 'choking' from other forms of performance decrement. Buszard et al. suggest that the mechanisms that contribute to various levels of underperformance are likely to be the same and current attempts to define the severity of underperformance are confusing.

The first study reported in this thesis (Chapter 5) specifically aims to add clarity to this debate and definition. Buszard et al's view is that there is significant overlap between theories of distraction (e.g. Attention Control Theory) and those of self-focus (e.g. Reinvestment Theory). The former proposes a deterioration in performance under pressure as a result of attention to task irrelevant cues such as worry, whereas, the latter explains decrements as a consequence of attention being diverted towards the movements required in skill execution. If expert golfers are not required to consciously attend to these movements then reinvestment could in fact be seen as a form of distraction as they are not relevant to the successful execution of skills at this level of expertise. As Nieuwenhuys and Oudejans (2012) suggest, distraction and execution (self) focus models of attention propose different mechanisms that concern the anxiety

and motor performance relationship but that both can be explained in line with principles of distraction.

Research demonstrates that pressure induced failure is not evident in all highly practised 'automatic' performances (e.g. Beilock & Carr, 2001) as the mechanisms that underpin automated performances are not the same for all tasks. More complicated mathematical problems (e.g. Beilock et al., 2004) for example, are believed to automate via a shift to direct retrieval from memory, whereas, other tasks are automated via access to proceduralised motor programmes. Second and conversely, not all high working memory dependent and unpractised tasks are susceptible to pressure induced failures. The dependence on accessible declarative knowledge in novice sensorimotor tasks has been shown to be negatively impacted by dual task manipulations (e.g. Beilock, et al. 2002, Gray, 2004) and therefore, individuals performing these tasks would be expected to be susceptible to 'choking' under pressure due to distraction. In a golf putting task conducted by Beilock and Carr (2001), however, participants were exposed to high pressure environments both in the early and late stages of practice and this pressure was facilitative to performance in the early stages and was only considered to contribute to performance decrement in the later stages of learning.

Beilock et al. (2004) propose that pressure does not have one impact on attentional control in automated tasks and another on high working memory dependant tasks but instead the perception of pressure creates two effects that modify the allocation of attention to skill execution. First, consistent, with distraction theories, the presence of pressure reduces working memory capacity available for performance as cognitive anxiety about the situation and consequences emerge. Simultaneously the pressure situation encourages an increase in efforts to consciously control movements to ensure optimal performance standards are attained in line with explicit monitoring and self-focus theories. In short the characteristics of the skill demands are fundamental to understanding how attentional control contributes to skill failure. Pressure will induce reduced working memory capacity and efforts to consciously control movement and therefore, skills heavily reliant on working memory will breakdown as a result whereas proceduralised skills that are executed efficiently without working memory dependence will breakdown as a result of conscious control.

2.5 Dispositional and schematic moderators of performance under pressure

Self-focus and distraction theories of attention have both been detailed in the previous section to have an impact on skill breakdown under pressure through independent and additive explanations. The extent to which these can be attributed to performance decrement is dependent on a number of possible dispositional and schematic moderating variables such as skill level and specific skill demands (detailed in previous sections). Other moderating factors that have contributed to the choking literature are considered below to provide a rationale for the addition of achievement motivation discussed in Chapter 3.

2.5.1 Trait anxiety and self-confidence.

Performance deterioration under pressure has been associated with high levels of trait anxiety and qualitative research that has found anxiety to be a fundamental factor in those that had experienced the phenomenon (e.g. Hill et al, 2010b; Hill & Shaw, 2013) and the major contributor to suboptimal performance in football (Jordet, 2009; Jordet, Elferink-Gemser, Lemmink & Visscher, 2006; Jordet, Hartman, Visscher & Lemmink, 2007). Hill et al. (2010b) report that the moderating effects of trait anxiety and self-confidence require further attention, however, individuals that report higher levels of trait anxiety have been found to be more susceptible to inferior performance under pressure (e.g. Murray & Janelle, 2003; Wang et al., 2004) as do those that report low self-confidence (Baumeister et al., 1985; Baumeister & Showers, 1986).

Whilst explanations of the association between trait anxiety, self-confidence and performance have included alterations to visual search and gaze behaviour (Janelle, 2002), perceptions of pressure and the subsequent coping behaviours (Giacobbi & Weinberg, 2000), Hill et al. (2010b) maintain that ‘choking’ is elicited by high trait anxiety and low self-confidence through self-focus and distraction mechanisms. The intense consistent presence of state anxiety considered to be experienced by high trait anxious individuals is believed to overload working memory, which in turn leads to a processing inefficiency and a possible ‘choke’. Alternatively these individuals may ‘choke’ through self-focus routes as a result of their tendency to report a high propensity to reinvest.

2.5.2 Self-regulation.

Self-regulation research offers not only an explanation of skill-breakdown and ‘choking’ through self-regulation failure (Baumeister & Heatherton, 1996; Carver & Scheier; 1981; Kanfer & Karoly, 1972) but also highlights the important and undervalued role of motivation as a potential moderator of performance outcomes (Baumeister & Vohs, 2007; Muraven & Slessareva, 2003). The capacity to regulate the self and alter responses to situational stimuli provides insight into the skills and interventions required to alleviate the ‘choke’ or under performance. Baumeister and Heatherton (1996) outline a distinction between ‘underregulation’ and ‘misregulation’ failures. The former refers to an individual’s inability to utilise self-control, whereas the latter involves the misguided or inappropriate application of self-control that leads to undesired outcomes.

The feedback loop model of self-regulation is a multifaceted process that Carver and Scheier (1981) suggest consist of three main ingredients; standards, monitoring and operate phase (self-regulatory strength), that consequently provide three explanations of self-regulation failure through under-regulation. Baumeister and Vohs (2007) insisted that a fourth ingredient, motivation be included as ‘even if the standards are clear, monitoring is fully effective, and the persons resources are abundant, he or she may fail to self-regulate due to not caring about reaching the goal’ (p. 3). Self-regulation in recent conceptualisation (Bauer & Baumeister, 2011; Vohs & Baumeister, 2011) is a vital component to success when motivational conflicts arise between, for example, the needs of the individual and those that demand social acceptance.

Standards represent the goals, ideals and aspirations of the individual that are required for effective self-regulation. The lack of clarity in this area and setting of inappropriate goals and targets has been found to negatively affect action and efforts at self-regulation (e.g. Emmons & King, 1988; Heatherton & Ambady, 1993; Van Hook and Higgins, 1988). Self-regulation requires an individual to continually be aware of their own actions and to compare these ‘self-states’ to the previously outlined standards. This monitoring process represents the second important ingredient for self-regulation with those individuals who are unable to successfully self-monitor more susceptible to losing control. Although much of the research in this area has looked at addictive behaviour such as disordered eating and alcohol consumption (e.g. Heatherton & Baumeister, 1991) the failure to judge one’s abilities accurately as a consequence of inappropriate

goal setting or definitions of competence may result in monitoring deficiency and failure to initiate attempts to achieve these standards. It is within the operate phase that an individual should change their current state in response to successful monitoring.

Despite appropriate standards being set and the use of effective monitoring, self-regulation failures can still occur if an individual is unable and unsuccessful in creating the necessary change to current states as a result of the internal response patterns that are set in motion. In other words successful self-regulation as a controlled process does not stop the occurrence of an impulse but instead overrides the typical consequences associated with responses. Baumeister and Heatherton (1996) conclude that ‘the problem is not that people have impulses, it is that they act on them’ (p2).

The ability of an individual to override a habitual response is posited to be a function of their self-regulatory strength and as such will be subject to individual differences (Baumeister, Heatherton & Tice, 1994; Baumeister & Vohs, 2007; Muraven & Baumeister, 2000). Within this strength model, self-regulation is considered a limited resource and the associated demands of exerting control will serve to deplete resources resulting in self-regulatory breakdown in areas that would normally be manageable. Pressure and stress have been found to reduce this capacity with Glass, Singer and Friedman (1969) suggesting that efforts to cope with stress come at a ‘psychic cost’. Another implication of the strength model however, is that commensurate with the acceptance that physical strength can be developed through exercise so can self-regulatory strength through repeated exposure or practice. Schacter’s (1982) assertion that self-regulation should become easier the more one does it centres on observations of individuals who successfully quit smoking after multiple attempts. This suggests that all negative performance experiences may be an opportunity to develop self-regulatory strength to aid optimum performance in the long term and that the ability to perform under pressure is not an innate ability to cope with pressure but instead learned through successive approximations.

Baumeister and Heatherton (1996) position attention control as a primary factor in addressing the issues of inertia and transcendence, important to self-regulation, with a loss of attentional control a common first indication of self-regulation failure. The ability in the first stages of information processing to notice maladaptive impulse responses can resist the unwanted sequence from starting as once in motion the resultant inertia makes it more difficult to stop and places a greater strain on self-regulatory

processes. Heightened emotions shift attention toward the source, which are typically found in the present moment. Transcendence aids self-regulation by focusing attention away from the immediate stimuli however, it is common for an individual to immerse themselves in that immediate situation and as a consequence will experience a failure of transcendence and self-regulation. Transcendence relies on an individual's ability to appraise current negative situations in the context of more distal goals in order to regulate behaviour, which in turn is dependent on the concept of delayed gratification. In the same way as an individual may be able to regulate their alcohol consumption through contemplating the impact that it will have on their business performance the following day, a sports person, for example, would be able to resist a desire to withdraw effort to satisfy higher level goals of professionalism.

The posited role of achievement motivation in this thesis is important in defining performance outcomes. Valued goals together with transcendence may increase self-regulation and resist full 'choking experience' as performance is evaluated with longer term aspiration. The source of emotional distress can also be initiated by negative past experiences that are accessible in memory, for example a recent poor performance or 'choking' experience. This mechanism of self-regulation failure is initiated by efforts to distract oneself from the unhelpful memories by focusing on the immediate situation which as previously outlined presents challenges to self-control.

A further important aspect of self-regulation failure posited by Baumeister and Heatherton (1996) is the extent to which individuals comply and act on impulses that are contrary to their normal standards of desired behaviour. Baumeister and Heatherton explore the degree to which acquiescence can be explained by either overwhelming unstoppable forces or giving in to temptation in order to avoid the effort and frustration associated with attempts at self-restraint. The authors were sceptical of the popular notion of the presence of irresistible forces as leading to self-regulation failure as it was apparent that the vast majority of these could be resisted if people's lives depended on it. This suggests both that a degree of complicity is involved in self-regulation failure as they at some stage involve deliberate, volitional acts and that there are motivational explanations of these behavioural responses.

There are costs associated with self-control in high pressure environments which require a delay of gratification and an ability to remain with the pressure experience which may include elements of negative affect. In addition these efforts can be physically tiring as

well as mentally draining which will in turn, impact self-regulatory strength and capacity for other self-control needs. In order to consider it possible that a golfer would 'choose to choke' it is important to acknowledge that the pressure environment may provide high anxiety from which withdrawing effort, for example, provides immediate relief. To inhibit inertia and the full 'choking' experience would require the individual to voluntarily return from this newfound state of relief to one of anxiety and uncertainty, which in that moment may not be appealing. Second, during the 'choking' experience there may be processes within the players' control that are abandoned such as oversimplistic decision making in order to avoid excessive doubt and confusion. This strength model outlines an asymmetry in the way that golfers may potentially meet the demands of performing under pressure. Whereas, the ability to maintain self-control is viewed as a continual process in which one has to resist shot by shot and hole by hole temptation to succumb to impulses throughout the round, the decision to abandon self-control is viewed in isolation and is not reconsidered (Baumeister & Heatherton, 1996).

Self-regulation failure attributed to under-regulation depicts the golfer as unwilling or unable to exhibit self-control, however, instances of self-regulation failure can also be explained through misregulation, characterised by misguided or wasted efforts that ultimately result in failure. Baumeister and Heatherton propose three main causes that are now outlined with relevance to explanations of (sub) optimal golf performance and 'choking'. The first, misunderstood contingencies, represents the failure of well-intentioned self-regulatory efforts that may even be well executed as they are implemented based on false assumptions as to what would produce favourable outcomes. Golfers may believe that it is helpful to show their emotions, but discover that venting anger and frustration results in greater distress. The second, termed quixotic misregulation, relates to frustrations that can result from attempts to control the uncontrollable or automatic processes such as thought suppression which paradoxically can lead to an increased awareness of unwanted thoughts (Wegner, 1992, 1994). Excessive emphasis on affect regulation as a third pattern of misregulation identifies only one aspect of the challenge faced when performing under pressure and thus leaves important practical (e.g. tactical, decision making) issues unresolved. This is evident in the golfer who may be experiencing anxiety at the start of a performance (e.g. first tee nerves) as a consequence of the heightened awareness of spectators watching. In an attempt to manage the unwanted feelings of high cognitive and somatic anxiety regarding possible poor performance the player may speed up their pre shot routine and execution of the shot as a means of escaping the immediate unwanted feelings but

instead exacerbates the problem. Within the self-regulation conceptualisation, explicit monitoring could be viewed as an adaptive regulatory strategy and Baumeister's (1984) 'choking' explanation, conscious processing and reinvestment theories would be defined as misregulation failures, as in all cases the player would experience performance decrement despite intention and direct effort to achieve higher than normal performance standards.

Baumeister and Heatherton (1996) suggest that one self-regulatory lapse is not sufficient to explain larger scale failures and instead lapse-activated causes are responsible. These causes are influenced by individuals' beliefs and values (e.g. perfectionist tendencies) as well as high pressure / stress contexts (Marlatt, 1985). An initial lapse can lead to relapse as a consequence of an individual's efforts at absolute perfection. Paradoxically these high standards may have previously served as an adaptive regulatory strategy to discourage a lapse from happening or concentration to waver but ultimately catastrophise the initial undesired performance. One instance of self-regulatory or performance decrement can lead to attributions of failure and the belief that they have been unable to demonstrate requisite standards. Consequently self-control efforts are reduced and what could have remained an isolated incident of skill failure has a larger impact on overall performance. Performance effects will also influence lapse activated responses as initial isolated performance decrements may increase pressure on the golfer to perform. Excessive ruminative focus upon previous failures may increase efforts to overcome the initial deficit (Schlenker, Phillips, Boniecki & Schlenker, 1985).

The ability of golfers to regulate their behaviour in response to pressure induced impulses offers some understanding of those that will perform optimally and others that are susceptible to performance decrement when they need it most. This may be a function of under-regulation and a players' inability or opposition to control their behaviour or as a result of inappropriate well intentioned misregulatory efforts. From this understanding the concept of volition permeates and highlights multiple opportunities to intervene to promote optimal performance (focus before and during skill execution) and to resist longer term, substantial decrements associated with instances of suboptimal performance. A single incident of skill failure does not inevitably lead to a full 'choking' experience but instead will be appraised and monitored in accordance with underlying beliefs of how the outcome threatens previously set standards and the extent to which motivation can overcome temporary

ego depletion (Baumeister & Vohs, 2007). It is, therefore, of paramount importance that these standards (goals) are appropriately set and evaluated and that apposite regulatory strategies are employed.

2.5.3 Self presentation.

Self-consciousness has been a dominant influence on ‘choking’ research; however, differing views remain on its role in performance and the mixed findings have been attributed to the influence of other variables such as the skill level of the performer and task complexity. As highlighted in the previous section, Baumeister (1984) argued that highly self-conscious athletes would be less susceptible to ‘choking’ as their tendency to adopt an inward focus of attention would create immunity to the negative effects of self-focus. In contrast to the research supporting Baumeister’s position (e.g. Beilock & Carr, 2001; Lewis & Linder; 1997) other studies have demonstrated that high self-conscious athletes’ susceptibility to self-focus would make them more likely to ‘choke’ under pressure (e.g. Liao & Masters, 2001; Poolton, Maxwell & masters, 2004; Wang, Marchant, Morris & Gibbs, 2004).

It is unclear whether the presence of an audience will have a positive or negative effect on performance with Wallace, Baumeister and Vohs (2005) suggesting that a supportive audience would cause ‘choking’ by increasing anxiety levels in the individual which would in turn lead to an increase in self-focus. Contrasting evidence can be found in the ‘home advantage’ literature, however, (e.g. Thomas, Reeves & Bell, 2008) and so other moderating variables need to be considered to understand the accepted effects of an audience on performance. Public self-consciousness, the realisation that others may be aware of oneself, ‘may result in uneasiness when the individual expects critical evaluation by others’ (Mesagno, Harvey & Janelle, 2012, p. 60). This fear of negative evaluation has been relatively under investigated and may help to understand possible audience effects as it predisposes individuals to performance decrements. Mesagno et al. studied 138 basketball players classified as having either high or low fear of negative evaluation (FNE) and observed them performing shots under high and low pressure phases. High FNE players displayed a significant increase in anxiety and a significant decrease in performance from low to high pressure phases compared with low FNE comparisons who experienced minimal increase in anxiety, but were able to maintain performance. Cognitive rather than somatic anxiety was found to be a partial mediator

between FNE group and performance and these findings warrant further exploration of the processes that link FNE, cognition and skill execution.

2.5.4 Coping styles and public status.

A wide range of coping strategies have been established to be at an athletes' disposal in their attempts to meet the demands of stressful situations (see Nicholls & Polman, 2007 for a review). Strategies have been determined based on their function and intention and the most commonly used (macro level) have been problem-focused and emotion focused coping, the former with the intention of altering the stressful situation and the latter dealing with the emotional distress initiated by the situation. In addition avoidance and approach coping have been identified as behavioural and psychological efforts to distance oneself from the source of stress or deliberately confronting it in an effort to reduce it. Finally appraisal-focused coping involves re-evaluation and situation restructuring in order to reduce the importance or meaning of the stressor.

It has been proposed that in pressure situations the coping style adopted by athletes influences their susceptibility to 'choking' (e.g. Jordet, 2009; Wang et al., 2004) with approach (e.g. basketball; Wang et al., 2004) and avoidance coping styles found to be significantly related to 'choking'. An escapist self-regulatory coping style (micro level) was found in footballers that missed penalty kicks in high pressure situations (Jordet & Hartman, 2008). The avoidance coping style identified by Jordet and Hartman reflected observation of the preparation time of 291 players taking 359 penalty kicks and the finding that unsuccessful kicks followed a significantly faster preparation time and epitomised an immediate behavioural withdrawal from the situation.

A range of moderating variables can be seen to influence a golfer's performance under pressure and clarity regarding the underpinning mechanism of performance decrement can only be achieved with greater understanding of these moderator effects. The studies within this thesis look to explore the role of achievement goals in the attention control-performance relationship and in doing so it is hoped that this will provide greater understanding of the effects of the moderators outlined above.

2.5.5 Perceptions of pressure.

There are many contexts in which performers find themselves in 'high stake' situations in which optimal performance is both personally meaningful and is perceived to have consequences for future success (DeCaro, Thomas, Albert & Beilock, 2011). Whether it is delivering a key business presentation, hitting the right notes in an audition, passing exams, scoring in a penalty shootout or making the cut on the European Golf Tour, the desire to perform to one's potential is believed to create performance pressure (Baumeister, 1984; Hardy, Mullen & Jones, 1996; Beilock & Carr, 2001). The importance of understanding how the performance environment might alter cognitive processes and attentional control that lead to skill failure is central to this thesis to enable appropriate performance climates to be observed and manipulated in laboratory settings. In this section the pressure conditions that have been found to induce skill breakdown through attentional explanations of 'choking' are outlined to provide a rationale for the study design in this thesis.

The different mechanisms underlying 'choking' and skill breakdown proposed by distraction and self-focus theories have been previously outlined. The former infers that pressure negatively affects performance by diverting attention and working memory resources away from skill execution and the latter suggests that pressure functions to direct too much attention toward skill processes and procedures. DeCaro et al. (2011) questioned how high pressure situations could exert different effects depending on the task being carried out, believing them to, in fact, involve multiple components, exerting multiple effects which would lead to distracting thoughts, explicit monitoring or even both. The authors highlighted a lack of focus to the pressure situation in the 'choking' under pressure literature, with the make-up of the pressure situation itself largely ignored both in real world and laboratory manipulations.

Various conditions have been created in the sport specific research area including videotaping performance (e.g. Otten, 2009), observation and audience support (e.g. Baumeister & Steinhilber, 1984), visual feedback (e.g. Gray, 2004) and financial reward (e.g. Masters, 1992) with research into motor action and cognitive problem solving demonstrating that novices typically experience performance deterioration when factors such as audience size and financial rewards are heightened experimentally (Baumeister & Showers, 1986; Beilock et al, 2002; Gucciardi & Dimmock, 2008; Lewis & Linder, 1997).

DeCaro et al. (2011) suggested that being watched by others may induce a *monitoring pressure* in which attention may increase to skill processes and procedures and especially if this is in conjunction with evaluation. An incentive as used by Masters (1992) on the other hand may result in an *outcome pressure* as performers' focus of attention is shifted to the consequences of performance and in some situations, there may be elements of both. Goldman and Rao (2013) caution however, that observation of performance outcomes to determine underpinning preference mechanisms of pressure are problematic as intended actions are separated from realised outcomes. An example from research in golf by Pope and Schweitzer (2011) concluded from putting outcomes, that golfers have a loss-averse preference and this centred on the empirical finding that more par putts are made by golfers than comparably difficult birdie putts. Loss averse golfers, with a separable cost of effort, will try harder in order to be successful on par putts and the subsequent increase in accuracy is taken as evidence of loss aversion. Goldman and Rao explain that to reliably infer choices from outcomes, the following assumptions are necessary. First that psychological pressure does not differentially affect putting accuracy for birdie and par putts; it is this assumption that enables us to isolate the impact of effort. Second, that trying harder will lead to an increased success rate.

DeCaro et al. (2011) found that pressure to attain a particular performance based outcome was detrimental to the execution of a skill that was reliant on working memory and attention but not skills that were less reliant on executive control. When looking at pressure situations that induced performance monitoring they discovered that rule based category learning was not affected but the evaluation of others may lead to attention of the step-by-step processes of skill execution, as they believed that others would be doing so as well. Their findings supported both distraction and self-focus hypotheses of 'choking' depending in large part on the characteristics of the performance situation created with the acknowledgement that whether performance fails or not is also dependant on the attentional demands of the task being performed.

The research by DeCaro et al. (2011) enhances understanding of when distraction and/or explicit monitoring may come about when under stress and will inform the design of experiments in this thesis that look to manipulate pressure situations. DeCaro et al. further classify performance situations as multifaceted high-pressure, which again will enhance study design and ensure ecological validity. Multifaceted high-pressure situations acknowledge that both elements of the performance environment relating to processes and outcomes may be evident at the same time as in the case of the golfer

who is on the verge of winning an important title (monetary reward) and is also being watched by crowds and a television audience. In these situations attention demanding and proceduralised skills are performed poorly (Beilock & Carr, 2001; Beilock & Carr, 2005; Beilock & DeCaro, 2007; Gray, 2004) with DeCaro et al. (2011) offering three explanations. First, consistent with previously outlined skill demand explanations put forward by Beilock et al. (2004), performance is impacted by both types of pressure simultaneously resulting in the reduction of working memory capacity in these situations. The attention that is still available may then be explicitly devoted to the systematic control of the skill. This would explain how attention demanding skill such as math problem solving would suffer from the reduction in working memory and well learnt sensorimotor skills such as golf putting would be affected by the increase in explicit monitoring or conscious processing. A second proposal is that one type of stress may lessen the impact of the other. For example, performers could become less distracted under outcome pressure if they were also facing the pressure of being evaluated (explicitly monitored). A final possibility is that performers are most affected by the component of the pressure situation which is most salient to them so for the golfer who is at the developmental stage with high attentional demands and wanting to perform well, distraction may have a bigger impact than explicit monitoring even if there are people watching (e.g. Nieuwenhuys & Oudejans, 2012).

2.6 Promoting optimal performance

Mesagno and Hill (2013) highlight that challenges with agreed definitions of ‘choking’ and underperformance, together with a need for greater understanding of the role of previously identified moderators, has meant a paucity of interventions are currently offered to alleviate the ‘choke’ and maximise performance standards. It is important that interventions are specifically matched to the client’s needs, therefore, psychological skills and strategies would need to address the underlying mechanisms and moderators uniquely contributing to a players’ performance. Interventions, therefore, need to be implemented at both the learning and performance phases and account for self-focus, distraction and additive explanations of skill breakdown that consider the skill level of the performer and the complexity of the skill. The study of intervention efficacy has enabled greater understanding of the mechanisms that can facilitate or promote optimal performance. The interventions that have been researched to promote sport performance under pressure provide possible windows into causal links and are outlined here to

highlight support for distraction and self-focus theories of attention that have been detailed in this chapter.

2.6.1 Implicit, errorless and analogy learning.

In the previous section the accumulation and subsequent reinvestment of explicit, declarative knowledge was highlighted as being a fundamental component of ‘choking’ under pressure through self-focus. As a result implicit learning has been offered as one of the few interventions to prevent conscious control of movement as learning in this way makes it difficult to articulate and attend to specific rule based knowledge (e.g. Masters & Poolton, 2012). Despite widespread support for the efficacy of implicit learning in alleviating the ‘choke’ (e.g. Koedijker, Oudejans, & Beek, 2007; Maxwell, Masters & Eves, 2000; Mullen, Hardy, & Oldhan, 2007) there have been questions over the validity and applicability of the interventions. These include: the use of varied dual tasks during the learning phase and a lack of consistency across studies in recording the number of explicit rules accumulated by the participants in each condition. A study by Hardy, Mullen and Jones (1996), for example, found that the control group in their study reported more explicit knowledge than the ‘explicit group’ even though the control group did not receive any technical instruction during the learning phase. It is also acknowledged that implicit learning is a slower process than explicit methods and does not afford the skilled performer, who already possesses an explicit knowledge base, relevant assistance; as a result there has been a reluctance to adopt this method by practitioners and coaches (Maxwell, Masters & Eves, 2000; Poolton, Masters & Maxwell, 2006).

Alternatives to dual task methods of implicit learning include: errorless learning (e.g. Maxwell, Masters, Kerr & Weedon, 2001; Sanli & Lee, 2014) and analogy learning (e.g. Liao & Masters, 2001; Masters, 2000) that have been proposed in an attempt to address the challenges of ‘real world’ application. Maxwell et al. developed the errorless (easy to difficult progression) and errorful (difficult to easy progression) protocols, with the former focusing on the minimisation of errors rather than the prevention of errors (Poolton & Zachary, 2007). These protocols are based on the hypothesis that explicit learning is promoted through the identification and attempts to eliminate errors and this process cannot occur through errorless (implicit) learning as there are no errors to eliminate and there would, therefore, not be a need for explicit learning through hypothesis creation and testing. Schema theory, however, proposes

that both correct and incorrect movements assist the learning process due to differences in the nature of memory representations for regulating control of movement (Schmidt, 1975). According to Schmidt, the same actions in sport are rarely repeated in exactly the same way, as the demands of the task require individuals, to alter, for example, height, speed or trajectory and so to perform a skill we require a generalised motor programme (basic form of movements), recall schema (information to adjust the generalised motor programme) and recognition schema (extrinsic feedback). Through this explanation developing schema strength is a priority and is reliant on repetition and breadth of practice with both errorless and errorful practice important for learning.

Analogy learning seeks to teach complex actions through the use of biomechanical metaphors (Masters, 2000) and unlike implicit learning focuses on the individual learning the skill (Berry & Dines, 1993). The analogy is considered to be effective as skills are processed and stored in a visual form and importantly outside central executive working memory which in turn maintains working memory capacity to execute complex actions and decisions. Evidence supports both the comparable learning rates of analogy and explicit learning groups compared with previous dual task interventions and the superior performance standards of analogy learners under pressure conditions (e.g., Lam, Maxwell, & Masters, 2009; Law, Masters, Bray, Eves, & Bardswell, 2003; Masters, Poolton, Maxwell, & Raab, 2008; Poolton et al., 2006). In a study by Liao and Masters (2001) participants were taught a table tennis forehand shot either through explicit instruction or through the analogy of drawing a right-angled triangle with the bat and hitting the ball as the bat travelled up the hypotenuse. Analogy participants were found to accumulate less explicit knowledge than the explicit group, learn at comparable rates and to maintain performance standards under distraction and pressure, whereas the explicit group 'choked'.

The use of analogies does represent a more plausible intervention but Hill et al. (2010) caution that similar concerns to implicit learning remain in the need to understand whether performers who have acquired skills through analogy have the ability to self-correct as errors arise and also whether this intervention is of use to those who have already obtained an explicit knowledge base of a particular skill. Possible alternatives that could address these issues include discovery and guided discovery learning and warrant further research specifically relating to 'choking' under pressure. Smeeton, Williams, Hodges and Ward (2005) for example were primarily interested in the utility of such methods on the development of anticipatory skills in intermediate level tennis players and found that guided discovery and explicit learning groups acquired skills at a

faster rate than the discovery-learning group. They did, however, observe that the explicit group experienced significant performance decrement under anxiety inducing conditions compared with both the discovery and guided discovery groups. These methods may provide developmentally appropriate components that support the requirement of declarative knowledge to acquire skills in a timely fashion at early stages of learning. In addition enhancement and correction might be offered to more expert performers as skills become more proceduralised by utilising the specific schemas and personal knowledge of the athlete in guided discovery.

2.6.2 Internal and external attentional focus.

Adopting an external focus has been observed to be effective in a number of sports such as skiing (Wulf, Hob & Prinz, 1998), golf (Wulf, Lauterbach, & Toole, 1999; Wulf & Su, 2007), basketball (Al-Abood, Bennett, Hernandez, Ashford, & Davids, 2002; Zachry, Wulf, Mercer, & Bezodis, 2005), American football (Zachry, et al., 2005), soccer (Wulf, McConnel, Gartner, & Schwarz, 2002), volleyball (Wulf et al., 2002), darts (Marchant, Clough & Crawshaw, 2007), across different skill levels (Wulf & Prinz, 2001) and has been elicited through instruction and/or feedback. There is further evidence to suggest that an internal focus of attention is a 'default' focus adopted by athletes as the benefits of external focus have not only been found relative to internal focus but also to control conditions without a specific focus (e.g., Landers, Wulf, Wallmann, & Guadagnoli, 2005; Marchant, Greig, Scott, & Clough, 2006; Wulf, Landers, Lewthwaite, & Töllner, 2009; Wulf & McNevin, 2003; Wulf, Weigelt, Poulter, & McNevin, 2003; Wulf et al., 1998).

An internal focus of attention has been consistently found across sports to encourage self-focused attention and a conscious control of movement and so an external focus of attention has been proposed to be more effective particularly in skill acquisition but also in the maintenance of performance standards (Perkins-Ceccato, Passmore & Lee, 2003; Shea & Wulf, 1999; Wulf, 2007; Wulf, Shea & Park, 2001). The Constrained Action Hypothesis (Wulf, Shea & Park, 2001) explains an external focus of attention as enabling unconscious, fast and reflexive processes to control the movement whereas, the motor system is constrained by an internal focus of attention that disrupts the automatic control processes that have the capacity to effectively control movements. There are considered, therefore, to be less cognitive demands induced by an external focus and Wulf et al. (2001) have provided evidence of the availability of increased

attentional capacity for processing task-relevant information under an external compared with internal focus. This would suggest possible facilitative effects of external focus during performance under pressure or high anxiety provoking contexts, however, research in this area to date remains limited (Moore, Vine, Cooke, Ring & Wilson, 2012.).

In comparison with previously detailed working memory explanations of the relationship between attention and performance decrement, research by Wulf and colleagues appear to suggest that the negative effects of an internal focus of attention are experienced across skill levels. This suggests that suboptimal performance or 'choking' would be influenced by a conscious control of movement at all levels of expertise. It is important, therefore, to note that an external focus can be considered multidimensional (McNevin, Shea & Wulf, 2003), specifically by distal and proximal external focus. Findings by McNevin et al. suggested learning enhancement benefits of the distal external focus compared with proximal and internal focus comparisons however, the results related to a distal external focus have been inconsistent across studies (Castaneda & Gray, 2007; Perkins-Ceccato, Passmore, & Lee, 2003).

Research specific to golf has highlighted a need to understand expert-novice differences as Wulf, McNevin, Fuchs, Ritter and Toole (2000) found that novice golfers that adopted a proximal external (movement of club) focus showed more effective learning than a distal external focus (the trajectory of the ball). Perkins-Ceccato et al. (2003) found support for Beilock, Carr, McMahan and Starkes (2002) assertion that the effects of attentional focus vary as a function of the performers level of expertise in finding that skilled golfers with distal external attentional instruction performed with greater consistency whereas, the opposite performance trend was observed in novice golfers. Contrasting findings by Wulf and Su (2007) that revealed expert golfers with a proximal external focus produced superior pitching performance than internal focus comparisons suggest a need for greater understanding of how skill level and skill demand complexity influences optimal attentional focus strategies. In a longitudinal study of elite golfers, Hill et al. (2011) found that once an internal rather than external focus was adopted participants gained a sense of control and confidence through task relevant focus and it was this that actually alleviated the 'choke'. As Wulf (2007) acknowledges the multidimensional concept of external focus is currently problematic as there is not a consensus over a precise definition and therefore, variability in its operationalisation. It

could be that some proximal attentional focus instructions are processed more in line with internal focus definitions for example.

2.6.3 Distraction and psychological skills training.

The evidence that self-regulation strategies and use of psychological skills are effective in resisting suboptimal and enhancing superior performance is mixed. The difference between highly skilled and less skilled athletes has often been attributed to the use of these skills (Hardy et al., 1996; Orlick & Partington, 1988) that theoretically enhance internal and specific mediating variables (e.g. confidence, arousal, attentional focus). The most popular of these cognitive-behavioural strategies include goal setting, imagery, self-talk, arousal regulation and multi-component interventions that make use of combinations of these skills often within pre and post-performance routines (Gardner & Moore, 2006; Mesagno, Marchant & Morris, 2008). Gardner and Moore (2007) caution that there remains a perplexing unequivocal support for the use of psychological skills training procedures for enhancing performance in the face of generally inconclusive empirical support for them (e.g. Gould, Damarjian & Greenleaf, 2002; Meyers, Whelan & Murphy, 1996; Williams & Leffingwell, 2002; Zaichowsky & Baltzell, 2001). Despite positive anecdotal evidence and case study reports there is 'vastly insufficient evidence for their efficacy' (Gardner & Moore, 2007, p.23). Conversely the extant literature suggests that attempts to control or suppress unwanted thoughts and emotions can have an adverse and paradoxical effect and actually increase the frequency of their occurrence. These techniques can trigger a metacognitive scanning process that acts to bring thoughts (task irrelevant) not otherwise conscious, to awareness when detected and away from task-relevant and goal directed attention (e.g. Purdon, 1999). The following section outlines research pertaining to performance enhancement and understanding of how we may alleviate 'choking' through the learning and performance phases.

Jackson and Willson (1999) suggest that performance can be facilitated under pressure by some levels of conscious processing and rather than minimising the amount of explicit knowledge accumulated during learning the focus should instead be on preventing performers from reinvesting that knowledge in pressure situations. Global cue words are posited as holistic representation of explicit rules that minimise the opportunities to reinvest detailed knowledge and as such would be a more limited level of conscious processing. Support was found for the Conscious Processing Hypothesis

and the use of a single swing thought (global cue word) over alternative attentional strategies (i.e. process goals and perceptual focusing techniques) in reducing the negative impact of anxiety on performance in Jackson and Willson's (1999) study of golfers putting performance. Mullen and Hardy (2010) highlight a process goal paradox in that these goals, which specify the unique behaviours that a player will engage in during performance, have been championed as an effective anxiety management strategy (e.g. Kingston, Hardy & Markland, 1992) and yet they encourage a task and self-focused attention considered detrimental to anxious expert performers. As a result these holistic or global process goals have been posited as encouraging the performer to conceptualise the entire movement and in doing so 'chunk' individual elements into a singular form thus allowing sub-actions of the movement to be executed automatically. Mullen and Hardy found support for the use of these holistic processes in a study of skilled but anxious long jumpers who outperformed athletes who adopted part-oriented process goals that directed attention to task relevant aspects of the skill. Further support is provided by Gucciardi and Dimmock's (2008) study of golfers using 'swing thoughts' during pressurised performance.

Strategies described as distraction model interventions such as performance routines however, encourage the performer to maintain appropriate attention control under pressure and minimise attention to irrelevant information. Support for the use of pre performance routines (PPR) and post-performance routines (POST) to alleviate 'choking' has come from Mesagno, Marchant and Morris (2008) and Mesagno, Hill and Larkin (2015). In the first study results revealed improved accuracy under pressure in ten pin bowlers that used PPR and that reported in interview less self-awareness and conscious processing. Again the mechanisms that were proposed to lead to performance decrement were suggested to be a function of individual differences (i.e. whether self-awareness intensified distracting thoughts and negative cognition or encouraged conscious control of movement). In a second study (Mesagno et al., 2015) support was found for the beneficial effects of pre performance routines in enhancing performance, readiness and perceived control and that this combined with post performance routines influenced positive performance, attention and emotional control, self-awareness, self-confidence and motivation.

Further evidence of the role that preparation has in differentiating elite from novice performers needs to be considered from the literature on training and practice. This concludes generally that more practice hours have been accumulated by experts than their less skilled counterparts and that there is deliberate quality to practice that is

specific to their sport (Ericsson, Krampe & Tesch-Romer, 1993; Schmidt & Lee, 2005; Ward, Hodges, Williams & Starkes, 2004). It may be that an enhanced understanding of the pressure inducing environment and the unique individual difference variables that contribute to perceptions of pressure and subsequent anxiety (e.g. fear of failure, increased outcome focus) will enable an appropriate preparation for competition (e.g. Ward, Sus & Basevitch, 2009). From an ecological theory of the environment perspective, each sporting domain is considered to be organised by a unique set of constraints (Vicente & Wang, 1998) that ‘define the boundaries on the action possibilities available to a performer with a given set of capabilities’ (Eccles, Ward & Woodman, 2009, p. 97). Assessment of skill demand within sports, as encouraged by Beilock et al. (2004) for example, under this model may enable prediction of performance decrement through distraction or self-focus and inform design of apposite training environments. The diverse skill demands and constraints placed on golfers (e.g. driving, iron play, pitching, chipping, sand play, putting and contextual variations) may contribute to differing levels of skill expertise at a micro level whereas on a global level the performer has attained a level of ‘expert’. This would have implications for predicting whether performance decrement would be experienced through distraction or conscious processing when working memory capacity has been reduced by perceptions of pressure.

Empirical data supports the notion that functional and optimal performance is achieved through attention to external stimuli, options and contingencies which encapsulate task-focused attention rather than attention towards internal thoughts and processes; self-focussed attention (Gardner & Moore, 2007). To achieve this a more distinct form of attention and awareness has been proposed as contributing to optimal performance, through minimal self-judgement, minimal attention to external or internal threat and minimal focus on consequences and future oriented ramifications; mindfulness (Brown & Ryan, 2003; Bernier, Thienot, Codron & Fournier, 2009; Gardner & Moore, 2007; Kabat-Zinn, 1994). Mindfulness has been defined as the non-judgemental focus of one’s attention on the experience that occurs in the present moment (Kabat-Zinn, 1994) and is further summarised as the active absorption in the task as opposed to active absorption in the self. There appears to be agreement that examination is needed of strategies that alleviate choking through distraction as well as self-focus (Mesagno & Hill, 2013) and mindfulness and acceptance interventions may provide a theoretical unity of attentional explanations of (sub) optimal performance under pressure.

2.7 Chapter summary

This chapter has detailed the extant literature relating to the mechanisms underlying ‘choking’ and optimal performance in sport, detailing positions on the role of self-focused attention, distraction and working memory during performance under pressure. In review Hill et al. (2010a) acknowledge the methodological limitations and the impact of distraction, however, acknowledge the dominant reporting in the literature of self-focus explanations of ‘choking’ under pressure in elite performers. Support for distraction theory is largely derived from skill failure on cognitive tasks that place increased demands on working memory (Beilock and Carr, 2001; Beilock, Kulp, Holt, & Carr, 2004) and for the conscious processing hypothesis or Theory of Reinvestment (self-focus), by research into skill failure in motor tasks (e.g. Masters, 1992). The development of the Movement Specific Reinvestment Scale as a measure of dispositional reinvestment has been detailed with initial research in this area yielding consisting findings that associate high reinvesters with maladaptive performance outcomes. More recent research (e.g. Malhotra et al., 2014; 2015a and 2015b) has established that an individuals’ propensity to reinvest is not always deleterious to performance. In tasks that have low cognitive demand and in environments that do not evoke high anxiety or perceptions of pressure, individuals who score high on the movement self-conscious and conscious motor processing dimensions of the MSRS have actually been observed to perform more efficiently. The research in this thesis continues to explore performance relationships with the subscales of the MSRS.

Attempts to move from trait measures of reinvestment to observations of self-focused attention during performances were explored in a review of electroencephalographic research. Self-focus and distraction theories of ‘choking’ make different predictions about activity in the executive control related brain regions. Attention Control and Processing Efficiency Theories would expect a decrease in activity in attention control regions when a performer ‘chokes’, whereas enhanced activation of these regions would be associated with an individual’s propensity to ‘choke’ under pressure in line with self-focus explanations. Current knowledge has identified the left temporal region of the brain as being associated with analytical processes and language processing and that the frontal midline region, the premotor area of the cortex as being responsible for planning and movement (see Hatfield et al., 2004 for review). These brain regions are identified as T3 and Fz respectively within the International 10-20 system (Jasper, 1958; see chapters 4 and 7) and communication between these two regions represents different

tendencies to employ verbal analytical control when executing skills (Masters & Maxwell, 2008).

Concerns have been expressed that many studies lack rigorous manipulation checks to ensure that there is adherence to treatment conditions manipulating attentional focus (Hill et al., 2010a; Mullen, 2007). These challenges have included the discovery that some participants switch away from assigned strategies when they discover the benefits of alternatives and the fact that expert performers tend to have pre-existing routines and strategies that they are unlikely to deviate from entirely in line with treatment condition requirements.

It is important to gain further understanding of potential moderators before conclusions are drawn regarding the mechanisms of ‘choking’ and this chapter has outlined current understanding of the role of self-regulation strength, trait anxiety, self-confidence, self-consciousness, fear of negative evaluation and coping styles have in explaining performance outcomes under pressure. The review has raised questions over the permanence, duration and inevitability of sub-optimal performance and the extent to which golfers are in control of this extending to a full ‘choking’ experience. The self-regulation literature (Baumeister & Heatherton 1996; Baumeister & Vohs, 2007; Muraven & Baumeister, 2000) emphasises the importance of the central components of this thesis, achievement motivation and attentional control, in promoting adaptive behavioural responses. Achievement motives inform the standards set by individuals and optimistically suggest that severe performance failures can be avoided if other desired goals are achieved. Attentional control theories have been detailed to contribute to enhanced self-regulation (i.e. explicit monitoring) and also explanation of quixotic misregulation failure (i.e. conscious processing, reinvestment). In addition the attention literature has revealed that it may be the type (content) of task relevant conscious processing that affects performance rather than the amount of conscious processing and so research that looks at skill level and skill level difference is required (Beilock et al., 2004; Gucciardi & Dimmock, 2008). The study reported in Chapter 5 of this thesis aims specifically to highlight the cognitive experience of competitive golfers and all the studies herein have been designed to get as close to the performance experience as possible with the intention of addressing these objectives.

In the final section the efficacy of interventions targeted at enhancing performance were detailed with mixed evidence supporting the use of psychological skills (Gardner &

Moore, 2007). Current research has highlighted the need to tailor intervention to the unique needs of the individual and the specific demands and constraints of the sport and skills contained within. It is proposed in this thesis that these individual difference variables will be both influenced by and lead to achievement motivation at a global, environmental and situational level. As such achievement motivation is posited to be the mechanism explaining how pressure perceptions initiate adaptive and maladaptive attentional (self-regulatory) processes that influence (sub)optimal skill execution and also as an intervention to energise positive outcomes.

The first two chapters of this thesis have outlined how motivation and attention permeate theoretical explanations of skill execution, skill breakdown and current understanding of differences in performance under pressure. The ‘choking’ phenomenon received specific attention because of the quantity of research that has attempted to investigate underlying mechanisms. Theories have centred on the role of attention during skill development and how attentional processes are influenced by pressure and perception of the performance environment, with self-focused attention posited as providing the best understanding of ‘choking’ under pressure particularly in elite performers. Buszard, Farrow and Masters (2013), caution against the oversimplification of dichotomous explanations of novice and elite ‘choking’ experiences (i.e. distraction / self-focus), and of separating ‘choking’ from other forms of performance decrement. They suggest that the mechanisms that contribute to various levels of underperformance are likely to be the same and current attempts to define the severity of underperformance are confusing. Recent research that has focused on the sub dimensions of movement specific reinvestment have proposed that rather than solely providing self-focused explanations of performance efficiency and outcomes, conscious monitoring (movement self-consciousness) and conscious control (conscious motor processing) may explain the influence of distraction and self-focus in conscious processing.

In reviewing the performance under pressure and attentional focus theoretical literature and empirical research, the influencing concept of motivation has been ubiquitous. ‘Choking’ has been described as colloquial term that describes events that sometimes occur in real life when performers are highly motivated to succeed (Mesagno & Hill, 2013) and Masters and Maxwell (2008) have suggested that similar to trait anxiety, reinvestment may be an acquired response to specific contexts with motivation, also underpinning this process:

Moreover, reinvestment tends to occur in circumstances in which people are highly motivated to make successful movements or self-conscious about the method in which they move or have difficulty in moving effectively (Wong et al., 2009, p410).

The bifurcation of reinvestment provides a theoretical rationale for the exploration of the relationship between achievement motives and attention in understanding performance outcomes. Attentional shifts to conscious motor processing or movement self consciousness may be energised by a performers aims of skill execution and perceptions of competence. Further justification for research in this area is provided from current understanding of the antecedents and consequences of achievement motivation detailed in Chapter 3. The studies in this thesis have been designed to provide greater understanding of the role that motivation plays in influencing attentional processes during competitive performance and performance under pressure. Chapter 3 details current scientific understanding of how motivation impacts psychological and performance outcomes in sport.

3. MOTIVATION IN SPORT

"At that point, I could have hit wedge-wedge and two-putt," Van de Velde explained, "but who wants to win like that?"

3.1 Chapter overview

The relevance of motivation to understanding attentional processes and its complexity is epitomised by Maehr (1984) who suggests that the study of motivation “begins and ends with the study of behaviour” (p. 132) and also by Deci and Ryan (1985) who propose that understanding of motivation helps answer the ‘why’ question in behaviour. Under Deci and Ryan’s summation we would expect to establish both the reasons behind behaviour or the absence of behaviour and in specific relevance to the studies in this thesis, gain understanding of attentional decisions when performing under pressure.

Motivation has been defined as: “the hypothetical construct used to describe the internal and/or external forces that produce the initiation, direction, intensity and persistence of behaviour” (Vallerand & Thill, 1993, p. 18). As such motivation is not directly observed but instead inferred through behavioural indices that include: effort, choice of behaviours in respect to level of challenge, consistency of behaviours, persistence following difficulty or failure and attention (Keegan, Harwood, Spray & Lavallee, 2010). The rationale, therefore, for exploring the motivation-attention relationship in this thesis is emphasised by this need and ability to infer the important construct of motivation through attention. It is also acknowledged that behaviour alone is not a comprehensive measurement of an individuals’ motivation and there remains a need to establish theories that infer the processes that occur to produce motivated behaviours.

In this chapter I will review the literature on achievement motivation so as to clearly present the rationale for the studies in this thesis that look to provide understanding of how individuals’ competence striving in achievement settings influences attention. I will draw on research that highlights the continuum-based shift from deterministic theories towards cognitive and social-cognitive understanding of motivation and represent the most popular contemporary theories of motivation in sport and exercise psychology (Roberts, 2012). Specific focus is given to achievement goal approaches that guide the studies in this thesis and specifically the translation from the education to the sporting domain and their influence on psychological and performance outcomes

(Ames, 1992; Cury, Elliot, Da Fonseca & Moller, 2006; Dweck, 1989; Elliot, 1997; Elliot & McGregor, 2001; Elliot Muruyama & Pekrun, 2011, Nicholls, 1984). Finally the methodological challenges that have permeated research into achievement goals over the last 30 years are outlined, highlighting the areas that have received less research attention. In doing so the aim is to establish how studies in this thesis enhance the extant literature.

3.2 Social-cognitive theories of motivation in sport

Understanding motivational issues in sport and exercise domains remains one of the central concerns of researchers, educators and applied practitioners alike (e.g. Roberts, 2012) with Harwood and colleagues stating “the past 20 years have been a watershed for our understanding of sport achievement behaviour” (Harwood, Spray & Keegan, 2008, p158). It has been argued that the term has been inconsistently defined and overused in both academic and professional sporting contexts (e.g. Roberts, Treasure & Conroy, 2007) with Roberts suggesting that definitions are often used so broadly by some that “they incorporate the whole field of psychology and so narrowly by others that it is almost useless as an organising construct” (2012, p.6). In applied settings motivational labels have been associated with arousal, such as the team talks given by coaches at half time and as Roberts (2012) notes, many believe that motivation is a measure of confidence or an attitude that takes people towards enhanced performance. The complexity of motivation cannot be fully explained by these and other simplistic assumptions that posit motivation as merely positive thinking, a personal entity or a characteristic inherited genetically that suggests - you either have it or you don't.

Theories of motivation can be viewed as being on a continuum ranging from deterministic to mechanistic to organismic to cognitive. At one end, deterministic and mechanistic conceptualisations are characterised by stimulus response theories that consider humans as passive and engaged only by psychological or physiological needs. Important assumptions of these theories are that higher mental processes are not involved, that individuals are not aware and act without conscious intent when motivated to respond to specific stimuli and consequently motivation can be perceived as mechanical in nature (Roberts, 2012). As early as 1932, Tolman proposed that unobservable variables or cognitions played an important mediating role between stimulus and response and by 1971 early deterministic conceptualisations had been replaced. At that time Weiner suggested that the most salient controversy in the field of

motivation was whether behaviour should be conceptualised as mechanistic or cognitive positing that “these two conceptual approaches differ in the extent to which higher mental processes are invoked to account for the initiation, direction, intensity and persistence of goal directed behaviour” (1972, p.1). The idea of ‘free will’ was central to the understanding human motivation and the belief that an individual has complete control over their behaviours (Maslow, 1954). Consequently deliberate choices are based on the processing of information from internal (e.g. memories) and external (e.g. situation) sources. As Keegan et al. review, from this perspective cognitive processes were conceptualised as the central determinant of motivated action, ‘examining how the individual deployed and managed their motivational resources’ (2010, p. 3).

As research in motivation placed less interest in the role of individual differences, personality and needs, greater importance was placed on the situation and its meaning to individuals. Organismic conceptualisation of motivation represented an initial quasi-cognitive perspective in the acknowledgement of both innate needs and the recognition that an important interaction exists between the organism and the social context (Roberts, 2012). Contemporary cognitive theories at the other end of the continuum consider thoughts to be an important variable and regard individuals as active, with their subjective interpretation of the social context initiating action. Weiner (1972) argued that differences between individuals high and low in motivation could be determined by their thoughts of why success and failure occur and in doing so promoted a new era in which cognitive and social-cognitive approaches to understanding became dominant.

Petri and Govern (2012) encapsulate the challenge of adopting a universal approach to understanding motivated behaviour when proposing that “explanations of hunger will differ from explanations of achievement. I think that it is naive to believe that one comprehensive theory can explain all motivational states” (p. 22). Some human behaviour is best explained by a motivation influenced by internal states that elicit a response in genetically determined ways, whereas other behaviours are more dependent upon thought processes and the combined intentional use of internal and external information. This information is gained both developmentally and from the cognitive interpretation of individuals’ experiences with their environment (Petri & Govern, 2012). Theories reviewed below make an important contribution to understanding behaviour associated with the psychological motive of achievement that is the focus of both the sporting context and this thesis. In this context agreement appears to exist between contemporary theorists concerning a definition of motivation as a process rather than an entity; a process that influences the initiation, direction, magnitude,

perseverance, continuation and quality of goal directed behaviour (Maehr & Zusho, 2009).

3.2.1 Need Achievement Theory.

McClelland (1961) and Atkinson's research (1957), into achievement motivation contributed to significant early understanding of behaviour in the sport and exercise domain (Lavalley, Kremer, Moran & Williams, 2012). The McClelland-Atkinson model also known as need achievement theory was based on earlier drive theories particularly the work of Hull (1943) and Spence (1956). In attempting to understand how well a task will be achieved, psychologists had focused on establishing the amount of skill and motivation involved (McClelland, 1985). Hull formalised this relationship mathematically in the equation: $sEr = D \times sHr$. Hull proposed that excitatory potential or the tendency to make a response (sEr) is a function of habit strength, more specifically, the skill an animal had acquired in making the response (sHr) multiplied by drive strength (D). A third variable was later included by Hull (1952) that considered the effect of incentive value (K) on performance as it was consistently apparent in animal studies that rats ran faster for tastier food: $sEr = D \times sHr \times K$.

Spence (1956) believed, however, that incentive value (K) was of greater importance and would lead to some behaviour in the absence of drive and so should be added to drive strength with the sum of these multiplied by habit strength. If either incentive or drive were zero in Hull's equation there would be no tendency to act. McClelland (1951) considered achievement motives to be the dominant forces of action and these were independent dispositions acquired early in life as a consequence of positive and negative affective responses to achievement tasks. Need achievement theory predicts that when faced with a challenge we are simultaneously presented with a fight or flight decision. An individuals' need to meet this challenge ($nAch$) is dependent on the relative significance of the two independent dispositions or psychological constructs of an individuals' motive to achieve success (Ms) and their motive to avoid failure (Maf) and to that extent is an approach-avoidance model. An individuals' need for achievement or achievement motivation is, therefore, dependent upon the size of the difference between the two motives and is represented mathematically as: $nAch = Ms - Maf$.

As an expectancy / value theorist Atkinson progressed the model to incorporate his belief that individuals would engage in achievement situations dependent on both their

cognitive expectancy of success (subjective probability) and the perceived incentive value of achieving success in the task. It was predicted that as expectancy of success increased this would impact the value of that success and consequently a decrease in incentive would materialise. Mathematically, therefore an inverse relationship was assumed between the probability of success (P_s) and the incentive value of success (I_s) and is represented by the formula: $I_s = 1 - P_s$.

The emergence of important cognitive aspects of the theory were evident in that, in contrast to earlier deterministic theories that predominantly focused on infrahuman research, humans were conceptualised as having the capacity to influence achievement behaviour through application of their mental faculties. As such a reverse relationship applied for achievement tasks that were successfully accomplished when low expectations of success were present, as these were received with an increased personal value.

This original formula still resonates with contemporary research that values the role of intrinsic motivation because of the emphasis on the achievement motive disposition. In its rudimentary application to the sporting context; if a players' intrinsic motivation to fully engage in an achievement situation is greater than their fear of failing at it they would take part, however, they would be expected to withdraw from the situation if their fear of failure were greater than their intrinsic motivation to take part. Atkinson's original formula was represented as: $nAch = (M_s - M_{af}) (P_s \times I_s)$ where $I_s = 1 - P_s$.

The McClelland-Atkinson model evolved between 1950 and 1970 with a number of elaborations including an extrinsic reward component; M_{ext} (Lavalley et al, 2012), which was added to represent those rewards that individuals believe they will receive if successful: $nAch = (M_s - M_{af}) (P_s \times I_s) + M_{ext}$ where $I_s = 1 - P_s$. The theoretical implications are that behaviour can be predicted from individual differences in need achievement and the consequent approach or avoidance motivation. Any contribution to understanding the 'choking' phenomenon and underlying mechanisms can be found in the disparate behaviours of sports people with a high motive to achieve success and low motive to avoid failure and those whose motive to avoid failure is greater than their motive to achieve success. The former will be optimally motivated in need achievement terms, when they perceive the task to be of intermediate difficulty. This approach motivation would be reduced if the achievement task were perceived to be too easy or difficult. In contrast a performer who is predominantly motivated to avoid failure may only engage in challenges that are either very easy (to ensure the avoidance of failure) or very difficult (so that there is an excuse for failure). The theory may therefore, have

some utility in understanding how the dynamic nature of the competitive environment can influence sports performers expectancy of success and how their subsequent achievement motives can differ as a function of their need to achieve or avoid failure; a subjective perception of pressure.

Despite representing a shift from mechanistic to cognitive conceptions of motivated behaviour the McClelland and Atkinson model considered cognition as being important without fully explaining how judgements relating to probability of success are determined or how success and failure are perceived. As can be seen in contemporary achievement motivational approaches described later, the theory does acknowledge the interaction between personality and situation; however, only in so much as they are present in the same model. Weiner (1972) noted that need achievement theory was at the time “the most precise of the cognitive conceptions of actions, yet remains generally unconcerned with mental events” (p. 269).

3.2.2 Self Determination Theory.

Contemporary models that explain motives to participate and engage in sport derive from the pioneering work of Deci and Ryan (1985), which in turn represent a development of the social cognitive movement. Cognitive evaluation theory, later assimilated into the broader theory of self-determination (Deci & Ryan, 1985) has made a significant contribution to the achievement motivation literature. This primarily has been through consideration of how the social environment of an achievement situation and reward systems cognitively influence intrinsic motivation. In an attempt to unify concepts into a comprehensive overall theory Vallerand and Losier (1999) proposed an integrated theory of motivation in sport. In the context of this thesis the integrated theory of motivation can potentially provide understanding of how the competitive environment, feedback and perceptions of ability and pressure can impact motivation and future behaviour.

At the core of the integrated theory of motivation (Vallerand & Losier, 1999) remain the concepts of extrinsic and intrinsic motivation, which are fundamental features of self-determination theory with the addition of amotivation (Deci & Ryan, 1985). Motivation therefore, is conceptualised within the model as a self-determination continuum with amotivation at one end representing the least self-determining motivation and specifically no motivation at all. Contrary to earlier models that held intrinsic and extrinsic motivation as dichotomous concepts, there are considered to be four degrees of

extrinsic motivation that graduate along the self-determination continuum resulting in them being more alike in this regard. There are many forms of extrinsic motivation for the sports performer for example, trophies, money, praise, social approval and fear of punishment and the four types are labelled as external regulation (behaviours only performed for external reward or to avoid punishment), introjected regulation (partially internalised motive but still perception of being controlled), identified regulation (identification with and ownership of extrinsic motivation) and integrated regulation (behaviour previously perceived as being externally controlled now internally controlled and personally valued). Finally intrinsic motivation represents the highest level of self-determination and sportspeople who are intrinsically motivated pursue challenges and engage in activities that interest them with a perception of volition and personal control. This motivation manifests in three different ways; towards knowledge (e.g. learning new skills) towards accomplishment (e.g. mastering a particular skill) and towards stimulation (e.g. exhilaration). As there is no sense of external reward for these individuals it is possible that sportspeople with high intrinsic motivation will not be as susceptible to associated pressures such as increased salience of winning and losing or coach / spectator feedback and recognition.

In addition to three categories of behavioural regulation (reasons for acting) conceptualised by Self Determination Theory (intrinsic, extrinsic and amotivation, Deci & Ryan, 1985), three innate psychological needs of autonomy, competence and relatedness are proposed to exist (Ryan & Deci, 2002). The need for autonomy represents an individual's belief that they are the origin or cause of their behaviour (deCharms, 1968), the desire to feel effective, with the opportunity to exhibit ability is represented by the need for competence (e.g. Elliot, McGregor & Thrash, 2002; Harter, 1983) and the need for relatedness encompasses feeling a sense of connection with others (Baumeister & Leary, 1995). The innate motive to satisfy these psychological needs provides rationale for association with self-focus and distraction theories of attention in that these need motives may energise individuals to consciously control movements as a consequence of autonomy perceptions or competence striving and equally they may influence attention away from a task relevant focus via relatedness needs.

Ntoumanis (2012) reports, the high self-determined profile in conjunction with high or low controlling motivational profile has been found to promote the most adaptive outcomes in relation to effort, affect, discipline, attitudes towards sport and performance. Of interest to understanding performance in competitive environments is

research that has established autonomous motivation as a positive predictor of adaptive coping efforts (Gaudreau & Antl, 2008), however there are very few studies that have identified, albeit weak relationships, between motivation and objective performance scores.

Vallerand and Losier (1999) outline how social factors such as experiences of success and failure, competition and coaching behaviour together with psychological mediators of autonomy, competence and relatedness are seen as influencing motivation. These psychological mediators consequently determine motivation and specific behavioural and affective consequences. The social factor of a competitive environment is proposed to impact the beliefs that sports people have about themselves as there is an increased focus on external rewards and social comparison in this context. If the competitive environment does not enable the satisfaction of the innate human needs of autonomy, competence and relatedness then a reduced motivation and psychological development are predicted as well as the possibility of poor performance (Vansteenkiste, Simons, Soenens & Lens, 2004).

Research investigating the impact of the competitive environment upon intrinsic motivation may provide an understanding of associations between perceptions of pressure, motivation and skill breakdown. Controlling and informational components are evident in the competitive environments, which have the potential to influence self-determination and players' perceptions of ability. As the prospect of winning or beating an opponent becomes more salient in a round of golf, for example, external rewards can become the dominant motivation and so intrinsic motivation is reduced. The subjective evaluation of performance outcomes rather than purely objective measures can serve as an informational component in the competitive domain and this means that although intrinsic motivation can increase with enhanced feelings of self-competence, negative evaluations may lead to reduced perceptions of ability (McAuley & Tammen, 1989).

Perceptions of competence are central to many contemporary theories of motivation (e.g. Harter's competence motivation theory, Harter, 1978; self-determination theory, Deci & Ryan, 1985, personality and the Big 5, Roberts, Bogg, Walton Chernyshenko & Stark, 2004; self-efficacy, Bandura, 1997) and builds on the premise that individuals are innately motivated to be competent in achievement settings. In social cognitive terms, competence is considered as a basic psychological need for humans that initiates or energises behaviour. The hierarchical model of achievement motivation central to this thesis and discussed in the following section can be seen as a complimentary model to

SDT (Conroy, Elliot & Coatsworth, 2007) in its specific focus on competence within self-determination theory.

3.3 Theories of achievement motivation

The previous section has highlighted two important theoretical influences on the concept of achievement motivation that is central to this thesis. Need Achievement and Self Determination Theory provide a foundation for understanding how competence striving is influenced by a motive to achieve success and avoid failure and that perceptions of competence contribute to autonomous motivation and self-determination considered, in sport to be the most adaptive form of motivation.

Achievement Goal Theory (Nicholls, 1984; 1989) evolved alongside self-determination theory but has become the dominant theory for exploring the idea of how success and failure are defined in both sport and educational domains (Keegan, Harwood, Spray & Lavalley, 2010). The achievement goal framework proposes that individuals are intentional, goal directed organisms that operate rationally. It has become the most important conceptualisation of motivation in sport and physical education over the last 30 years and suggests that achievement goals both govern achievement beliefs and influence subsequent decision-making and behaviour when players are in achievement contexts (Roberts, 2001, 2012). The approach has evolved from the education domain and the independent and collaborative work of among others, Maehr, Nicholls, Dweck and Ames (e.g. Ames, 1992; Dweck, 1986; Maehr & Nicholls, 1980; Nicholls, 1984). In this section elaborations of this theory are detailed with particular focus on comparison between Nicholls' and Elliot's model of achievement goals, the application to the sporting world and to the studies in this thesis that pose questions relating to achievement motivation's influence on attention when performing under pressure. In reviewing the development of Achievement Goal Theory initial conceptualisations focus on dispositions (orientation) and environmental influences that infer goal involvement and then move towards goal states that define competence closer to skill execution and as such are considered more proximal representations of goal involvement. Goal orientation and goal states are central to the studies in this thesis to understand their relationship with and influence on reinvestment.

3.3.1 Achievement goal orientation.

Maehr and Nicholls (1980) argued that in order to understand achievement behaviour researchers must acknowledge that success and failure are psychological states. These psychological states are derived from a person's interpretation of the effectiveness of their achievement striving. Positive evaluation of outcomes that reflect desirable self attributes, such as high effort and/or ability result in perceptions of success whereas those reflecting undesirable attributes of the self, such as low ability, laziness and or low effort lead to outcomes perceived as failure. In the world of sport, winning and losing are of paramount importance and the notion of success and failure in this domain are subjective for all those involved, as one is not synonymous with the other (Spink & Roberts, 1980). For Maehr and Nicholls, however, success, failure and achievement can only be recognised in terms of the goal of behaviour and conceptions of competence and ability are an essential variable within Achievement Goal Theory (Roberts, 2012).

Attributions continued to play a central role in Maehr and Nicholls' (1980) efforts to redefine how achievement settings influenced goal-directed behaviour. They suggested that three goals predominate as a result of attributional analysis of motivation and the personal meanings that individuals attach to success and failure, namely task, ego and social approval. The adoption of a task-involving goal defines success in subjective terms such as personal improvement, mastery of a particular task and the recognition of progress. People that are task involved are focussed on the process rather than the outcome in an achievement situation with the primary goal of problem solving in order to develop a higher understanding of the task. Maehr and Nicholls (1980) also emphasise that for the task involved, perceptions of the performance of others are not relevant and perceptions of personal ability are not considered as they are assumed to be high.

The performance of others plays a larger role when an individual is ego involved as success is defined in normative terms such as beating others or successfully performing a task that others would perceive to be difficult. Competence perceptions when ego involved, are derived from normative criteria with satisfaction gained from performance outcomes and looking superior relative to others. Maehr and Nicholls (1980) further contend that avoidance behaviours ensue in subsequent equivalent achievement contexts if poor performance has been attributed to low ability. This would see the sport performer avoid difficult tasks, preferring those where they can feel confident of experiencing success and withdrawing effort and giving up in the face of difficulty.

The third achievement behaviour, identified as social approval oriented behaviour, became subsumed within the ego involved classification particularly when applying the framework to adult achievement behaviour. The goal that the individual would be involved in under this definition would be to maximise the ability to demonstrate personal commitment to a task in order to gain social approval from others for that intent (Weiss & Chaumeton, 1992). Although a review of the literature positions Maehr and Nicholls as the originators of the achievement goal approach, it was not until elaborations were made by Dweck (1986) and Nicholls himself (1984) that the concepts of task and ego goals specifically became viewed as constituting theory.

Dweck developed an Achievement Goal Theory that was focused on achievement in the academic domain and specifically how achievement goals adopted by children were directed by conceptions of intelligence. Central to Dweck's position was whether children perceived intelligence to be a global and stable, fixed 'entity' or as something that could be developed through practice and effort. Task and ego goals were identified as learning and performance goals in Dweck's theorisation (Dweck & Leggett, 1988) with the former representing goals pursued by individuals motivated to improve their personal ability incrementally and the latter as 'entity' driven and evaluation of competence made relative to the performance of others. A further important proposition from Dweck refers to the patterns of cognition, affect and behaviour particularly in response to perceptions of failure. Individuals who pursue learning goals view failure as a temporary state, which can be overcome with a revision of strategies or increased effort. For those that are performance oriented, prediction of adaptive patterns is dependent upon perceptions of ability. For example individuals with high ability perceptions demonstrate similar behavioural patterns to task oriented children pursuing learning goals whereas, those that consider their ability to be low, attribute task failure to their lack of innate ability, experience negative feelings and in future select either very easy or difficult tasks, in order to protect feelings of competence.

For Dweck, a child's incremental and entity conceptions of intelligence determine the nature of the achievement goal adopted and any subsequent pattern of behaviour. The predictions put forward by her research have some intuitive appeal for the sporting domain and particularly for understanding performance in pressurised environments. Dweck and Leggett (1988) for example suggest that performance decrement may be a consequence of the reduction in effort evident in individuals who perceive low levels of ability in the pursuit of performance goals and the associated negative effects that accompany feelings of anxiety. These predictions continued to be a focus for Nicholls'

(1984) development of Achievement Goal Theory and these principles for the first time were applied to the sporting context.

According to Nicholls (1989) individual differences contribute to a person's tendency to adopt task and ego goals. In the sport literature these dispositional goal perspectives have been labelled as goal orientations in an attempt to create consistency of terminology (Duda, 2001). Nicholls Achievement Goal Theory (1984) which is also known as goal perspective theory, suggests that the development of the achievement motive and the display of motivated behaviours are associated with the conceptual development of ability and as such provides a framework for considering motivational perspectives across the lifespan. For Nicholls (1984; 1989) perceptions of effort, ability and outcome alter in different situations and as part of the developmental process with maturation representing the extent to which a child is able to differentiate between each.

Nicholls (1989) suggested that children pass through four levels in reaching an understanding of not only the concepts of effort, ability and outcome but also luck and task difficulty. At the first level the child is considered to have an undifferentiated goal perspective in that they view effort, ability and outcome as the same and do not have an appreciation of how luck differs from ability or how tasks can differ in difficulty. There is recognition of a difference between effort and ability at the second level but the child still considers effort to be a major contributor to success and there is a transition at level three in which the child begins to differentiate between these two concepts. A differentiated goal perspective reflects both the child at level four and the adult perspective in which there is a clear distinction between the concepts of effort, ability and luck. At this stage the impact of task difficulty is also acknowledged, as is the idea that different opponents present a different level of challenge. There has been support for Nicholls' developmental theory of achievement motivation (e.g. Fry & Duda, 1997), however it must be noted that goal orientations also develop in response to life experiences as well as personality characteristics.

Where Dweck placed an importance on the conceptions of intelligence, Nicholls focus returned to those of ability. The meaning of success to Nicholls was a central tenet of achievement goal adoption according to Papaioannou, Zourbanos, Krommidas and Ampatzaoglou (2012). This is epitomised by the suggestion that high motivation occurs when the accomplishment of a task represents a meaning that is associated with an individual's long-term life objectives. For Nicholls the motivation process is energised by achievement goals whereas for Elliot achievement goals are conceptualised in

accordance with earlier traditions of achievement motivation (e.g. McDougall, 1932; Murray, 1938; McClelland, 1951) that associate 'desired goals' with instincts and that portray these goal concepts as "concrete representations of more abstract motivational dispositions" (Elliot & Church, 1997, p. 219).

Elliot and Church (1997) support the energising benefits of motivation; however, they propose that this originates from two motive dispositions that represent underlying competence relevant motives; the need for achievement and the need to avoid failure. Not only are they posited to energise but to also select and direct achievement behaviour and as such achievement goals are "presumed to be the direct regulators and proximal determinants of achievement behaviour" (p. 219). The model put forward by Elliot and Church was therefore, hierarchical in that achievement goals were positioned as focused 'needs' or 'motivational surrogates' (Papaioannou et al., 2012) of their higher order achievement motives.

3.3.2 Achievement goal states.

To enable a full understanding of the achievement goal framework that is adopted for the design of studies in this thesis, the following section will highlight the key components of the original dichotomous model posited by Nicholls because of its use in sports research and also discuss the major constructs of Achievement Goal Theory that include goal perspectives and the orthogonality of goal orientations. Focus proceeds to the trichotomous (Elliot & Church, 1997), 2 x 2 framework (Elliot & McGregor, 2001) and more recent proposal of a 3 x 2 achievement goal model (Elliot, Murayama & Pekrun, 2011; Mascret, Elliot & Cury, 2015).

Elaborations of Achievement Goal Theory reflect fundamental differences in the conceptualisation of ability, competence and ultimately achievement goal states. Where Dweck (1986) and Nicholls (1984; 1989) each proposed that achievement-oriented behaviour is motivated by a desire to enhance competence or gain favourable judgements of one's competence, Elliot and others (e.g. Elliot & Thrash, 2001; Senko & Harackiewicz, 2002) consider striving to outperform others to be the critical feature. Dweck and Nicholls agreed that mastery goals are concerned with developing competence in a task and that performance goals are concerned with demonstrating competence, although they disagreed as to the importance of social comparison in defining the performance goal. For Elliot, mastery goals are defined by intrapersonal and/or task based criteria and performance goals by interpersonal and/or normative

criteria, which hold as the essence of achievement motivation, a striving to attain competence. Elliot and Thrash (2001), however, question whether performance goals should include a competence demonstration aspect. Figures 3.1 and 3.2 provide a clear representation of the conceptual differences between the achievement goal frameworks proposed by Nicholls and Elliot. For Nicholls (1984; 1989) individuals will be in a state of task or ego involvement as a consequence of a combination of relatively stable intrapersonal traits (orientation) and the social situation (climate). As such the important aspect of this conceptualisation is that there are two contrasting definitions of competence (task/ego).

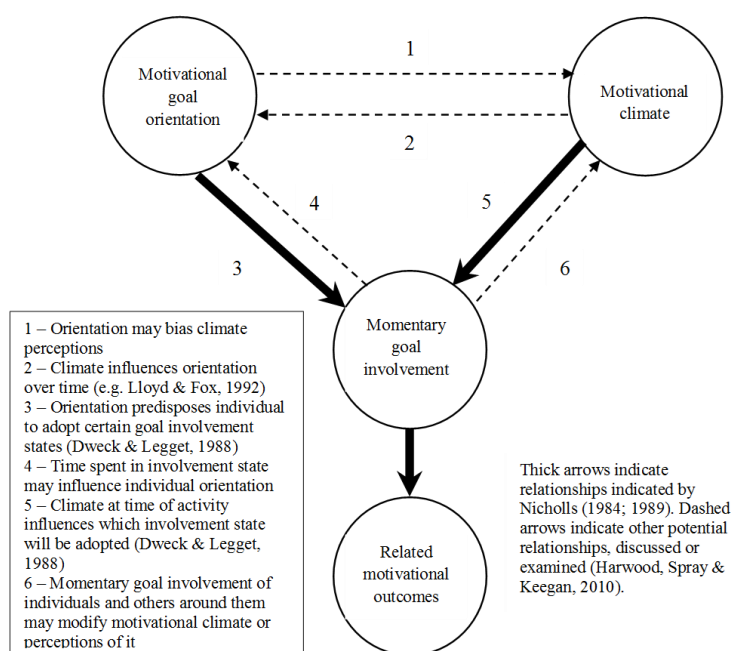


Figure 3.1 Theoretical links between achievement goal orientations, climates and involvement

(With permission Keegan, Harwood, Spray, & Lavalley, 2010).

In subsequent research, these two definitions of competence have been applied at different levels of analysis: (a) the state level (goal involvement); (b) the contextual level (climate); and (c) the dispositional level (goal orientation). In Elliot's (1999) hierarchical model an individuals' goal orientation is contained within a summary construct of antecedent variables that include for example; competence based variables (e.g. need for achievement), self-based variables (e.g. self-esteem) and demographic variables (e.g. gender).

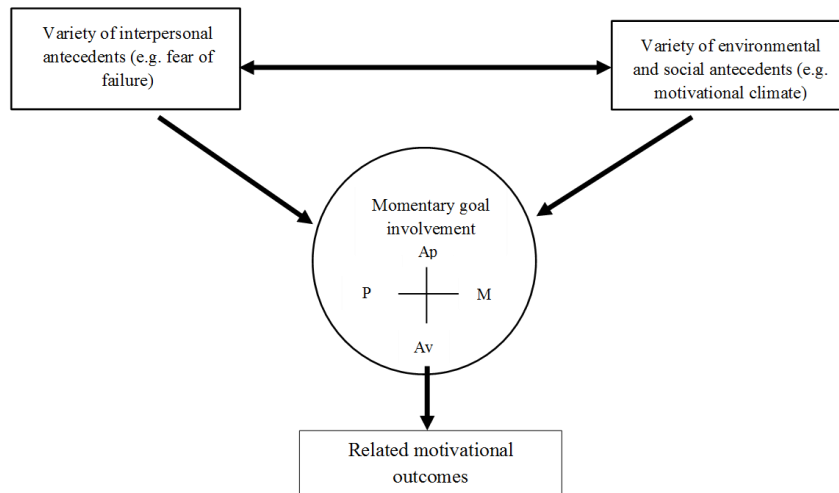


Figure 3.2 Elliot's alternative conceptualisation of achievement goal structures; the hierarchical model

(With permission Keegan, Harwood, Spray, & Lavallee, 2010).

Challenges to Nicholls' theory principally focused on dissociation with the definition of achievement goals from the concept of success and instead proposes that dynamic goal involvement states are influenced by both the definition of competence and the valence of the goals (Roberts, 2012). As such the person centred approach taken by Elliot (e.g. Elliot & Church, 1997; Elliot, 1999) posits the underlying cause of achievement goals as being the individuals' needs, moving away from Nicholls suggestion that different definitions of competence stem from different definitions of success (Papaioannou et al., 2012). The achievement goal construct according to Elliot and colleagues should focus solely on the demonstration of competence and the avoidance of demonstrating a lack of competence (e.g. Elliot & Thrash, 2001). Although Elliot suggests that the dominant conceptualisation of task and ego goals, prior to his revision of Achievement Goal Theory, was approach forms of motivation (Elliot & Church, 1997), Nicholls original work did explore the notion that individuals can be concerned with avoiding the demonstration of incompetence when in achievement settings (1984). In achievement situations, he suggested that individuals with low perceived competence could be classified as being either committed to demonstrating competence despite perceptions of inadequacy (approach); committed to avoiding the demonstration of incompetence (avoidance) or finally not committed to avoiding the demonstration of low ability (similarities with amotivation). The classic motivation theorists (e.g. Murray, 1938; McClelland, Atkinson, Clark & Lowell, 1953) concur with Elliot's challenge of the unitary focus on approach motivation, emphasising that orientation toward the attainment of success or the avoidance of failure is possible in achievement settings.

Developments proposed by Elliot and Harackiewicz (1994 and 1996) were put forward as an integrative conceptualisation of achievement goals that consider both the contemporary task/ego and approach/avoidance distinctions. As previously stated the hierarchical model proposed was consistent with traditional theories of motivation that held goal concepts as midlevel constructs structurally situated between global motivational dispositions and specific behaviours (e.g. McClelland, 1951; Murray, 1938).

The role of competency expectancies represents a further separation between Nicholls' (1984) and Elliot's models with the former believing them to act as a moderator variable, interacting with achievement goals to influence achievement relevant outcomes. For Elliot and Church (1997) competency expectancies are viewed as "empirically related but conceptually distinct from motive dispositions" (p. 219). As represented in figure 3.2 the higher order motivational construct of motive dispositions consists of achievement motivation and fear of failure, achievement goals represent the mid-level 'motivational surrogates' and competence expectancies are viewed as independent antecedents of achievement goal adoption. In combination with motive dispositions, task specific competence expectancies are viewed as exerting direct, proximal influence on achievement relative outcomes.

A revision of the achievement goal construct in the hierarchical model was made in response to historical, theoretical and empirical concerns with the dichotomous model. These consider avoidance/approach distinctions to represent different motivational systems and the fact that the task/ego distinction was not able to fully account for the empirical data at that time. In this revision both the task/ego and approach/avoidance distinctions were incorporated with task/ego re-labelled as mastery/performance. The performance construct was partitioned into approach and avoidance orientations resulting in three independent achievement goals (trichotomous framework). These were a mastery goal that focused on the attainment of self-referenced competence; a performance approach goal, focused on attaining normative competence; and a performance avoidance goal that was focused on avoiding normative incompetence (Elliot, 1999). Subsequently the mastery goal was also bifurcated into approach and avoidance forms culminating in a 2 x 2 framework (Elliot & McGregor, 2001) that produced four possible achievement goals; mastery-approach, mastery-avoidance, performance-approach and performance avoidance. An example of how each of these goals may be adopted by a golfer in competition would be that they may be concerned that they will perform poorly in relation to other players in the event (performance-

avoidance), or that they will fail to successfully execute a desirable technique or skill (mastery-avoidance). They may, however, be concerned with winning the event and outperforming others (performance-approach) or with improving their own performance in relation to previous experiences (mastery-approach).

Whereas the association of reason with aim was central to the dichotomous model, the inclusion of valence in the trichotomous and 2 x 2 frameworks supposed that aim should be separated from reason when investigating achievement goals (Papaioannou et al., 2012). These were further interpreted as being “concrete cognitive representations that serve as a directional function in motivation, by guiding the individual toward or away from specific possible outcomes” (Elliot & Thrash, 2001 p. 143) and as such suggests that a goal is neither an interpersonal predisposition to adopt goals nor a socially emphasised desirable outcome (Keegan et al., 2010). Elliot and McGregor (2001) argued that mastery-avoidance goals had been overlooked in the achievement goal literature as mastery goals in general were assumed to represent an approach form of regulation akin to intrinsic motivation. Although each of the goals in the model was posited to have a distinct pattern of antecedents and consequences, mastery goals have been consistently portrayed as the ideal form of competence based regulation.

Expansion of the 2 x 2 framework by Elliot, Murayama and Pekrun (2011) has revisited the importance placed on defining the achievement goal construct grounded in competence alone. Elliot et al. (2011) reiterate the lack of precision in defining the achievement goals solely in terms of purpose, as there are, at least, two interpretations that relate to the reason for which something is done, and an intended or desired result. Elliot et al. consider dichotomous models to incorporate both of these definitions of purpose in their conceptualisation of achievement goals. For example, the reason for engaging in achievement behaviour, epitomised by wanting to develop or demonstrate competence, is included as is the aim that is pursued (i.e. objective/intrapersonal or normative competence).

A goal may be pursued for a number of reasons (antecedents) and these reasons provide an energising force for behaviour; however this energy is channelled by the goal itself either towards or away from potential desirable and undesirable outcomes. ‘Goal complexes’ encapsulate how reasons for pursuing a goal and the goal itself theoretically interact which means that sports people in competitive settings will experience the performance and pressure environment differently depending on the goal that they have adopted and the intrapersonal and situational reasons for goal adoption (Elliot, 1999). For Elliot et al. the challenge with earlier achievement goal conceptualisation is that the

reason aspect of purpose consists of competence factors but also additional content (i.e. from the use of 'demonstrate'), specifically in the performance goal construct that holds approval and self-presentation as an important component (Elliot, 2006; Urdan & Mestas, 2006).

Elliot and McGregor (2001) acknowledged when proposing the 2 x 2 model that a more 'mature' framework may be sought that looked to further partition absolute and intrapersonal standards into separate goals. Though they viewed definition and valence as the only dimensions that are fundamental, inherent aspects of competence with which to model achievement strivings, they recognised that these standards were conceptually separable. The 3 x 2 achievement goal model (see Figure 3.3) considers that competence may be defined in terms of the standard used in evaluation or how an individual determines whether they are performing well or poorly. Three basic evaluative standards are suggested to be task, self and other and both the trichotomous and 2 x 2 achievement goal models are considered to be conceptualised on this basis (Elliot et al., 2011). Mastery goals focus on the attainment or avoidance of task and self-based competence and incompetence respectively and performance goals on the attainment or avoidance of other based competence or incompetence. Conceptualisation on this basis lead Elliot et al. to conclude that mastery based goals contain two different standards of evaluation and therefore, propose a new model encompassing six goal constructs.

Definitions of competence can be absolute, intrapersonal or interpersonal and competence may be valenced either positively or negatively. From this model and in the context of sport, a task-approach goal focuses on the attainment of task based competence (e.g. perform the skill or complete the challenge correctly), a task-avoidance goal focuses on the avoidance of task based incompetence (e.g. avoid executing the skill incorrectly), a self-approach goal focuses on the attainment of self-based competence (e.g. perform better than before), a self-avoidance goal focuses on the avoidance of self-based incompetence (e.g. avoid performing worse than before), an other-approach goal focuses on the attainment of other based competence (e.g. perform better than others), and an other-avoidance goal focuses on the avoidance of other-based incompetence (e.g. avoid performing worse than others). The studies by Elliot et al. (2011) provided strong support for the proposed model and its applied utility.

		Definition		
		Absolute (task)	Intrapersonal (self)	Interpersonal (other)
Valence	Positive (approaching success)	Task-approach	Self-approach	Other-approach
	Negative (avoiding failure)	Task-avoidance	Self-avoidance	Other-avoidance

Figure 3.3 The 3 x 2 Achievement Goal Model (Elliot, Murayama & Pekrun, 2011)

The antecedents and consequences of achievement goal adoption will be discussed later in this chapter and in more detail when introducing each study. The consensus within the achievement goal literature, however, is that individuals should be encouraged to pursue mastery approach goals and discouraged to pursue other avoidance goals (e.g. Dweck, 1999; Harackiewicz, Barron, Tauer & Elliot, 2002; Patrick & Ryan, 2008) and the studies by Elliot et al. (2011) add to this understanding with the refinement of promoting task-approach over self-approach goals. The focus of this research has been exclusively in the education domain and so this model requires investigation in other achievement settings.

3.3.3 The orthogonality of achievement goals.

Measurement of goal orientation and involvement are discussed in detail in Chapter 4, however, an important difference between Nicholls and Dweck's theories is that task and ego orientations are orthogonal and independent of each other. That is to say that an individual can be high on both, low on both or a combination of high and low on both and this has been supported in the sport psychology literature (e.g. Harwood & Hardy, 2001; Harwood & Swain, 2001). Importantly this independence is accepted in relation to the dispositional level of achievement goals but there are additional goal perspectives of goal involvement and the motivational climate that need to be considered and continue to be debated (e.g. Harwood, Hardy & Swain, 2000; Treasure, Duda, Hall, Roberts, Ames & Maehr, 2001).

Goal involvement is a situation specific state measure that reflects how an individual relates to an achievement situation at a given point in time (Elliot & McGregor, 2001). Nicholls theory proposes that sometimes, environmental influences will raise awareness of social evaluation and consequently will promote a state of ego involvement, with increased feelings of anxiety. In the absence of these social evaluative cues a state of task involvement will be adopted together with feelings of reduced anxiety. A sport persons' goal involvement can in turn be greatly influenced by the motivational climate, which like the individual can be task or ego oriented and defined as being either a mastery or competitive/performance climate. Perceptions of a mastery climate are typically a result of athletes receiving positive reinforcement when they work hard and demonstrate improvement and when the criteria for success and failure are self-referenced. In contrast a performance climate is evident when athletes perceive that poor performance and mistakes will be punished and that success and failure criteria are referenced in comparison with others (Roberts & Kristiansen, 2012). The important point to note is that dispositional goal orientations and perceptions of the motivational climate are two independent dimensions of motivation that interact to influence goal involvement and an individuals' motivated behaviour.

Nicholls (1989) position on the independence of goal involvement is not clear but there is the inference that each individual may possess certain levels of task and ego involvement for an achievement situation in line with this orthogonality assumption. Duda, however, points out that it is difficult to imagine a player being both task and ego involved at the same time proposing that "a suitable assessment of goal states would seem to consist of dependent dimensions that can be measured dynamically throughout a sporting event" (2001, p. 134). In Elliot's approach, achievement goals are considered neither orthogonal nor bipolar with empirical research suggesting positive associations may be found among all four goals. As such individuals are thought to pursue different goals simultaneously (Conroy, Elliot & Hofer, 2003).

The mutual exclusivity of goal involvement is considered by others, however, to be one of the most important tenets of Achievement Goal Theory (Roberts, 2012). Whilst this notion has been challenged by parallel processing models of information processing (Harwood & Hardy, 2001) and research in the educational domain that proposes the simultaneous pursuit of goals (e.g. Barron & Harackiewicz, 2001), the theory is seen to explicitly position an athletes' state of goal involvement along a continuum from task involvement to ego involvement. As an athlete processes information from the sporting context and attends to cues created by the motivational climate their goal state can alter

moment to moment. An example would be a golfer who begins a competitive event with a strong task involved motivation to develop certain aspects of performance in accordance with self-referenced based criteria. When, as a result of successful performance, they find themselves with an opportunity to win the tournament, they may wish to demonstrate superiority over their opponents and consequently become ego involved.

Where goal orientations are seen as orthogonal with numerous 'goal orientation profiles' possible, goal states are seen as dynamic and alter in accordance with athlete perceptions as they interact with the sporting environment and the achievement situation. Duda (2001) further highlights the need to measure goal involvement closer to the achievement situation, which is an aim of the studies in this thesis. Assessment is typically made before competition or a training session (e.g. Harwood & Swain, 1998) or by asking participants to recall goal involvement retrospectively when viewing video replays of performance, a technique used previously by Smith and Harwood (2001). The first example is problematic due to the dynamic nature of goal states previously outlined. Although intentions may be captured prior to commencing play we will not capture the challenges encountered during performance that indicate that goal involvement will not remain stable throughout.

Although the procedure used by Smith and Harwood (2001) is time consuming it does get closer to goal involvement at particular times in a performance. There are, however, issues with the quality of participant recall that can potentially affect the reliability of accurate accounts of goal involvement after the event, as these assessments may be influenced by the subsequent knowledge of outcomes. All of the studies in this thesis attempt to measure goal involvement as close to the performance experience as possible in order to both build on the methods of Smith and Harwood (2001) and the more common research practice of assuming goal involvement states from measures of orientation (Roberts, 2012).

3.4 Achievement goals in sport

Ability and perceptions of competence are central factors in understanding skill execution and participation in sport (Duda, 2005). In this domain studies have been grounded in social cognitive theory (Bandura, 1977, 2002), focusing on judgements of competencies and perceptions of self-efficacy and awareness of social factors that influence beliefs regarding ability and interest in sport. In the sporting domain the

fundamental assumptions of achievement goal frameworks remain, in that the meaning of the sporting activity to the individual will impact the consequent affective responses, cognitions and behaviours, and that this meaning is derived from the achievement goals valued by the sports person (Nicholls, 1984, 1989). As Duda succinctly outlines “in essence achievement goals are held to be the interpretive lens influencing how we think, feel and act when engaging in achievement endeavours” (2005, p. 319.). The three central constructs of goal orientation, goal involvement and perceptions of the motivational climate have been examined in the sport domain with the former consistent with Nicholls (1989) proposals that there are individual differences in the proneness for task and ego goals. The following review looks at the antecedents of goal orientation and involvement before detailing the known correlates of achievement motivation at these three levels. The review will provide an enhanced rationale for exploring how attentional processes detailed in Chapter 2 can be explained by different achievement motives.

3.4.1 Antecedents of achievement goals.

A review of 23 published studies carried out up until 2009 revealed investigation into the relationship between motive to achieve success, motive to avoid failure, fear of failure, perceived competence, mastery climate, performance climate and achievement goals (Papaioannou et al., 2012). Findings were commensurate with research in the education domain (e.g. Elliot, 1999; Elliot & McGregor, 2001) with corrected mean correlations reported in review (Papaioannou et al., 2012). These revealed a positive relationship between motive to achieve success and mastery approach goals $r = .45$, $p < .001$ (Halvari & Kjormo, 1999; Thomassen & Halvari, 2007); perceived competence and mastery approach goals $r = .38$, $p < .001$ (e.g. Ommundsen, 2006; Wang, et al., 2007) and mastery climate and mastery approach goals $r = .50$, $p < .001$ (e.g. Morris & Kavussanu, 2008; Papaioannou, Milosis, Kosmidou & Tsigilis, 2007). In addition mastery approach goals were found to be negatively related to motive to avoid failure $r = -.30$, $p < .001$ (Thomassen & Halvari, 2007) and unrelated to performance climate (e.g. Cury, Da Fonseca, Rufo & Sarrazin, 2002; Morris & Kavussanu, 2008).

Although extensive research has been conducted on the trichotomous achievement goal model (for review see Payne, Youngcourt & Beaubien, 2007) there has been comparatively less on the 2 x 2 framework that considers the mastery avoidance construct which has called into question its relevance to understanding the achievement

motive (Deshon & Gillespie, 2005). Their importance to individuals across education, work and sport settings has however, been established in research (van Yperen & Renkema, 2008; Anseel, van Yperen, Janssen, & Duyk, 2011) that has found that between 15% and 49% of participants indicated that mastery avoidance goals were most dominant. Research into antecedents of mastery avoidance goals has found a positive relationship with fear of failure $r = .47, p < .001$ (Kaye, et al., 2008; Nien & Duda, 2009) and mastery climate $r = .30, p < .001$ (Skjesol & Halvari, 2005; Ommundsen, 2006) whilst relationships were not found between mastery avoidance goals and either perceived competence (Smith, et al., 2002) or performance climate (Papaioannou, et al., 2007).

Investigation into the antecedents of the performance dimension of the 2 x 2 framework (Elliot & McGregor, 2001) as reviewed by Papaioannou et al. (2012) has found positive relationships with fear of failure $r = .26, p < .001$ (e.g. Conroy et al., 2003; Conroy & Elliot, 2004), perceived competence $r = .34, p < .001$ (Smith et al., 2002) and performance climate $r = .41, p < .001$ (Cury et al., 2002; Morris & Kavussanu, 2008) with a negative relationship found with motive to avoid failure $r = -.16, p < .05$ (Thomassen & Halvari, 2007) and unrelated findings for the relationship between performance approach goals and motive to achieve success (e.g. Halvari & Kjormo, 1999) and mastery climate (Cury et al., 2002; Morris & Kavussanu, 2008). The final performance avoidance goal dimension has been investigated with positive relationships established with motive to avoid failure $r = .51, p < .001$ (Thomassen & Halvari, 2007), fear of failure $r = .40, p < .001$ (e.g. Conroy et al., 2003) and performance climate $r = .32, p < .001$ (e.g. Ommundsen, 2006; Morris & Kavussanu, 2008). A negative relationship was found with motive to achieve success $r = -.47, p < .001$ (Thomassen & Halvari, 2007) and performance avoidance goals were found to be unrelated to both perceived competence and mastery climate (e.g. Skjesol & Halvari, 2005).

Additional antecedent relationships were found with aspects of perfectionism in the review by Papaioannou et al. (2012) that included positive relationships between striving for perfection (Stoeber, Stoll, Pesheck & Otto, 2008) as well as self-oriented perfectionism (Kaye et al., 2008) and both performance approach and mastery approach goals whereas, a relationship was not found with mastery avoidance or performance avoidance goals and these antecedent variables. In contrast negative reactions to imperfection (Stoeber, et al., 2008) and perfectionism concern over mistakes (Stoeber, et al., 2009) have been found to be positively related to both performance approach and

performance avoidance goals as well as mastery avoidance goals. The relationship with the mastery approach dimension and these variables has yielded contrasting findings.

A number of other antecedents have been hypothesised as influencing goal involvement including demographic variables such as gender and aspects of the achievement environment (Elliot, 1999). In sport, however, antecedent research has been dominated by motive dispositions (i.e. need for achievement and fear of failure) and perceptions of team and parent motivational climate (Morris & Kavussanu, 2008). A central tenet of Achievement Goal Theory is that goal involvement is initiated as a result of the interplay between situational and individual difference variables (Treasure et al., 2001). This thesis looks to establish the contribution of the competitive environment on goal adoption and proposes an individual's propensity to consciously control movement during skill execution (dispositional reinvestment) as an additional antecedent variable to be considered.

3.4.2 Goal orientation relationships.

Research into this area suggests that variations in disposition correspond to a number of variables that reflect the sports persons' beliefs about the cognitive, effective and behavioural responses to sport. These include associations between sport goal orientations and beliefs regarding the causes of success and overall purpose of sport involvement; perceived competence; reported positive and negative affect; achievement behaviours and strategy use during practice and competition. Biddle, Wang, Kavussanu and Spray (2003) for example, in their systematic review, highlighted a moderate to large effect size (0.47) between task orientation and the belief that sport success was a result of hard work and training and a similar effect size (0.45) for the belief that possessing high ability is central to achievement in sport and ego orientation. Contemporary achievement goal frameworks posit that individuals that are strongly ego orientated will possess more fragile perceptions of ability (Nicholls, 1984, 1989; Dweck, 1986, 1999).

In sport, relationships between task and ego orientation and perceived competence have predominantly been researched cross-sectionally and the results reported by Biddle et al. (2003) indicate only small positive associations. These findings, however, are to be expected from such research designs that only capture moments in time and it is suggested that more relevant support for the predictions of Achievement Goal Theory should be sought from the assessment of perceptions of competence over time (Duda &

Nicholls, 1992) particularly from those experiencing performance difficulties (Duda, 2001).

A dominant area of research in the goal orientation literature has been to establish the relationships between goal orientation and reported positive affect in the sporting domain where positive affect has been operationalized in terms of enjoyment, intrinsic interest and satisfaction (Duda, 2005). Systematic reviews by Ntoumanis and Biddle (1999) and Biddle et al. (2003) have supported a moderate positive relationship between task orientation and positive affect whereas no such association is currently evident with ego orientation. In contrast, negative affect, typically defined with respect to anxiety and boredom, has also been studied, with review reporting a small negative relationship with task orientation (Biddle et al., 2003). A consistent relationship between ego orientation and negative affect has not been found.

Of particular relevance to this thesis are the studies that have explored predictions of behaviour and interdependencies between goal orientations and performance related strategy use. It is somewhat surprising considering behaviour prediction is central to the study of motivation, that such limited investigation has been made in this area (Duda, 2005). Challenge seeking, performance and persistence relationships that have been investigated yield no meaningful association with ego orientation but a small positive effect has emerged in the case of task orientation (e.g. Van Yperen & Duda, 1999). A summary of research into relationships with performance related strategy use suggests that task goal orientation corresponds to more adaptive strategies, whereas more short term solutions are associated with an ego orientation in order to protect an individual's perception of ability (Duda, 2005). Nicholls (1989) proposes that an insight can be gained into athletes' wider views about sport such as: what it takes to succeed and the consequences of participation from gaining an understanding of the degree to which they are task or ego orientated. A popular misconception concerns the maladaptive consequences of an ego orientation, however, as Hardy (1997) argues there is no evidence to suggest that an ego orientation is problematic and should be discouraged in the sporting domain. Duda (2005) further highlights that as achievement goal frameworks posit perceived competence as moderating the impact of achievement goals on achievement related responses, determining an athlete's level of ego-orientation alone is not particularly useful. It is also important to consider findings from research on the correlates of task and ego involving sport environments.

Orthogonality is the most important attribute of achievement goal orientations. Early developmental research established that task and ego orientations are independent

(Nicholls, 1989) meaning that an individual can be high or low in either or both orientations at the same time, and research from the sport and exercise domain has subsequently supported this (e.g. Duda, 1988; Pensgaard & Roberts, 2000). Two strategies are commonly used to ascertain goal orientation profiles that determine whether an athlete is high, low or moderate in each; either through a mean or median split of the task and ego scores (e.g. Fox, Goudas, Biddle, Duda & Armstrong, 1994) or through cluster analysis (e.g. Hodge & Petlitchkoff, 2000). Individuals with high task and high ego orientations and those with high task and low ego orientations have been found to have the most adaptive motivational profiles (Fox et al., 1994; Hodge & Petlitchkoff, 2000; Harwood, Cumming & Fletcher, 2004; Smith Balaguer & Duda, 2006). These findings are consistent with those that hold task orientation as adaptive and ego orientation as maladaptive when assessed independently, particularly when the latter is accompanied by low perceptions of competence. The importance of considering the simultaneous combination of goal orientations is emphasised, however, in the finding that high ego orientation is not always deleterious when coupled with either high or moderate task orientation (Harwood et al., 2004; Pensgaard & Roberts, 2000).

In the sport domain, Roberts (2012) summarises achievement goal research as demonstrating that individuals with high ego and high task orientation and those with high task and either moderate or low ego orientation consistently report more desirable responses on a number of variables that have been studied. These include; greater imagery use, increased physical activity, higher self-determination and superior social relationships. Pensgaard and Roberts (2000) suggest that elite athletes are likely to be high task and high ego or high ego and low or moderate in task orientation supporting the belief that ego orientation is not always problematic (e.g. Hardy, 1997). The high ego and low task oriented athlete, however, is perceived to be at most risk of experiencing maladaptive motivation, withdrawal from sport and burnout when they believe that demonstration of competence is no longer attainable. Finally those individuals with low task and low ego profiles are considered to be the least motivated and may not even fully engage or adhere to achievement tasks. Of greatest significance is the acknowledgement that individual differences in goal orientation are associated with different achievement behaviours (Roberts, 2012) and as Duda (2005) concludes:

‘the existent research on the correlates of sport goal orientations supports the premise that dispositional goals act as schemas reflecting the purposes underlying people’s behaviour and represent an integrated system of interpretations of cognitive and affective responses to achievement experiences’ (p. 325).

3.4.3 Goal profile relationships.

There is less agreement as to the orthogonality of achievement goal involvement with Duda and Whitehead (1998) suggesting that it is implausible for someone to be truly task and ego involved in the same moment. Harwood, Hardy and Swain (2000) challenge this belief that there can be only a single motivational cause to an action from both applied experience and research that highlights the brain's capability for parallel processing (Kahneman, 1973). In response Treasure, Duda, Hall, and Roberts, (2001) argue that one particular focus dominates at any given time (i.e. there is a reduction in task involvement when an individual's attention turns to how they look or evaluation of their performance in comparison with others). Following the development of the 2 x 2 achievement goal framework (Elliot & McGregor, 2001) a revision was posited from research in education contexts that revealed that students pursued multiple goals (Barron & Harackiewicz, 2001; Harackiewicz, Barron, Pintrich, Elliot & Thrash, 2002) with the suggestion that research should focus on how goals combine to promote achievement and motivation.

These developments challenged traditional thinking that held mastery (task) goals as adaptive and performance (ego) goals as maladaptive to performance as the bifurcation of the performance dimension in the initial trichotomous model yielded performance approach and performance avoidance goals that had a varied influence on outcome variables. Mastery goals are still considered to be associated with positive outcomes; however there is contention as to whether this is through the sole pursuit of these goals or in combination with performance approach goals (Barron, Finney, Davis & Owens, 2003). Mastery and performance goals have been proposed to combine in four ways (Barron & Harackiewicz, 2001). First, there may be additive effects (additive goal pattern) whereby each goal is independently beneficial to a single outcome; second, the adoption of both goals simultaneously would represent an interactive effect (interactive goal pattern) that demonstrate greater adaptive consequences than the endorsement of either goal alone on a single outcome; third, if there are unique effects of both goals on multiple outcomes these would be defined as specialised effects (specialised goal pattern); and finally, when individuals focus on the goal that is most relevant at the particular point in time (selective goal pattern) there are selective effects (Linnenbrink, 2005).

Although achievement goal theorists have suggested that performance goals could offer benefits in certain situations, original conceptions required the presence of high

confidence (Dweck, 1986; Nicholls, 1984) with any gains coming at a cost (e.g. mild anxiety). Senko, Hulleman and Harackiewicz (2011) caution that differences that exist in the definition of performance goals regarding reason and aim will undoubtedly influence their effect. Where some consider the critical element of performance goals as being the desire to demonstrate competence (e.g. Grant & Dweck, 2003; Kaplan & Maehr, 2007) others believe that this includes self-presentation concerns that should be considered separately and instead adopt the definition of the desire to outperform others (e.g. Elliot, 2005).

Recent research in the education domain has found association between performance goals and more desirable outcomes such as high persistence, effort and most notably achievement (Hulleman, Schragger, Bodman & Harackiewicz, 2010) with the possibility that performance goals may promote classroom achievement more reliably than mastery goals (Senko et al., 2011). The distinction between performance goal definitions is of great relevance in this regard as in a review of 98 studies by Hulleman et al. (2010) the average correlation between academic achievement and performance goals was positive when there were a majority of items that emphasised normative comparisons, but negative when the emphasis was on competence demonstration. The Achievement Goal Questionnaire Revised (Conroy et al., 2003) considers performance goals as the desire to enhance competence, through striving to outperform others and will therefore, look to establish if similar achievement benefits can be found in the sporting domain. As there is an inherent performance climate created in competitive sport it is expected that sportspeople will pursue performance goals more spontaneously than students in educational settings are believed to (Brophy, 2005) and so a multiple goal perspective may be of greater relevance in this domain.

A fundamental component of achievement goal approaches is that the state of goal involvement initiates and energises achievement striving. There has to some extent, been an assumption in research that this has been accurately measured through the independent study of goal orientations and motivational climate (Roberts, 2012). In Roberts review of the motivational implications of task and ego involvement, individuals who score high on ego orientation or are subjected to a performance climate are considered to be more likely to be ego involved, whereas those that score highly on task orientation or who are exposed to a mastery climate are believed more likely to be task involved. When adopting these criteria differences have been reported in beliefs about competence and success, purposes of sport, affect and intrinsic interest, anxiety, achievement strategies, effort and performance, well-being and ill-being, moral

functioning, cheating and burnout. Individuals who are task involved determine competence based on self-referenced factors with a primary focus on mastery. Conversely ego involved individuals need to compare favourably with others in order to feel competent, with those task involved more likely to develop perceptions of competence over time (Elliott & Dweck, 1988).

A consistent general finding is that being task involved is associated with the belief that success is achieved through hard work and co-operation whereas being ego involved is synonymous with the view that success is a result of high ability. Task involved sportspeople indicate that the purpose of sport and physical activity is to enhance self-esteem, encourage a physically active lifestyle and to foster pro-social values such as social responsibility, cooperation and the willingness to follow rules, whereas the ego involved individual views sport as providing social status and enhancing popularity (e.g. Duda & Nicholls, 1992; Ommundsen & Roberts, 1999; White, Duda & Keller, 1998). Task involvement has also been found in meta-analysis (Ntoumanis & Biddle, 1999) to be moderately to highly positively correlated with positive affect suggesting that those task involved experience greater enjoyment and elevated mood.

A further consistent finding when using either disposition or the motivational climate to infer goal involvement is associations with anxiety. A reduction in anxiety and concerns about performance is found in those task involved (e.g. Pensgaard & Roberts, 2000), whereas a positive association is found between ego involvement and anxiety, worry and concern with mistakes (e.g. Abrahamsen, Roberts & Pensgaard, 2008; Smith & Smoll, 2007). Caution is needed however, when interpreting these findings as there is an important role played by perceptions of competence; although task involvement has been found to decrease cognitive trait anxiety, low perceived competence increased both somatic and cognitive anxiety (Ommundsen & Pedersen, 1999).

Four goals exist in the 2 x 2 achievement goal framework (Elliot & McGregor, 2001). Firstly, Mastery-approach (MApp) goals represent a striving to approach absolute or intrapersonal competence, for example mastering a task. Mastery avoidance (MAv) goals represent a striving to avoid absolute or intrapersonal incompetence and a focus on not performing worse than one did previously. Performance-approach (PApp) goals focus on approaching normative competence and outperforming others and finally Performance-avoidance (PAv) goals centre on not appearing to be the worst performer in a group and to avoid normative incompetence (Conroy et al., 2003). A review by Papaioannou et al. (2012) established 25 studies that reported correlation coefficients between achievement goals with 15 of the studies based on the trichotomous model and

ten on the 2 x 2 framework that incorporates the mastery avoidance dimension. Positive relationships were found between mastery approach goals and both performance approach goals and mastery avoidance goals but, mastery approach goals were unrelated to performance avoidance goals. Performance approach goals were positively related to mastery avoidance goals and performance avoidance goals and mastery avoidance goals were positively related to performance avoidance goals (e.g. Morris & Kavussanu, 2008; Wang, Biddle & Elliot, 2007; Wang, Chia Liu, Lochbaum & Stevenson, 2009).

From Nicholls conceptualisation (1989) the adoption of mastery goals were preferred over ego-involving goals (performance goals in Elliot's terminology) whereas Elliot suggested that the latter can be adaptive for individuals of all abilities as long as they are associated with approach rather than avoidance tendencies (Elliot, 2005). In addition Elliot suggests that only individuals with high perceived competence can adopt approach goals that influence adaptive motivational patterns and those with low perceived competence will instead adopt avoidance goals that lead to maladaptive motivational patterns.

The work of Elliot and colleagues to assess goal involvement in academic contexts has provided a foundation for study in the sporting domain initially through the trichotomous model and then the 2 x 2 framework. The negative associations often reported with performance goals were reconsidered following the reconceptualization of achievement goals in the 2 x 2 framework (Elliot & McGregor, 2001) as it was revealed that these were often due to the avoidance component (e.g. Payne, Youngcourt & Beaubien, 2007). Performance was also observed to be positively associated with performance approach goals (e.g. Stoeber, Uphill & Hothman, 2009) and so debate exists as to what extent the approach-avoidance distinction has clarified understanding of relationships with performance goals (Hulleman, Schrage, Bodman & Harackiewicz, 2010; Senko, Hulleman & Harackiewicz, 2011).

This debate challenges the consistency in conceptualising achievement goals across studies and Hulleman et al. (2010) highlight the fact that many studies that link performance approach goals to maladaptive processes did not distinguish between normative and appearance components. Research in sport psychology has only recently started to investigate how the two performance goals affect sporting performance with to date only six studies in this area. Three of the studies focused on the training and practice environment (Elliot, Cury, Fryer & Hughton, 2006; Chalabaev, Sarrazin, Stone & Cury, 2008; Schantz & Conroy, 2009) and three have assessed competitive

performance (Stoeber et al., 2009 studies 1 and 2; Stoeber & Crombie, 2010). Four of the six studies found significant effects of performance goals on performance (Elliot et al., 2006, Stoeber et al., 2009 studies 1 and 2; Stoeber & Crombie, 2010) in both experimental designs that manipulated goal involvement (Elliot et al., 2006) and those that established the relative strength of individuals' motivational orientation (approach vs. avoidance). Such findings indicate that athletes who are more orientated towards performing better than others than not performing worse than others are likely to perform at better than expected levels; the greater this difference the better their competitive performance will be (Stoeber & Crombie, 2010).

There has been greater consistency, however, in research of mastery approach goals, which have been found to be positively associated with a number of adaptive motivational processes including persistence, effort and self-efficacy (e.g. Grant & Dweck, 2003; Liem, Lau & Nie, 2008). Although less research has been carried out on the more recent goal construct of mastery avoidance the empirical findings suggest a more negative pattern of associations with motivational processes and outcomes compared with mastery approach goals (Moller & Elliot, 2006; van Yperen, Elliot & Anseel, 2009). Despite the reported adaptive benefits of adopting mastery goals Elliot, Shell, Henry, and Maier (2005) address the perplexity in the achievement goal literature that highlights the inability of mastery goals to facilitate performance to the same degree as performance approach goals (e.g. Brophy, 2005). Drawing on the work of Raynor (1969; 1970) they considered the concept of instrumentality or 'contingent future' when examining how achievement motivation predicts performance, as research predominantly focuses on situations in which only immediate success and failure are at stake.

Raynor (1969 and 1970) posited that this is not a reflection of real life achievement striving, which typically presents immediate opportunity for success and failure with implications for future outcomes and therefore, suggested that achievement motivation models should take this into consideration. Elliot et al. (2005) found that both mastery and performance goals were equal facilitators of performance in the absence of performance contingency and it was only when this contingency was added to the achievement context that performance approach goals were observed to yield a performance advantage. The important consideration for understanding how goal involvement may impact performance under pressure is that although the task-focus of mastery goals may not be of direct benefit to performance outcomes in some circumstances, it may serve an important prophylactic role in others. That is to say that

in the golfing context, although the adoption of mastery goals may not be associated with superior performance defined by score, they may play a vital role in resisting the proposed mechanisms of 'choking' under pressure and Elliot et al. (2005) encourage research in this area.

The hypothesised association between achievement goals as defined by Elliot and McGregor's (2001) 2 x 2 frameworks and performance outcomes under pressure gains support from contrasting relationships established in the extant literature. There is indication of direct relationships with performance as well as the possible mediational role of achievement goals in optimal performance or skill breakdown as a result of achievement goal influence on cognition, affect and behaviour. Achievement goals have been related to both adaptive and maladaptive outcomes and patterns of behaviour. This distinction was determined in review by Papaioannou et al. (2012) to incorporate adaptive outcome variables that relate to positive constructs such as satisfaction, intrinsic motivation and positive affect and in contrast, maladaptive outcomes that comprised negative variables that included extrinsic motivation, boredom, anxiety and negative affect.

A general finding by Papaioannou et al. was the positive relationship between approach goals and adaptive motivational patterns, whereas these patterns were unrelated to mastery and performance avoidance goals. When considering objective measures of performance that could be considered comparable with the 'choke' or 'clutch' performances in golf, both mastery and performance approach goals have been found to be positively related to race performance (Stoeber, Uphill & Hotham, 2009) and pacer test performance (Garn & Sun, 2009). Mastery approach goals have also been found to be related to shuttle run (Lochbaum, Stevenson & Hilario, 2009) and academic performance (Papaioannou, Ampatzoglou, Kalogiannis & Sagovits, 2008). In addition positive relationships have been found between mastery approach goals and intrinsic motivation (Nien & Duda 2009), situational interest (Shen, Chen & Guan, 2007), self-reported tolerance (Lochbaum et al., 2009) and positive affect (Adie, Duda & Ntoumanis, 2008) with performance approach goals relating to effort (Garn & Sun, 2009) and sport satisfaction (Papaioannou et al., 2008) and both approach goals positively relating to self-esteem (Adie et al., 2008) and metacognitive regulation (Ommundsen, 2006).

The established influence of approach goals on variables such as effort and metacognitive regulation provide rationale for the proposed association with attentional focus and the underpinning mechanisms of skill breakdown under pressure that are the

focus of this thesis. If an individual's competence strivings can have an impact on these behavioural and cognitive outcomes it is possible that this would extend to a self-focus of attention that defines reinvestment (Masters & Maxwell, 2008) and skill breakdown for the elite performer or distraction that can contribute to suboptimal performance in novice performers.

Avoidance goals have been predominantly found to be unrelated to adaptive motivational patterns and specifically those of considered relevance to the current study and detailed above; for example race performance and metacognitive regulation (Ommundsen, 2006; Stoeber et al., 2009). Van Yperen, Elliot and Anseel (2009) suggest caution in the interpretation of findings that promote the adoption of approach and in particular performance approach goals as the studies have examined links in contexts that most closely match the nature of performance based goals (competence evaluation is of a interpersonal standard of evaluation). It may therefore, not be surprising for performance approach goals to be consistently found to be positively related to performance and conversely performance avoidance goals to be associated negatively with performance (Elliot & Moller, 2003; Harackiewicz, Barron, Pintrich, Elliot & Thrash, 2002; Porath & Bateman, 2006; Van Yperen, 2006). In contexts conducive to performance based goals there have been mixed findings with some supporting a positive relationship between mastery approach goals and performance (e.g. Janssen & Van Yperen, 2004) and others that have produced null effects (e.g. Davis, Mero & Goodman, 2007; Lee, Sheldon & Turban, 2003). A number of studies suggest that an overemphasis on mastery can be detrimental to performance attainment (e.g. Brown, 2001; Bunderson & Sutcliffe, 2003). There is also an absence of research in the sport psychology literature that examines the relationship between mastery avoidance goals and performance with those in other performance domains (i.e. occupational, educational) consistently yielding null results (e.g. Finney, Pieper & Barron, 2004; Elliot & McGregor, 2001). Those that have determined mastery avoidance goals as being deleterious to performance improvement have not done so in sport or physical activity contexts (Van Yperen, 2003; Van Yperen, et al., 2009) and so further research is required to establish similar relationships to performance in the sporting domain.

Whereas the positive influence of achievement goals will provide understanding of the most adaptive cognition, a review of the maladaptive outcomes by Papaioannou et al. (2012) offers insight into possible relationships between achievement motivation and the mechanisms that underpin the 'choke'. All of the goals within the 2 x 2 framework

except for mastery approach goals were found to be positively correlated with maladaptive outcomes. Performance approach goals were positively related to external regulation (Barkoukis, Ntoumanis & Nikitaras, 2007; Smith, Duda, Allen & Hall, 2002), extrinsic motivation (Nien & Duda, 2009), test anxiety (Smith et al., 2002), and negative affect (Adie, Duda & Ntoumanis, 2008; Kaye, Conroy & Fifer, 2008). Performance avoidance goals were positively related to external regulation, test anxiety (Smith et al., 2002), self-handicapping (Ommundsen, 2004), entity theory (Stevenson & Lochbaum, 2008), and negative affect (Adie et al., 2008) and mastery avoidance goals were related to negative affect (Adie et al., 2008; Kaye, et al., 2008).

Further indication as to the achievement goals that may resist the detrimental effects of reinvestment is found in the negative relationships found between mastery approach goals and maladaptive outcomes such as amotivation, self-handicapping and entity theory and between performance approach goals and self-handicapping. The suggestion that these positively valenced achievement goals are associated with a reduced need to protect self-esteem through self-handicapping, may infer that this population focus less attention on the perception of others. As a consequence they may be less self-conscious about movement (sub scale of the movement reinvestment scale). Although a positive relationship has not been found with incremental theory, if those involved in mastery approach goals have a negative association with entity theory in the academic domain it may suggest that in the sporting context such goals will be associated with golfers who do not believe their ability to be fixed and instead may consider that increased effort may improve performance.

3.4.4 Goal climate relationships.

Understanding the influence of the perceived motivational climate may provide the greatest utility for application and intervention in sport contexts, particularly the training environment and consideration of youth development. The findings of motivational climate studies, that are predominantly correlational and cross-sectional, support those that have been observed for goal orientations. For example; a task involving climate has been found to be associated with greater enjoyment, satisfaction and positive affect (e.g. Carpenter & Morgan, 1999); beliefs that effort is an important contributor to success (e.g. Treasure, 1993); subjective and objective performance and more adaptive coping strategies and persistence (e.g. Sarrazin, Vallerand, Guillet, Pelletier & Cury, 2002). Perceptions of an ego-involving climate have been found to be associated with greater anxiety (e.g. Pensgaard & Roberts, 2000), the belief that

sporting achievement is dependent upon possessing ability (e.g. Seifriz, Duda & Chi, 1992) and withdrawal and dropout from sport (e.g. Sarrazin et al., 2002). Research has also focused on which construct (orientation / climate perception) is the best predictor of achievement related cognitions, affect and behaviour with findings suggesting that the nature of the dependent variable is largely influential. For example when looking at an athletes' self-esteem this measure is more dispositional and so goal orientations have a greater predictive utility, whereas when assessing levels of enjoyment in a particular sport setting perceptions of the motivational climate account for more variance (Duda, 2005). With regard to the design of Study 3 in this thesis, perceptions of the performance environment and pressure are central to evoking attentional focus and therefore, it is expected that the motivational climate will be of greatest influence to participants' achievement motives.

Situational factors are an important component of Achievement Goal Theory with Nicholls (1984) original conception considered interactionist in that it proposed that task and ego goals would be adopted as a consequence of the interaction between an individuals' goal orientation (disposition) and specific situational cues within the achievement environment (Harwood, Spray & Keegan, 2008). It was the work by Ames and colleagues on environmental influences; however that has been attributed to the development of research into motivational climates (e.g. Ames, Ames & Felker, 1977; Ames, 1984a). Situational conditions in which goal structures were manipulated and rewards and incentives offered were found to make salient specific informational sources in self-evaluations of ability, the affective impact of success and failure and subsequent perceptions of ability. Although this initial research was not grounded in Achievement Goal Theory, Ames (1984b), identified qualitatively different 'motivational systems' in children compatible with the concept of task and ego involvement, which were later termed mastery and performance involving climates.

Ames research continued to focus on the classroom environment and the extent to which mastery and performance involving climates could be controlled by situational cues provided by the teacher to enhance the salience of different achievement goals (1992). Importantly for the relevance of the sport domain, this goal salience was proposed to be influenced by other social agents outside of the classroom setting by the nature of their "instructional demands" (Ames, 1992; p.262). Ames further emphasised that it was an individuals' perception of the environment or motivational climate that was the critical determinant of subsequent achievement goal adoption and the prediction of behaviour. Two types of motivational climate were subsequently defined. First, when

criteria for self-evaluation are self-referenced and people are viewed as competent when they have made progress, accomplished a task or acknowledged new learning; a mastery climate is created. Second, when the criteria for evaluation are predominantly referenced in comparison with others and particularly the outperformance of others with an emphasis on the minimisation of errors; this will influence perceptions of a performance climate.

Ames (1992) defined six specific classroom structures under the acronym TARGET that would be likely to promote either mastery or performance climates. Based on previous research by Epstein (1989) these were: tasks (design of tasks), authority (location of decision making), recognition (distribution of rewards), grouping (manner and frequency of grouping), evaluation (performance standards) and time (pace of learning). By manipulating the criteria in the TARGET framework, early sport research sought to encourage either mastery or performance in participants with support found for the theoretically specified links between the motivational climate and an individual's behaviours or cognitions across a number of sports (Duda & Chi, 1989; Marsh & Peart, 1988). The TARGET strategies that have been used, however, have been criticised for lacking use of validated and reliable measurement tools for each component of the framework, and inconsistent training policies for those overseeing interventions (Braithwaite, Spray & Warburton, 2011).

There has been extensive research into the motivational, affective and behavioural correlates of perceived mastery (task) motivational climates and perceived performance (ego) climates. Ntoumanis and Biddle (1999) first reviewed attempts to experimentally manipulate motivational climates and reported analysis of these climate perceptions, and Harwood et al. (2008) disseminated a qualitative review of theoretical associations between perceived motivational climates and a range of outcome variables. These included; perceived competence, positive and negative affect states, beliefs about the purpose of sport (e.g. status versus development), as well as beliefs relating to the causes of success in sport (e.g. effort/learning versus natural ability). Braithwaite, et al. (2011) carried out a meta-analysis of research conducted on motivational climate in physical education and determined associations between perceived mastery motivational climates and affective outcomes such as; attitudes, boredom and commitment, behavioural outcomes including fitness and development of motor skills and cognitive outcomes such as; anxiety, confidence and perceptions of ability. In all reviews, consistent patterns are reported that posit perceptions of mastery motivational climates as being associated with positive/adaptive experiences, whereas, perceptions of

performance motivational climates were found to be either unrelated or were linked to negative/maladaptive experiences.

With regard to the influence of perceived motivational climates on individuals' emotions, mood and cognition, Harwood Keegan, Smith and Raine (2015) propose that a perceived mastery climate should be less likely to elicit distress, anxiety, fatigue, worry and pressure. This is expected, as there is an emphasis on personal development, which in turn enables mistakes to be viewed as part of the learning process. Conversely, an increase in negative cognitive, affective and emotional experiences is predicted in perceptions of performance climates that place greater emphasis on competition, rivalry and that have a greater intolerance of mistakes.

Although goal involvement has largely been inferred through perceptions of the motivational climate as well as through goal orientation, there have been several studies that have looked at the relationship between perceptions of the motivational climate and achievement goals defined by the 2 x 2 framework (Elliot & McGregor, 2001). In a review by Harwood, et al. (2015), five samples totalling 1,345 participants established relationships between climate perceptions and mastery approach goals and mastery avoidance goals and eight samples consisting 2,473 participants correlated perceptions of the motivational climate with performance approach and performance avoidance goals. Moderate positive relationships were found between perceptions of mastery climates and mastery approach goals and small positive correlations with mastery avoidance goals and performance approach goals. Perceptions of a performance motivational climate found moderate positive association with both performance approach goals and performance avoidance goals and a small positive association with mastery avoidance goals. In short a strong case can be made for the benefits of climates high on mastery cues in promoting positive and desirable consequences, whereas these adaptive motivational patterns are observed to a lesser extent under the perception of performance climates.

3.5 Chapter summary

The aim of this review has been to provide a strong rationale for exploring the contribution of golfers' achievement motivation in the underlying mechanisms of attention that have been attributed to skill breakdown under pressure. Contemporary theories of achievement motivation have been detailed with their association and complementarity to classic motivation theories. The positioning of competence as an

innate psychological need along with autonomy and relatedness, within self-determination theory, suggests potential motives to exert conscious control over movement or to be distracted from task relevant information. Similarly need for achievement and fear of failure achievement motives, as antecedents of goal involvement, may also provide understanding of attentional focus selection as fear of failure, for example, has been found to promote performance approach goals for self-presentation gains (Conroy, 2001). This further positions achievement goals at the situational level (involvement) as a strategy for attaining competence and avoiding incompetence.

Research that supports the adaptive consequences of mastery orientation and involvement, together with incremental beliefs of ability may offer insight into individuals who are more susceptible to the 'choke'. It is possible that there is further evidence of a goal paradox, in that promoted mastery goals may elicit attentional focus to skill relevant aspects of skill execution and an unhelpful explicit monitoring or conscious processing in some golfers. However, this may only lead to under-performance or a temporary skill breakdown if they do not view these outcomes as stable representations of ability. Finally perceptions of ability and differentiation may speak to the attentional focus differences found in skills of different complexity and demand. It is possible that golfers may hold different perceptions of ability across skills (i.e. driving, iron play, pitching, chipping, sand play, putting) and this may subsequently determine the investment of effort and initiate self-presentation concerns that lead to self-focus or distraction in different contexts.

Achievement Goal Theory has been put forward as the favoured approach for understanding cognitive, affective and behavioural responses to the achievement motive in the sporting domain, however, despite its increasing contribution to the extant motivation and sport performance literature, a number of specific issues have been raised. Differences have been outlined between the models and conceptualisation of Achievement Goal Theory as well as the role of competence posited by Nicholls (1984, 1989) and Elliot (1999, Elliot et al. 2011). In that regard the studies in this thesis focus on those put forward by Elliot and a striving to attain rather than demonstrate competence as this represents an achievement rather than self-presentation motive. For Elliot achievement goals are framed by different perceptions of competence, and goal involvement (situational level) outlined previously in the 2 x 2 framework (Elliot & McGregor, 2001) are put forward as a cognitive representations that serve to direct behaviour.

A sustained rationale for the utility of research into the relationship between achievement motives and reinvestment has been provided in review of contemporary achievement goal models (e.g. Elliot & McGregor, 2001; Elliot et al., 2011). These models propose definitions of normative, self referenced and absolute competence that comprise factors analogous to technical, conscious motor processing, movement self consciousness, skill relevant and skill irrelevant attentional focus, detailed in Chapter 2.

A fundamental assumption of Achievement Goal Theory is that the meaning of the sporting situation to an athlete will impact cognitive, affective and behavioural responses and that goal states alter moment to moment. In addition, the nature of the dependant variable has been found to be an important factor when considering the best predictor of these achievement goal outcomes. For example, the prediction of self-esteem, considered more closely aligned with disposition is best achieved through achievement goal orientation. As ‘choking’ is a phenomenon influenced by anxiety inducing environments and perceptions of pressure, motivational climates may yield the most relevant information and areas for potential intervention. Consideration will, however, be given to the three levels of competence analysis outlined in this review, of orientation, climate and involvement with a focus on how dispositions, social factors and the competitive environment influence perceptions of pressure and goal adoption defined by 2 x 2 and 3 x 2 frameworks.

In order to examine the relationship between achievement goals and performance attainment, empirical research has focused on two approaches; those that measure existing achievement goals and experiments that manipulate achievement goals. Both make important contributions to the literature and are adopted in study design in this thesis, as they enable achievement goals to be examined across time and context and provide understanding of the efficacy of intervention in applied settings. Our knowledge of the role that achievement goals play in optimal and sub-optimal performance, however, remains limited. Trichotomous and 2 x 2 proponents have not assessed how the social context affects volition in the adoption of performance or mastery goals and the mastery avoidance goal and recent 3 x 2 goal constructs require further investigation. To date the relationship between these goal constructs and performance have received little research focus and association with the mechanisms proposed to underpin the ‘choking’ phenomenon, in particular, appear to be unexplored. Such an investigation may, therefore, provide understanding of how an individual’s propensity to adopt an inappropriate attentional focus influences goal adoption and how goal

involvement initiates a player's focus of attention to execute motor skills in competitive contexts.

4. METHODOLOGY

4.1 Chapter overview

The main aim of this research is to establish if there is a relationship between achievement motivation and attention during performance under pressure. In this chapter, methods and underlying epistemology, adopted to address this aim and subsequent main research question of how achievement motivation influences attention during performance under pressure, are detailed. The purpose of the chapter is to justify the suitability of these methods in addressing the main research question and those pertinent to each study, together with the following objectives of the thesis:

1. To gain greater understanding of the cognitive experiences of golfers performing in perceived pressure situations.
2. To address identified methodological shortcomings of research in this area and utilise methods that get as close to the performance under pressure experience as possible.
3. To enhance current operational definitions of performance under pressure in sport.
4. To provide knowledge of the role that achievement goals play in directing attentional processes posited to contribute to performance decrement under pressure.
5. To propose developmentally apposite interventions and strategies that encourages adaptive attentional focus.

There is debate in the philosophical literature as to the appropriateness of utilising mixed methods in psychological research. As mixed methods are used in the current thesis, this debate is first, briefly addressed, before comprehensive discussion is provided of the qualitative and quantitative methods of data collection and analysis. Specific methods including study design, participants, materials and procedure are covered within the individual chapters (5, 6 and 7) dedicated to each study. Figure 4.1 outlines how each of the three studies within this thesis have been designed to address the main aim, research question and each of the five thesis objectives. In addition figure 4.1 clarifies how qualitative and quantitative methods have been selected for their suitability in answering each of the research questions in each study.

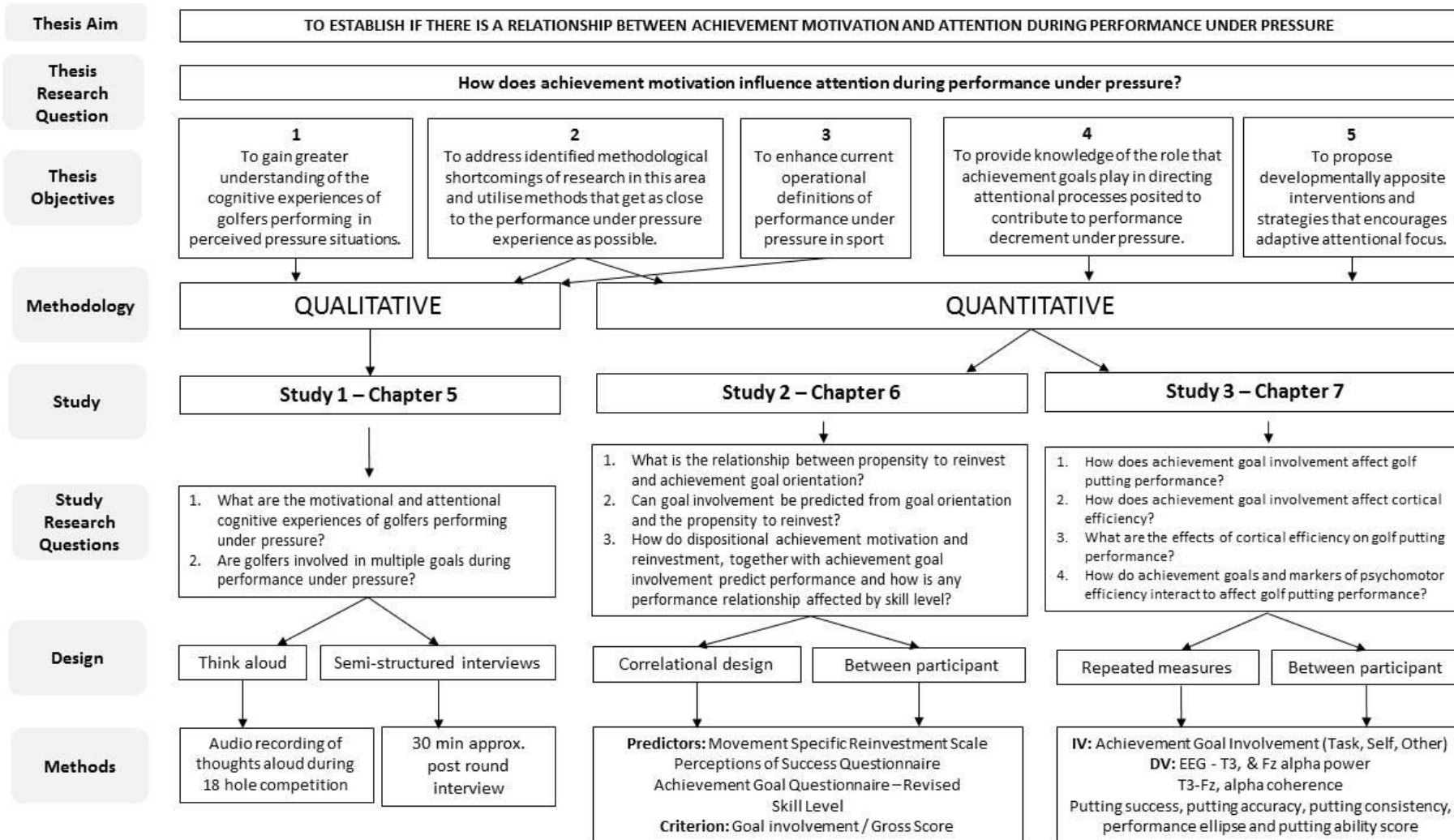


Figure 4.1 Thesis map of how studies meet research aims and objectives

Ethical approval was received from the University of Greenwich for all of the research in this thesis. Participants in each study provided informed consent, were reminded of the right to withdraw their data at any time, and were fully debriefed on each occasion. They were informed of the confidential nature of their participation with assurances given regarding the safe storage of data. In Study 1 (Chapter 5), participants also verified that transcriptions were accurate accounts of their involvement in the study.

4.1.1 Methodological rationale.

Quantitative designs dominated early research into competitive anxiety and issues relating to competition stress with a focus on the statistical relationship of variables in order to generalise to larger populations (Neil, Mellalieu & Hanton, 2009). Such studies are still of great relevance and form part of this thesis, however, the encouragement of Scanlan, Ravizza and Stein (1989) and Scanlan, Stein and Ravizza (1991) to explore the sports performers' experience has paved the way for greater acceptability of qualitative approaches in attempting to meet many of the perceived limitations of methods such as self-report measures. More detailed insight has been gained by interview techniques and focus groups that allow the participants to share in greater depth, their experiences of performing under pressure (Hill et al., 2010b; Gucciardi et al., 2010). Neil et al. (2009) note that interviews have been used to further comprehend and explain quantitative findings and to confirm current theories (e.g. Thatcher & Day, 2008). Despite the recent acceptance that qualitative methods have some relevance to psychological research, quantitative methods still dominate (Creswell & Plano Clark, 2007), however, a move to more innovative mixed method approaches has been embraced by sport psychology (e.g. Holt & Hogg, 2002) in part, to attempt to address the limitations of each approach.

Such a rationale has received criticism (Toomela, 2011; Wiggins, 2011) as the relationship between methods with such divergent philosophies of science is not clear and understanding is therefore, needed of how they can be justifiably integrated. Wiggins (2011) suggests that an initial distinction should be made between *methods* and *methodology*. The former represents the technical components of collecting, storing and analysing research data with the latter referring to the study of methods themselves together with the worldviews that influence such a study; 'methods are guided by methodologies, which are in turn guided by the basic fundamental assumptions of a worldview' (p. 45).

Worldviews or paradigms are typically referred to as positivist or post-positivist (a foundation of quantitative methodologies) and interpretivist or constructivist (a foundation of qualitative methodologies) and are believed to guide researchers in several important ways (Kuhn, 1962). First in terms of what they observe and study, second, the nature of the questions that they ask relating to the objects of study, third how these questions are structured and lastly how results are interpreted. The worldviews that underpin qualitative and quantitative approaches are of such contrast with competing and contradictory principles that many researchers hold them to be incompatible and contend that methods will both implicitly carry the assumptions of their associated worldview and will in turn be biased towards interpretation of the world in keeping with these assumptions (Sugarman & Martin, 2005; Williams, 2005). Wiggins (2011) outlines attempts to integrate qualitative-quantitative methodologies as ‘methodological eclecticism’, ‘methodological pluralism’ or ‘mixed methods’ and suggests that despite assertions that mixing is possible, researchers are not explicit in how this is to be done in theory or in practice leading to ambiguity as to whether they are addressing issues of incompatibility.

The belief of quantitative purists, in line with positivist assumptions, is that social observations should, and can be treated, as entities, as is the case with physical phenomenon. For this to be achievable the observer is considered separate from the entities of interest assuming the nature of enquiry to be objective (Johnson & Onwuegbuzie, 2004). Nagel (1986) proposes that time and context free generalisations are both an aim and are possible to establish reliable and valid causation of social scientific outcomes. Qualitative purists who advocate the assumptions of constructivism, idealism, relativism, humanism, hermeneutics and postmodernism reject the tenets of positivism (e.g. Guba & Lincoln, 2000; Lincoln & Guba, 2000). In contrast they support the existence of multiple constructed realities, value-bound research, and the belief that is neither possible nor desirable to establish time and context free generalisations and that the subjective observer, as the only source of reality, cannot be separated from what is being observed. Both positions are proposed by the purists of each paradigm to be most appropriate for scientific research with the underlying belief that these together with associated methods, are incompatible and can and should not be mixed (Johnson & Onwuegbuzie, 2004). Johnson and Onwuegbuzie highlight that the persistent quantitative v qualitative debate has been divisive with emphasis on the differences rather than potential compatibility of the two orientations and propose mixed methods as a legitimate and logical third option that draws on the strengths of both.

Similarities do exist as both methods make use of empirical observations and maximise trustworthiness of analysis and as Sechrest and Sidani recognise quantitative and qualitative approaches intend to “describe their data, construct explanatory arguments from their data, and speculate about why the outcomes they observed happened” (1995, p.78). There has been a move (i.e. post positivists) to find agreement on a number of important points of previous philosophical difference. These include acknowledgement that; what appears reasonable can vary across persons; that what we observe is affected by our background knowledge, theories and experiences; it is possible for more than one theory to fit a single set of empirical data; agreement that the future may not resemble the past and so we only obtain probabilistic evidence rather than proof and that researchers are embedded in communities and as such are affected by their attitudes, values and beliefs (for review see Johnson & Onwuegbuzie, 2004). Mixed methods, therefore, represents an approach to knowledge that encompasses the multiple viewpoints, perspectives and positions held by qualitative and quantitative purists (Johnson, Onwuegbuzie & Turner, 2007).

4.1.2 A pragmatic approach.

Pragmatism as a philosophy offers insight into how different approaches should be mixed effectively providing a practical and outcome oriented method of enquiry to help researchers’ better answer their research questions (Hoshmand, 2003). In summary pragmatism accepts more moderate versions of philosophical dualisms (e.g. rationalism vs empiricism, free will vs determinism, and subjectivism vs objectivism) based on their utility in solving problems. Pragmatists reject reductionism and the notion that culture, thoughts and beliefs can be reduced to only neurobiological processes; there is a higher regard for the reality and intrapersonal human experience in action and consequently knowledge is accepted as being both constructed and influenced by the reality of the world we experience. Differing perspectives and even conflicting theories are considered useful to gain understanding of people and the world and so pluralism and eclecticism are promoted. Provisional truths are what individuals live by in the absence of absolute truths and are obtained in recognition that current meaning and knowledge is tentative and will change over time.

Commensurate with pragmatist philosophical positions, Johnson and Turner (2003) suggest research methods are selected in line with a needs-based and contingency approach. Their fundamental principle of mixed methods states that multiple data

should be collected from different strategies, approaches and methods in a way that the consequent combination will be likely to lead to both complementary strengths and weaknesses that do not overlap, or as Denzin (1978) opines “the result will be a convergence upon the truth about some social phenomenon” (p. 14). The objective of mixed methods inquiry is the discovery of patterns through induction, the testing of theories and hypotheses through deduction and the provision of best explanations of findings through abduction.

The use of mixed methods has been identified as early as 1959, in an article by Campbell and Fiske who introduced the idea of triangulation, in which more than one method is used as part of a validation process. Denzin (1978) developed this idea further defining the triangulation methods as “the combination of methodologies in the study of the same phenomenon” (p. 291) and proposing data triangulation, investigator triangulation, theory triangulation and methodological triangulation as four distinct types. Morse (1991) provides a further bifurcation of methodological triangulation as being either simultaneous or sequential. Simultaneous triangulation describes qualitative and quantitative methods in which there is minimal interaction during the data collection stage but findings are complimentary at the interpretation stage. When study planning and design are dependent on the results of a previous approach sequential triangulation is proposed. The use of mixed methods for triangulation provides corroboration of evidence from quantitative and qualitative approaches; however the utility of these combinations also enables analysis to develop to provide richer data and the encouragement of alternative ways of thinking through attention to the contradictions and challenges that arise from the disparate data sources (see Greene, Caracelli & Graham, 1989; Rossman & Wilson, 1985).

Methods are considered to be mixed in two major ways: 1) by mixing qualitative and quantitative approaches within the research process (mixed-model); or 2) by incorporating a qualitative and quantitative phase in an overall research study (mixed-method). Mixing may occur, within a single study or a larger research project (mixed-method program) and in addition findings from the research must be either mixed or integrated at some point. In an attempt to unify previous definitions Johnson, Onwuegbuzie and Turner (2007) analysed those provided by the major proponents of mixed methods and propose mixed methods research to be:

“the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference

techniques) for the broad purposes of breadth and depth of understanding and corroboration” (p. 123).

In Johnson et al’s (2007) conceptualisation, mixed methods are positioned as a third major research paradigm in the centre of a continuum (see figure 4.2.) The continuum describes, from a mixed method perspective researchers as commencing from an identified ‘home’ (i.e. pure quantitative, pure mixed, pure qualitative) but recognises that they will, in line with a contingency theory of research (pragmatism), be likely to visit other homes when it will be of benefit to research.

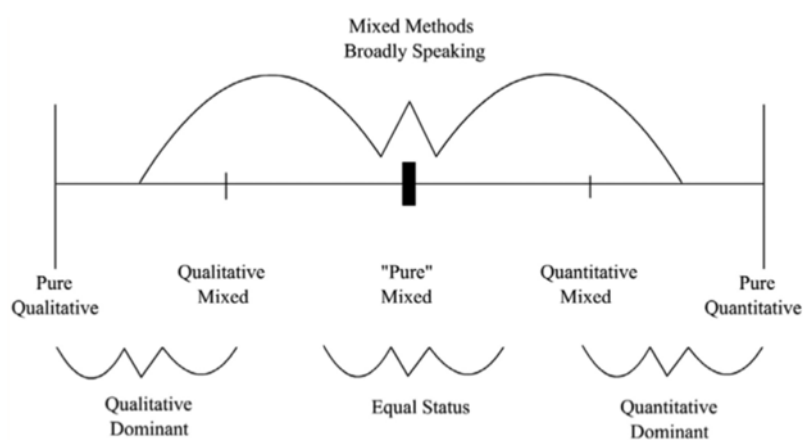


Figure 4.2 Mixed methods conceptualisation (Johnson et al., 2007)

This continuum proposes additional ‘types’ of mixed methods research as being either qualitative dominant (QUAL + quant) or quantitative dominant mixed methods research (QUANT + qual) with Johnson et al. (2007, p.124) providing definition of each:

Qualitative dominant mixed methods research is the type of mixed research in which one relies on a qualitative, constructivist-poststructuralist-critical view of the research process, while concurrently recognizing that the addition of quantitative data and approaches are likely to benefit most research projects. Quantitative dominant mixed methods research is the type of mixed research in which one relies on a quantitative, post positivist view of the research process, while concurrently recognizing that the addition of qualitative data and approaches are likely to benefit most research projects.

The mixed methods used in this thesis have been adopted in consideration of ‘pragmatist’ philosophical assumptions and claims of what knowledge is (ontology) and how we know it (epistemology). In contrast with, for example, constructivist and positivist assumptions, pragmatism is concerned with applications and solutions to problems (Patton, 1990) and an intention to understand the problem takes precedent

over the importance of methods (Creswell, 2003). Tashakkori and Teddlie (1998) reiterate the importance of focusing on the research problem in proposing pragmatism as an applicable philosophical underpinning in the use of mixed methods as a pluralistic approach to gaining knowledge of a particular problem; the problem of interest in this thesis relating to understanding performance under pressure. Creswell (2003) considered the basis for the knowledge claims provided by pragmatism and suggested that pragmatism is not aligned to any one philosophical system or reality, enabling researchers to select the methods, techniques and procedures that best meet their needs and objectives; including both qualitative and quantitative approaches to collecting and analysing data. These methods are proposed to work together to enable the best understanding of the research problem and as such the ‘truth’ is not grounded within a strict dichotomy of mind and reality independent of the mind but instead represented by what works best at that time.

The mixed method approach undertaken in this research follows a sequential strategy of inquiry (Creswell, 2003; Morse, 1991) that commences with a qualitative study exploring the performance under pressure phenomenon in depth and then is followed by quantitative methods that first look at a larger sample and then a smaller purposive sample in order to generalise findings to the competitive golfing population. It is the intention in this research to select methods that are determined by the questions to be addressed and in so doing adopts a hierarchical approach to the use of mixed methods. The absence of a universally accepted definition of ‘choking’, a reliance on self-report measures and recall of experiences together with gaps in the literature relating to individual differences, encourages investigation of an exploratory nature in order to validate previous research findings, understand different populations and to get as close as possible to the experience of interest. With that in mind, it is recognised that there is a use of mixed methods but not an integration of methodologies as defined by, for example, a framework of acknowledged methodological appropriation (Wiggins, 2011).

A positivist worldview permeates this thesis in that it attempts to establish relationships between the moderators and mechanisms of skill breakdown and the identification of generalisable interventions that overcome the effects of pressure on attention and performance. Qualitative research is considered necessary, however, to adequately understand the performance under pressure experience, from which hypotheses will be generated and tested (QUANT + qual; Johnson et al, 2007).

4.1.3 Researcher orientation.

As suggested by Filiault and Drummond (2008) the social positioning of the interviewer in qualitative research may have an impact upon elements of the research process and may include insider knowledge that can influence access to participants, the development of an interview schedule and the subsequent analysis of the interview content. In contrast, Lofland and Lofland (1995) also note that investigation that is personally meaningful can enhance the quality of research; therefore, the concerns that I bring as an interviewer to the social analysis are made known from the outset.

At 39 years of age I have been a professional golfer for 21 years having first picked up a golf club at the age of 12. At that time golf represented a very different challenge to other sports that I was involved in, with rewards that seemed more appropriate and personally meaningful. Performance in golf was my responsibility alone. There were no team members to support or rely on when things were not going well which also meant that victories, in whatever form, were solely my own. Changing assessments of success dominate my reflections of playing golf, with development and learning new skills providing satisfaction in the early stages and a reduction in handicap always a goal. Handicap then became the marker by which I judged any performance or practice session and influenced many of the maladaptive belief systems that I created (e.g. perfectionism, negative evaluation, and self-efficacy). To achieve professional status, at that time, you had to achieve a handicap of 4.0 or lower and that became my principle aim. Rather than continuing my development and becoming the best player that I could be, the status of 'professional' became a greater motivating factor. I believed that professionals did not make mistakes and so I would not tolerate any, either in practice or in competition. When mistakes did occur, it led to frustration and a reduced confidence in my abilities.

The decision to pursue a career in golf also provided its own unexpected pressures. I then felt that I 'should' win tournaments and 'should' get into the club teams, all of which influenced a period in which I feel I stopped learning and developing, as I became solely focused on outcome measures of success. Having turned professional and seemingly achieved an initial goal, I was now in an environment where peer comparison was going to determine my perceptions of competence, with many opportunities to feed a belief that I was not good enough to be playing at that level. The perception my colleagues had about me and my golf influenced many of my actions. I would be

intimidated by other players and be more concerned about affecting their game than focusing on my own. As things deteriorated, when opportunity for success in the form of a good score evaporated, I would withdraw effort and on some occasions pull out of the event. I felt it more acceptable to say that I had not tried than to be exposed to the feeling of ‘that was the best I could do’. This reduction in effort spread to training as well and I did not practice as much as I could and had no real structure or purpose to that part of my game. What had started out as an environment in which I had felt good about myself, confident and capable had become ‘torturous’ with countless situations in which I could demonstrate my inferiority. Skills that were well learnt and that I could perform with ease in practice became disjointed when I perceived pressure, to the point where I was unable on occasion to initiate a movement in the swing.

As the golf course no longer became a source of enjoyment, I began to focus more on coaching and have worked with players of all ages and abilities. I had good knowledge of the mechanics of the golf swing and would use video analysis as well as extensive feedback to ensure my clients developed their golf swings towards more efficient models. I started to notice that players would often leave a coaching session either with incomplete understanding or on some occasions more confused and certainly more uncomfortable than when they started. Subsequently their movements lacked fluidity and each poor shot was met with a need to correct and attempt a new strategy meaning that consistency was hard to achieve. As a result of this extensive playing knowledge and coaching experience, golf appears an appropriate context in which to explore the attentional and motivational processes of sportspeople performing under pressure.

4.2 Qualitative approach

The proposed methods aim to address gaps in the current literature in which performance under pressure and the ‘choking’ phenomenon has been studied through retrospective means, a reliance on memory and accurate recall of experience, thoughts and feelings. Initially this will be achieved through inductive research and qualitative analysis that makes use of aspects of talk/think aloud strategies (TA) (Ericsson & Simon, 1993) and semi structured expositional interviews. In adopting TA protocols it is hoped that the thoughts and feelings that influence the behaviours in the ‘here and now’, in closest proximity to skill execution, will be exposed. The following section details the qualitative methods of data collection and analysis used in the first study of this thesis (Chapter 5).

4.2.1 Verbal reports as data and the think aloud (TA) technique.

Difficulties in relying wholly on external observation to gain understanding of mental processes has lead researchers to question participants about their experiences, thought processes and strategies in order to yield verbal accounts for introspective analysis. This returned to favour with the emergence of cognitive theories of psychology phenomena (Ericsson & Simon, 1993). Cognitive theories of thinking are dominated by the information processing approach and representational conceptions of thinking (Newell & Simon, 1972) epitomised by Underwood, (1978, pp. 9 – 10):

The reality which we experience is quite artificial...for the world of which we are conscious is the product of a series of processes applied to sensory data...our 'immediate' contact with the world is illusory...our experiences are representations based on the processing of our private sensory experience.

Merleau-Ponty (1962) contended however, that ignoring the presentational aspects of human lives that indicate meaning is to perpetuate a variation of the 'retrospective fallacy'; of putting the researcher's conception in place of the subject's own experience. This study, therefore, considers that perspective of thought, in recognising that a golfer always thinks about the game from a point of view (Aanstoos, 1987) and in relation to their current context and situation, as opposed to all possible outcomes and options that typify computer models of thought.

Criticism of think aloud protocols exists within the literature, however, with suggestions that there are decrements to performance and explanations that appeared to be inconsistent with observed behaviours (Nisbett & Wilson, 1977). A critical assumption of protocol analysis is that in instructing participants to think aloud, verbalising their thoughts, the sequence of thoughts mediating the completion of the task is not altered. In an extensive review, Ericsson and Simon (1993) found that there was no evidence to suggest that thinking aloud altered sequences of thoughts or accuracy of performance (at levels 1 and 2, see below for definition) when compared with participants who performed tasks in silence. However increases in time taken to complete tasks were observed.

Access to verbal reports is gained by asking participants a specific question, to which they have to speak their thoughts out loud. To do this, they have to transform their comprehension of the question into retrieval cues that select the information of relevance from the vast amount of information in long-term memory (LTM). The

participant then must put that information into a sequential form that enables the production of a coherent series of verbalisations. In order to ensure that the information that the participant retrieves is not dependent on long-term memory, Ericsson and Simon (1993) propose that concurrent as opposed to retrospective verbal reports are collected, so that processing and verbal report coincide in time.

These methods will encourage verbalization of thoughts associated with the execution of golf shots and are expected to encompass aspects of, and influences on, decision making and responses to performance outcomes. Participants are asked to vocalise self-generated thoughts whilst taking part in a competitive round of golf. Ericsson and Simon (1993) make distinction between the types of verbalisation that require considerable intermediate processing prior to articulation and that which is of on-going processes. They propose three levels of verbalisation. In level 1 there are no intermediate processes as verbalisations do not have to be transformed before being verbalised by participants and so extra effort is not considered necessary to communicate thoughts. Distinction is made, however, between self-directed verbalisations, which have been found to be more natural than communication that has been directed to others.

At the second level description and clarification of thought content is provided, therefore, transformation is required of, for example, images or feelings into words. Ericsson and Simon (1993) note that such explication requires additional processing time but does not replace other processing relevant to task performance and that as a result participants may subsequently take longer to complete tasks. In the third level of verbalisation, explanation is required of thoughts, ideas, hypotheses or their motives. As such, these verbalisations are no longer a simple recoding of information present in short term memory but instead require the association of this information to that previously attended to. The verbal reports in Study 1 (Chapter 5) will be elicited in accordance with the level 2 methodologies of Ericsson and Simon. This omits the necessity of participants to provide a reason for their actions, as this would engage additional thinking, reducing the observation of the covert thought processes that generate the action.

These methods build upon the work of Nicholls and Polman (2008) who collected verbal data using think aloud protocols over six holes of golf in order to assess stress and coping strategies associated with performance. The authors promote the use of methods that are less vulnerable to distorted accounts, as is often the case when relying on memory recall. They acknowledge that golf, with minimal aerobic activity and time

between skill executions, provides a good context with which to explore thoughts that accompany sporting performance. Study 1 aims to increase ecological validity by completing recording of thoughts over a full round of golf consisting of 18 holes in order to assess temporal aspects of attentional and motivational thought content. In addition, the pressure environment will be created by associated factors of competing in tournament golf with each player free to implement their own goal systems on performance rather than setting prescribed standards of attainment and financial reward as utilised by Nicholls et al. (2008).

4.2.2 Semi-structured research interview.

Following completion of their competitive round of golf and record of thoughts aloud, participants will take part in a semi-structured interview to explore in greater depth their perceptions of performing under pressure and to clarify any issues of note observed by during the round. In addition, this enquiry will help identify factors important to the development of appropriate motivational climate conditions in Study 3, a consideration supported by King (1994) in the proposal of guidelines in which these interviews might be used.

The principle aim of the interview is to encourage participants to talk freely and openly about the performance experience that they have just been involved in and about situations in which they may have excelled or suffered performance decrements in the past. Powney and Watts (1987) suggest that contrary to the structured/unstructured distinction commonly used (Robson, 2002) a respondent/informant interview typology may be more appropriate, as with the former the necessary control that the interviewer maintains throughout the process in itself ensures a structure. The respondent interview intends to hold the interviewer's agenda as the guiding principle and is more closely aligned with the approach taken in Study 1, whereas the informant or non-directive interview has a more unstructured feel with a primary concern on the interviewees' perceptions within a particular situation or context.

The interview schedule was developed with consideration of the key factors associated with the 'choking' experience identified by Hill et al. (2009 and 2010b) but that also sought interest in all performance experiences under pressure (i.e. under performance and optimal performance). A set of items was created within subheadings of: antecedents of 'choking' under pressure, mechanisms of 'choking' under pressure, consequences of 'choking', moderators of 'choking' and interventions used. Although

constructed in a sequential format there was flexibility for change and deeper exploration of certain responses of interest with probes and prompts predetermined to encourage more complete accounts of any given experience (Robson, 2002). In addition to these written cues my experience with the interview process ensured good use of body language and non-verbal actions to elicit more information from participants and this together with my familiarity with golf terminology and credibility within the game assisted in rapport building in the early exchanges of the interview.

There was no time limit allocated for the interview, however, consideration was given to the length of participation each golfer had to give in total following the think aloud phase. To ensure reasonable management of time there was a greater structure to opening and concluding comments to clarify the intentions of the interview and to debrief and discuss any participant concerns upon completion.

4.2.3 Thematic analysis.

Braun and Clarke (2006) suggest that thematic analysis is the foundational method for qualitative analysis and involves core skills applicable to other forms. Although many employ thematic coding as a tool (Boyatzis, 1998; Ryan & Bernard, 2000) Braun and Clarke argue that it is a method in its own right. In this research, thematic analysis is used for its flexibility and freedom from specific theoretical and epistemological positions and so is preferred over alternatives such as Interpretative Phenomenological Analysis (IPA; e.g. Smith & Osborn, 2003), nor is it the primary goal of the analysis to be used to generate a theory of the ‘choking’ phenomena in which a grounded theory analysis would be more appropriate (McLeod, 2001). Braun and Clarke further support thematic analysis’ compatibility with essentialist and constructive paradigms and highlight the potential the method has in yielding rich, detailed accounts of data that may not be available from alternative methods (e.g. protocol analysis; Ericsson & Simon, 1993).

This thesis will utilise the terminology outlined by Braun and Clarke (2006) who make distinction between the *Data Corpus*, *Data Set*, *Data Item* and *Data Extract*. In referring to the *data corpus* all the data collected for the research is inclusive. A *data set* may consist of all the think aloud protocols or interview responses from a particular player or instead be identified by a particular analytic interest in a specific subject area within the data. In this case the data set consists of all instances in the data corpus where that topic is referred; for example, motivational self-talk prior to the first tee shot. The

data item represents each individual piece of data collected to make up the data set and data corpus and finally the *data extract* refers to an individually coded piece of data, which has been identified and extracted from the data item.

Essentially thematic analysis enables the identification, analysis and reporting of patterns or themes within the data, organising and describing the data set in rich detail with the ability to interpret various aspects of the ‘choking’ and performance under pressure experience. Whilst there is flexibility in how it is used Braun and Clarke (2006) offer clear guidelines on ‘how to do it’ to ensure that analysis is theoretically and methodologically sound. In addition they address concerns over qualitative psychologists’ lack of clarity regarding what they are doing (Attride-Stirling, 2001) and the more general critique of the approach that ‘anything goes’ (Antaki, Billig, Edwards & Potter, 2002). With this in mind the theoretical position of the thematic analysis is made clear in the method section of Study 1 together with decisions on what constitutes a theme, whether analysis is inductive or deductive and the level at which themes are to be identified in order to elucidate repeated patterns of meaning (Braun & Clarke, 2006).

The analysis will be carried out as encouraged by Braun and Clarke (2006) and negotiate six phases in moving back and forward between data corpus, sets, items and extracts. The initial phase focuses on becoming familiar with the data and becoming aware of the depth and breadth of the content through repeated reading. The need to transcribe the think aloud and interview recordings and generate verbatim accounts represents an enforced opportunity to start this familiarisation (Riessman, 1993) and for some this process is considered a key phase of analysis (Bird, 2005). Further reading then allows important checks to be made between transcription and original audio recordings. Writing is an integral part of the analysis as a whole and will commence at this early stage with the recording of notes and early ideas on potential themes.

Having made note of early interest areas and ideas, initial codes are produced from the data in phase 2. These codes represent a specific feature of the data that may be semantic or latent in content, are of interest to the analyst and can be assessed in a meaningful way to understand the performance under pressure experience. Coding will be applied to the entire data sets with equal attention given to each and influenced by the research questions when being either theory or data driven. Surrounding data will be retained to maintain the context of coding and individual extracts may be coded into multiple themes. These themes are formed in phase 3 when all the data has been coded and are considered for their inclusion in proposed overarching themes. From visual representations of what become candidate themes and sub themes relationships can be

considered by the researcher and the significance of individual themes become clearer (Braun & Clarke, 2006).

In phase 4 the candidate themes are reviewed as it is often the case that there are not enough data to support them, that some themes may overlap and subsequently collapse into each other and that some themes may require subdivision to form two distinct themes. This phase comprises two levels of review. First, at the level of the coded extracts, where upon re-reading each from across the themes, they are considered for their inclusion in a coherent pattern. If this is not the case then new themes might be created or those themes that do not appear to fit may be re-housed in another, already existing theme. At the second level the individual themes are considered for their validity in relation to the entire data set and to ensure that they accurately reflect the meanings that are evident in the data set as a whole. Rereading of the entire data set is then encouraged at this stage to first confirm that the themes work in relation to the data set, and second, to pick up on any data that may have been previously missed and can be coded and included in themes. This iterative process continues until a satisfactory thematic map is formed and as Braun and Clarke suggest, when refinements are no longer adding anything substantial.

Once the thematic map is established the themes that will be presented are defined and refined in phase 5; my interest in each is made clear and the essence of what the theme is about is conveyed by way of analysis. Braun and Clarke (2006) suggest that by the end of this phase the analyst should be able to describe the scope and content of a theme within a couple of sentences and consider the concise names that each theme will be given in the final analysis to best inform the reader of what each is about. The story of the data is then told in the final phase with justification and validation of the analysis clearly communicated to the reader in a concise, coherent and logical manner both within and across themes. The analysis goes beyond a description of the data and through the selection of appropriate extracts that bring to life the story that the data tell, a robust argument in relation to research questions will be made.

4.3 Quantitative approach

Qualitative methods have been selected in Study 1 for their utility in addressing the first three objectives of this research: 1) to gain greater understanding of the cognitive experiences of golfers' performing under pressure; 2) to get as close to the performance experience as possible and; 3) to enhance current operational definitions of performance

under pressure in sport. Quantitative methods are selected in the design of studies two and three of this thesis also in support of objective 2) but to also address objective 4) to provide knowledge of the role that achievement goals play in directing attentional processes and 5) to propose developmentally appropriate conditions that encourage adaptive attentional focus. The following section details the measures of achievement motivation and reinvestment used in Study 2 and Study 3.

4.3.1 Measuring dispositional reinvestment.

The suggestion that an individual has a propensity to reinvest, originated from Masters, Polman and Hammond (1993), and their assertion that it may be a factor subject to individual differences, and a characteristic of personality. They subsequently developed a Reinvestment Scale that consisted of 20 items derived from factor analysis procedures. These items were taken from previously validated scales that were tapping elements of inward focus of attention to the mechanics of one's movements, specifically; 12 items from the Self-Consciousness Scale (Feignstein, Scheier, & Buss, 1975), 7 items from the Emotional Control Questionnaire (Roger & Nesshover, 1987), and 1 item from the Cognitive Failures Questionnaire (Broadbent, Cooper, Fitzgerald & Parkes, 1982). High scores on this original scale were associated with a disruption of motor performance under conditions that promoted anxiety. There was some support for the scale across sports including golf (Maxwell, Masters & Poolton, 2006) providing initial confidence in the predictive validity of the Reinvestment Scale; however it was evident that it suffered from a number of limitations. Jackson et al. (2006) highlighted the threat to face validity in that the scale did not directly specify movement in suggesting that it 'does not attempt to measure the process of reinvestment directly but instead aims to bring together conceptually linked items that predict this process' (p.65). In response, Masters, Eves and Maxwell (2005) developed a movement specific version, modifying all 20 items from the original scale to relate to movement. For example 'I am aware of the way my mind works when I work through a problem' was altered to 'I am aware of the way my mind and body work when I am carrying out a movement'. Additional questions that were considered relevant to movement disruption were included (n=6) and others eliminated as they were answered uni-directionally with a response frequency greater than 80%. Items were also removed as one factor consisted of a cluster of reverse coded items and as a result of coefficient loadings.

The subsequent Movement Specific Reinvestment Scale (MSRS) yielded two movement relevant factors; movement self-consciousness and conscious motor

processing. The self-reported ratings for each question are typically provided on a six-point 'Likert' type scale ranging from 'strongly disagree' to 'strongly agree'. Participants are informed that all the questions are related to their movements and are asked to circle the answer that best describes how they feel. In consultation with the first author of the MSRS, items were altered for golf specificity, for example 'I reflect about my movement a lot' was altered to 'I reflect about my golf swing a lot' within the conscious motor processing subscale and 'I am concerned about my style of moving' was altered to 'I am concerned about my style of golf swing' in the movement self-consciousness subscale (see Table 4.1).

Table 4.1 The Movement Specific Reinvestment Scale adapted for golfers (MSRS)

Conscious Motor Processing
I am always trying to think about my movements when I am swinging the golf club
I reflect about my golf swing a lot
I am always trying to figure out why my golf swing has failed
I am aware of the way my body works when I am swinging the golf club
I rarely forget the times when my golf swing has failed me
Movement Self-Consciousness
I am concerned about my style of golf swing
I am self-conscious about the way I look when I am swinging the golf club
If I see my reflection, I will examine my golf swing
I sometimes have the feeling that I am watching myself swing the golf club
I am concerned about what people think about me when I am swinging the golf club

4.3.2 Measuring reinvestment through cortical efficiency.

A number of non-invasive recording methods have been used in the last 10 years to measure neural activity with methods based on neuroimaging and neurophysiology. The former include functional magnetic resonance imaging (fMRI) and near-infrared spectroscopy (NIRS) with neurophysiological methods including magnetoencephalography (MEG), transcranial magnetic stimulation (TMS) and electroencephalography (EEG). All of these methods enable greater understanding of human cognitive processing related to visual auditory, somatosensory, gustatory and olfactory stimulation and human motor processing, relevant to sporting activity and relating to preparation, execution and imagining behaviour (Nakata, Yoshie, Miura & Kudo, 2010).

The basic principles of electroencephalography (EEG) hold that the electrical activity of neurons in the brain produces currents that reach the scalp. Through non-invasive means the voltage differences of these scalp potentials can be measured, however, these potentials derive from both cerebral sources and non-cerebral artefacts that need to be accounted for (Thompson, Steffert, Ros, Leach & Gruzelier, 2008). The EEG signal is then transmitted from the electrodes on the scalp to a differential amplifier in order to amplify the microscopic potentials that would have been substantially weakened in their passage through the skull. This signal is continuously sampled at a rate of 256 Hz and above to provide a high temporal resolution and an analogue band pass filter with a lower cut off of 0.5 Hz and a higher cut off of 50Hz used to filter the raw signal. These cut offs are not considered problematic in the sports sciences as the low to mid-range frequencies are of greatest interest (Thompson et al., 2008).

A major challenge to obtaining 'clean' data on cerebral activity from EEG is the reduction of physiological and environmental artefacts. Although many skills associated with golf require minimal head movement, physiological artefacts are particularly problematic when an individual is in motion. Others include; muscle, skin, electrode movement, eye movement, ECG, respiration, tongue movement and electrical interference (Thompson et al., 2008). The skill of putting will be used to minimise physical movement and steps will be taken to address other issues as outlined by Thompson et al. These include: gluing electrodes to the scalp to restrict movement and identifying the distinctive raw signal morphology and amplitude patterns synonymous with for example, eye movement and electromyographic (EMG) artefact.

The EEG signal is 'wave-like' in appearance and in simple terms, reflects the rhythmic activity of underlying synaptic processes that themselves represent the synchronised activity of large neuronal assemblies (Thompson et al., 2008). Functionally specific cortical regions produce different rhythms observed as a composite EEG signal and this signal is then decomposed through Fourier spectral analysis into its constituent frequency bands and the amplitude of each band is computed. This frequency analysis, also termed power spectral analysis, aims to study EEG in several non-overlapping frequency bands in comparison with established criterion such as, optimal performance (e.g. increased alpha at T3, Thompson et al., 2008).

Whilst there is not a global standardisation of the frequencies of each bandwidth, the labels used are universal (Thompson, Thompson, Thompson, Fallahpur & Linden, 2011) and are listed in Table 4.2 together with the bandwidths assigned in Study 3. An increase in spectral power at a particular frequency reflects an increase in the number of

synchronously active neurons entrained within that particular frequency band (Heisz & McIntosh, 2013). Spectral power analysis was adopted in the present research rather than an alternative approach of studying event related potentials (ERP's). Where spectral power analysis quantifies the relative contribution of a particular frequency to the EEG signal ERP's capture the synchronous neural activity in the EEG that is phase locked to the cortical response to an external stimulus.

Table 4.2 Frequency bandwidth parameters adopted in Study 3

Frequency Bandwidth	Hz
Delta	1.5 – 4
Theta	4 – 8
Alpha	8 – 12
Sensorimotor rhythm (SMR)	12 – 15
Beta1	15 – 18
Beta2	18 – 25
Alpha1	8 – 10
Alpha2	10 – 12
Gamma	20 – 45

Once the EEG has been quantified, absolute and relative power transformations can be made. Absolute power, recorded in microvolts squared is the actual power in the participant's EEG database whereas, relative power is the percentage of power in any band compared with the total power in the participants' EEG database. For example relative alpha is the percentage of alpha of the combined sum of delta, theta, alpha, beta and gamma. Inter-hemispheric and intra-hemispheric coherence measures the correlation of the EEG signal between left and right hemispheres in the former or same hemispheres in the latter and thus represents the cross-correlation of oscillations within a particular frequency band across a pair of electrodes.

Faster waves such as beta are associated with mental activity and alertness whereas slower waves such as delta are more typically related to sleep. Beta waves are of interest to the research in this thesis as is alpha activity (i.e. 8 – 12Hz), which has been linked to relaxed focus or mental readiness and inversely related to activation. Further specificity has been noted in the alpha band with the recommendation that lower (8-10Hz) and higher (10-12Hz) components be examined separately (e.g. Klimesch, 1999). The low alpha bandwidth has been found to be more sensitive to changes in general arousal whilst high alpha is more indicative of task specific attentional processes of

particular interest to this research. The coherence analysis conducted in Study 3 was applied separately to low and high alpha and low (15 – 18Hz) and high (18 – 25Hz) beta, as Nunez (1995) suggests that these frequencies reflect global cortico-cortical communication than higher frequency bandwidths that are more characteristic of regional processing and more localised activation of the cortex.

4.3.3 Measuring achievement goal orientations.

Achievement motivation has been assessed in this thesis through achievement goal orientation and achievement goal involvement in Study 2 (Chapter 6) and through additional manipulation of the motivational climate in Study 3 (Chapter 7). Orientation represents the individuals personal theories of achievement and as such is considered an individual difference variable. It is predicted that an individual will act in either a task (mastery) or ego (performance) manner in achievement situations as a consequence of these self-schemas and that these predispositions are relatively enduring (Roberts & Kristiansen, 2012). The Perception of Success Questionnaire (Roberts, Treasure & Balague, 1998) measures the two factors of task and ego orientation through a 12-item inventory that has demonstrated strong psychometric properties (internal consistencies, retest reliability, concurrent and construct validity) across populations and is used to assess golfers' dispositional achievement motivation in the second study of this thesis.

4.3.4 Measuring achievement goal involvement.

The measurement of goal involvement by contrast has been a challenging task with Roberts (2012) outlining three ways that this has traditionally been attempted. Firstly by rewording the stems of existing goal orientation measures (e.g. Hall & Kerr, 1997; Williams, 1998), alternatively the use of single-item measures that asks participants to report whether they are focused on self-referenced measures of performance or in beating others in competition (e.g. Harwood & Swain, 1998). A retrospective reflection using video replays of an event as employed by Smith and Harwood (2001) represents a third way that Roberts suggests better captures the fluid and dynamic nature of task and ego involvement. Typically research infers goal involvement from goal orientation and/or measurement of the motivational climate under the assumption that the state of goal involvement matches this assessment. Whilst there is evidence to support this as a reasonable strategy, there remains a need to get closer to the performance experience to assess goal states in the 'here and now' whilst recognising the challenge of frequent

assessment during performance without changing the nature of goal involvement in the process. Duda, (2001) cautions that asking an athlete to assess their goal involvement may increase self-awareness and consequently increase ego involvement, however, it is expected that the qualitative methods employed in Study 1(Chapter 5) will enable uncontaminated access to these goal states.

Achievement goal questionnaires have gone through a number of iterations in order to get closer to the conceptual foundation that posits an achievement goal as ‘an aim that one is committed to that serves as a guide for future behaviour’ (Elliot & Murayama, 2008, p.614). In the original AGQ (Elliot & McGregor, 2001) it was felt that some of the item prefixes highlighted a value or a concern rather than a goal (e.g. ‘It is important for me to do better than other students’, ‘I worry that I may not learn all that I possibly can in this class’. In addition Elliot and Murayama highlighted the need to separate the underlying reason for action from this aim in defining goals (e.g. ‘my fear of performing poorly in this class is what often motivates me’) and so this was addressed in the revised version (AGQ-R; Elliot & Murayama, 2008) by removing the motive content. Additional changes looked to better clarify the unique content of mastery and performance goals and emphasise the normative component of performance goals and particularly performance avoidance goals that were not considered to be specific in this regard in the original achievement goal questionnaire.

Research using the 2 x 2 model of achievement goals had initially been focused exclusively within the academic domain before attention turned to alternative achievement contexts. In response to the acknowledgement that mastery goals in particular are a fundamental component of interventions to enhance motivation in sport and physical exercise (Biddle, 2001; Treasure, 2001), Conroy, Elliot and Hofer (2003) developed the achievement goals questionnaire for sport (AGQ-S), however this was based on an adaptation of the original AGQ (Elliot & McGregor, 2001). The original items from the AGQ were adapted directly to the sport context to describe different ways that athletes could strive for competence and exhibited strong psychometric properties including factorial validity, temporal stability and external validity. The measurements of achievement goals in this thesis were obtained from an adaptation of the AGQ-R for reasons of conceptual clarity outlined above, with stems altered for specificity to golf. Table 4.3 provides examples of items from the factors of the AGQ, AGQ-S, AGQ-R and the adapted AGQ-golf used in Study 2.

Table 4.3 Example items across 4 factors from measures of achievement goals

<i>AGQ</i>	<i>AGQ-S</i>	<i>AGQ-R</i>	<i>AGQ-golf</i>
<i>Mastery-approach</i>			
I want to learn as much as possible from this class	It is important for me to master all aspects of my performance	My goal is to learn as much as possible	My goal is to play as well as I possibly can
<i>Mastery-avoidance</i>			
I worry that I may not learn all that I possibly could in this class	I worry that I may not perform as well as I possibly can	My aim is to avoid learning less than I possibly could	My aim is to avoid playing as badly as I could
<i>Performance-approach</i>			
It is important for me to do well compared to others in this class	It is important for me to perform better than others	I am striving to do well compared to other students	I am striving to do well compared with other players
<i>Performance-avoidance</i>			
I just want to avoid doing poorly in this class	I just want to avoid performing worse than others	My aim is to avoid doing worse than other students	My aim is to avoid playing worse than other players

4.3.5 Methods of manipulation.

A principle objective in the design of the three studies in this thesis is to get closer to the observation of golf performance under pressure. It is therefore imperative that there is confidence that pressure can be perceived in each study and acknowledgement has been made of concerns raised by DeCaro, Thomas, Albert and Beilock, (2011) regarding manipulations of the pressure environment in previous research (e.g. Gray, 2004; Gucciardi & Dimmock, 2008; Otten, 2009). Competitive pressure was expected to be experienced in Study 1 and Study 2 as data was collected from participants before, during and after competitive play. In Study 3, the pressure environment was manipulated in the laboratory setting with attention given to the multifaceted nature of high-pressure situations highlighted by DeCaro et al. that can induce monitoring and outcome pressures and that may be evident simultaneously. Consequently, participants in Study 3 were made aware that they were being observed and that their performances were being recorded and would be analysed and evaluated by experts in biomechanics, psychology and professional golf. Such manipulation is considered to more accurately reflect the multifaceted pressure environment and to evoke perceptions of pressure that have been previously associated with self-focused attention and distraction.

The motivational climate has been posited as potentially providing the greatest utility of achievement goal interventions in sport contexts (Harwood et al., 2008) and achievement goal involvement (situational measurement of achievement motives) has been consistently inferred through perceptions of the motivational climate. In Study 3 (Chapter 7) participants are exposed to three motivational climate conditions that reflect the 3 x 2 achievement goal framework (Elliot, Murayama & Pekrun, 2011). Whilst structures have been proposed to promote mastery and performance climates (e.g. TARGET, Ames, 1992a), these have been criticised for being inconsistently applied and lacking validity for each component (e.g. Braithwaite et al., 2011). Conditions are therefore designed to promote the adoption of task based, self-based and other-based goals.

Manipulation of the mastery climate, defined by task-based goal adoption, was achieved by asking participants to feedback on how competently they executed movements assessed against criteria they provided in advance. A self-based goal climate was manipulated by challenging participants to improve their performance, defined by number of putts holed in each of the trials and finally the other-based goal climate was created with the use of a leader board consisting of previous participant performance and instruction to finish as high on the leader board as possible. At the time of data collection there was not an achievement goal measure that assesses the 3 x 2 framework in sport (Mascaret, Elliot & Cury, 2015) and so participants were given the adapted version of the 3 x 2 AGQ (Eliot et al., 2011) after they completed trials in each condition. This was to ascertain the extent to which the climate manipulation had been perceived in self, task or other goal based terms.

4.4. Chapter summary

This chapter has detailed the methods adopted in each of the three studies contained within this thesis that were designed to advance knowledge of how achievement motivation influences attentional processes during performance under pressure. A pragmatist philosophical position has been taken and debated to provide a rationale for the use of a mixed method program in this thesis and such methods are posited to lead to the best understanding of the research problem. A sequential strategy of enquiry was employed that first utilised qualitative methods to explore cognitions during performance under pressure before quantitative methods more explicitly examined the relationships between achievement motivation, attention and performance outcomes in golfers.

5. STUDY 1: EXPLORING DYNAMIC MOTIVATIONAL AND ATTENTIONAL COGNITIONS IN GOLFERS PERFORMING UNDER PRESSURE

5.1 Chapter overview

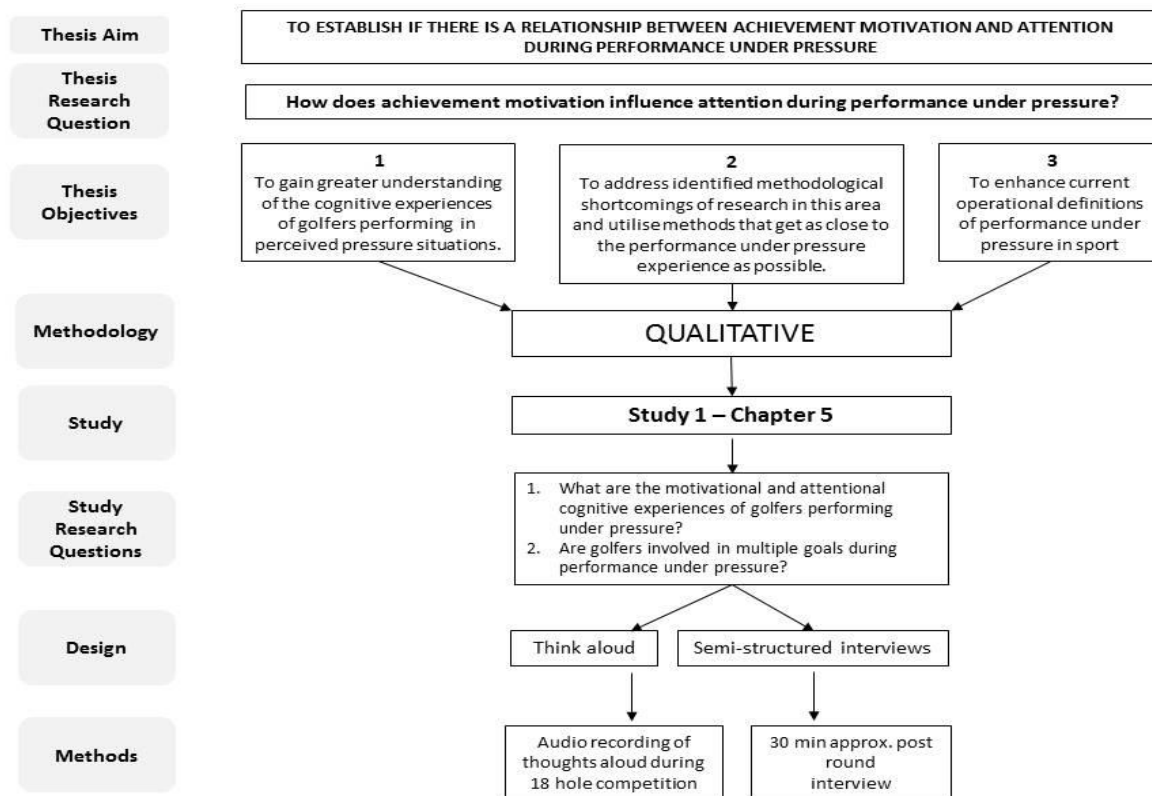


Figure 5.1 Diagram representing how Study 1 addresses thesis aim, question and objectives

This chapter reports the first study in this thesis that has utilised qualitative methods in order to gain access to the cognitive experience of golfers’ performing under pressure. The study has been designed as an exploratory foundation with which to address the main thesis research question of: how do achievement goals influence attentional processes during performance under pressure? and to specifically meet the first three objectives of the thesis:

1. To gain greater understanding of the cognitive experiences of golfers performing in perceived pressure situations.
2. To address identified methodological shortcomings of research in this area and utilise methods that get as close to the performance under pressure experience as possible.

3. To enhance current operational definitions of performance under pressure in sport.

In addition this study addresses two specific research questions:

1. What are the motivational and attentional cognitive experiences of golfers performing under pressure?
2. Are golfers involved in multiple goals during performance under pressure?

The review of literature into performance under pressure and of the mechanisms that currently have received greatest empirical support has been reported in Chapters 2 and 3 and has highlighted a need to gain greater understanding of the temporal psychological experience of golfers' performing under pressure. The first study in this thesis reported in this chapter, utilises qualitative methods to meet these objectives and to specifically provide enhanced description of the performance under pressure experience of golfers to enable hypothesis testing in subsequent studies.

5.2 Introduction

The extant literature proposes relatively consistent findings from experimental investigation into the underlying mechanisms of the 'choking' phenomenon (Gucciardi, Longbottom, Jackson & Dimmock, 2010). There is support for both distraction and self-focus theories in situations that place differing demands on working memory but as Beilock, Jellison, Rydell, McConnell and Carr (2006) suggest, the control processes athletes use to carry out tasks appear to influence the specific mechanisms that contribute to skill breakdown and sub-optimal performance under pressure (see Chapter 2 for review). Buszard, Farrow and Masters (2013) further caution against the oversimplification of dichotomous explanations of how novices and elites are considered to 'choke' under pressure and cite recent research that may explain the influence of distraction and self-focus in conscious processing of elite performers.

The dominant experimental approach to the research provides a threat to ecological validity with 'choking' observed through artificial manipulation of many of the moderators believed to influence the decrement in performance (Hill et al., 2010a). These include Self-Consciousness (Liao & Masters, 2002; Poolton, Maxwell & Masters, 2004; Wang, Marchant & Gibbs, 2004), Dispositional Reinvestment (Jackson, Ashford, & Nosworthy, 2006; Kinrade, Jackson & Ashford, 2010; Poolton, Maxwell, & Masters, 2004), Anxiety and Self Confidence (Baumeister & Showers, 1986; Wilson,

Smith & Holmes, 2007; Wilson, 2008; Oudejans & Pijpers, 2010), Skill Level and Task Properties (Beilock & Carr, 2001; Gray, 2004), Presence of an Audience (Wallace, Baumeister, & Vohs, 2005), Stereotype Threat (Beilock & McConel, 2004; Spencer, Steele, & Quinn, 1999; Stone, Lynch, Sjomeling & Darley, 1999) and Coping Strategies (Jordet, 2009; Wang et al., 2004) all of which as Gucciardi and Dimmock (2008) contest, are unlikely to represent real life levels of perceived pressure as experienced in the sport setting.

Despite attempts to promote research that adheres to a universal ‘choking’ definition adequately representing the full experience, studies that cite elite ‘choking’ episodes differ in the extent to which performance levels have to decrease in order for the phenomena to have been evident (e.g. Clark, 2002a; 2002b; 2007; Wells & Skowronski, 2012). Buszard et al. (2013) suggest, however, that study of performance outcomes under pressure should not separate ‘choking’ from other levels of performance decrement for two important reasons. First, current attempts to define the severity of underperformance are confusing and second, the mechanisms that underpinning various levels underperformance are anticipated to be the same.

In addition assumptions are made as to the situations that are most likely to produce performance decrement and therefore, warrant observation. In elite golf these are typically suggested to involve those players who are in a position to win and in the final round of a competition, with pressure reflected by increases in score (Clark, 2002a; Wells & Skowronski, 2012). Little acknowledgement is made, however, of the subjective experiences of pressure for all players in the field that are not only competing for victory but for others who, for example, need to make the halfway cut in order to receive any prize money, or accumulate ranking points to secure future opportunities. Wells and Skowronski continue the supposition synonymous with professional sport by suggesting “This, of course is because pressure should be greatest for those in a position to win a tournament” and offer the consequent financial rewards and security as justification (p.176).

There is a need, therefore, to get closer to the performance experience to better understand the temporal perceptions of the competitive environment that determine pressure for golfers of differing ability. If we recognise that pressure is uniquely constructed from attention to maladaptive patterns of thought and perceptions of the salient performance demands (Gardner & Moore, 2007) then we must gain a greater knowledge of what these demands are and to which external stimuli sportspeople of differing abilities attend, in order to more closely define pressure along the development

pathway. With this knowledge we will be more able to recognise both a ‘choke’ experience and ‘clutch’ performance in sportspeople who are working towards equally valued goals and objectives as those of winning a tournament and as a consequence able to provide apposite psychological intervention across skill levels.

With regard to the importance of goal striving, Chapter 3 highlighted the debate over the mutual exclusivity of achievement goals at the situational level (goal involvement). Goal orientations are considered orthogonal within Achievement Goal Theory (e.g. Elliot 2005) meaning that a number of ‘goal orientation profiles’ are possible. Achievement goals, in contrast, are seen as dynamic ‘states’ and alter in accordance with athlete perceptions as they interact with the sporting environment and the achievement situation. This position has been challenged by parallel processing models of information processing (Harwood & Hardy, 2001) and findings from the education domain that has identified the simultaneous pursuit of goals (e.g. Barron & Harackiewicz, 2001) and so more research is needed specifically in the sport domain to understand the nature of achievement goal adoption. The current theoretical position therefore, suggests that a golfers’ goal involvement can be positioned along a continuum from task (mastery) to ego (performance) involvement; as they process information from the sporting context and attend to cues created by the motivational climate, their goal state can alter moment to moment. Assessment of achievement goal involvement, however, has been typically made before competition and as such may be capturing intentions, or retrospectively (e.g. Harwood & Swain, 1998; Smith & Harwood, 2001) which are susceptible to issues of reliability and recall.

The first study in this thesis seeks greater understanding of how motivational and attentional processes relate, to impact performance during competition and under perceptions of pressure. The review of literature in Chapters 1, 2 and 3 provided a rationale for the exploration of the achievement goal and attention relationship. Whilst motivation appears a central component of explanations of skill breakdown and self-focused attention, it is acknowledged to not be directly observable and instead inferred through behavioural indices including attention (Keegan et al. 2010). Conscious motor processing and movement self-consciousness (sub-dimensions of the Movement Specific Reinvestment Scale, Masters et al. 2005) share defining normative and self-referenced characteristics with Achievement Goals Theories (Elliot & McGregor, 2001; Elliot et al. 2011). Where conscious motor processing suggests an inward or absolute referent, movement self-consciousness suggests an awareness of others or at least concern with the presentation of self. There currently appears to be no known research

investigating the proposed achievement goal – attention relationship, therefore Study 1 represents warranted exploration in this area. In addition, Study 1 further acknowledges the request of Duda (2001) to measure goal involvement closer to the achievement situation and to both build on the methods of Smith and Harwood (2001) and the more common research practice of assuming goal involvement states from measures of orientation and perceptions of the motivational climate (Roberts, 2012).

Nicholls and Polman (2008) highlight challenges to the research methods used to assess stress and coping that are commensurate with those in the extant ‘choking’ and performance under pressure literature. Fundamentally these limitations centre on the assumption that people are capable of accurately recounting their performance experiences without retrospective bias and distortions influenced by their subsequent knowledge of outcomes (Brewer, Van Raalte, Linder & Van Raalte, 1991). Given these concerns and the posited role of cognition in mechanisms that underlie successful skill execution and skill breakdown (e.g. Masters and Maxwell, 2008), methods that get closer to the performance experience and access to the thoughts of the performer are required.

This protocol requires participants to verbalise thoughts that would normally be silent and has enabled researchers to investigate cognitive processing strategies involved in for example, problem solving, decision making, reasoning and judgement tasks (e.g. Lucas & Ball, 2005). Through concurrent think aloud reports an accurate and comprehensive account of the contents of short-term memory can be accessed with the suggestion that whatever is consciously attended to by the participant is also verbalisable (Ericsson & Simon, 1993; Van den Haak, de Jong & Schellens, 2003). A move to verbalisations concurrent with task completion or skill execution over retrospective accounts was supported by findings of several social psychology experiments in which participants provided explanations inconsistent with observed behaviours (Nisbett & Wilson, 1977). Ericsson (2006) suggests that protocol analysis and the collection of verbal reports can aide understanding of expert thought as there is debate regarding the extent to which they are able to explain the nature and structure of their superior performance. The immediacy of verbal reports has been further proposed by Ericsson to address long-held concerns over reactivity, introspection and the belief that the generation of reports will alter the cognitive processes.

Not all verbal reports obtained through research satisfy the constrained conditions necessary for valid, non-reactive verbalisations of thinking that embody protocol

analysis as proposed by Ericsson and Simon (1993). Violations of the methodology include instructions to give more information than that which is contained within the specified thought sequences as in Hars and Calmel's observation of elite gymnastics performance (2007). In their attempt to gain an in-depth understanding of how gymnasts self-regulate their learning, Hars and Calmel describe the use of a think aloud procedure in which participants were invited to think aloud as they viewed a selected video sequence of their own performance. In addition, however, they were told that they could stop the videotape at any time they considered actions to be meaningful so that they could take time to explain their thinking. Ram and McCullagh (2003) describe an 'explanatory think aloud' procedure to explore the cognitive processes that underlie self-modelling. In their study participants were asked to verbalise what they noticed and what they felt when watching videos of either them playing volleyball or others performing unrelated skills. In contrast think aloud techniques have been used in sport and exercise psychology research that encourages concurrent thoughts without explanation. For example Darker and French (2009) sought understanding of problems associated with the completion of the theory of planned behaviour questionnaire in relation to walking behaviour and Nicholls and Polman (2008) explored the coping strategies used to meet acute stress in golf.

Although think aloud and verbal report techniques have been used in sport psychology research, the study by Nicholls and Polman (2008) represents the only known use of this method in the golf domain. The authors' preference for think aloud reflected the need to minimise the recall period and to get close to understanding the coping strategies used during performances. Participants were asked to verbalise their thoughts over a six-hole period, which was determined through a pilot study to provide sufficient data and not be too demanding. In addition they were to talk continuously throughout, only pausing when initiating the movement of the golf club in the backswing, with resumption required as soon as the golf swing was completed. Attempts were made to recreate the competitive experience by inducing stressors in the form of financial reward, however, these were incentives based on success measures relating to a prescribed goal or target score rather than normative reference and comparison with others, which would have more closely represented the competitive golf experience.

The pragmatic approach taken in this thesis to explore the motivational and attentional influences on performance under pressure allow for "diverse approaches, and the valuing of both objective and subjective knowledge" (Creswell & Plano Clarke, 2011, p.43). Criticisms of pragmatism that suggest that qualitative methods are merely

incorporated for their utility within a positivist framework are well established (e.g. Denzin, 1978; Lincoln & Guba 2000). The belief that there can be no truly mixed method when one method is used to service another (Coleman & Dabbs, 2007), however, fails to recognise the principle methodological motivation that has influenced the studies within this thesis that holds the research question of paramount significance above metaphysical concerns relating to ontology and epistemology. Ontological and epistemological positions have been stated in Chapter 4 and the qualitative approach taken in this study compliments these principle worldviews and looks to obtain greater understanding of the experiences of a specific sporting population in a unique context, and to build on extant theory from which appropriate interventions can be established (Neil, Mellalieu & Hanton, 2009).

Despite an enhanced appreciation of ‘choking’ under pressure Mesagno and Hill (2013b) concede that there remains a lack of detailed understanding and consensus of the mechanisms and moderators that underlie the phenomenon. The main thesis research question and first three objectives have been outlined at the beginning of this chapter and the present study has been designed to address these through an exploratory research question that seeks to understand golfers’ motivational and attentional cognitive experiences when performing under pressure. In particular focus is given to the role of achievement motivation in the performance experience as this has been proposed in the findings of Hill et al. (2009) to be an explanation of performance differences. Creswell (2003) acknowledges that qualitative interviews are beneficial in adding to this knowledge through the identification of themes and patterns from the participant perspective and for developing an analytic schema for the phenomena, however, the methods used in the present study look to address the perceived over-reporting of distraction by elite golfers in retrospective accounts (Hill et al., 2010b). By recording the thoughts of golfers during their competitive play, it is anticipated that a greater understanding will be gained, of the cognitive processes that are influenced by motivation, perceptions of pressure and that in turn guide attentional focus. The study design responds to recommendations to move away from retrospective accounts (e.g. Gucciardi et al., 2010; Hill et al 2010b) and the think aloud methods are considered appropriate for use in sports such as golf because of the pace of the game and opportunities for participants to produce verbal accounts during performance routines and breaks in play (Nicholls & Polman, 2008).

Interviews that follow think aloud data collection encourage a richer account of the performance experience and greater understanding of players’ motivated cognitions and

behaviours. Whilst multiple interviews are often promoted to increase rapport with participants, the think aloud design afforded six hours with participants in preparation and data collection in phase one in which this relationship was enhanced. A further intention of this study was not solely to tell the stories of player performances (but based on their reported experiences and reflections to look for general data patterns with the intention of developing a better appreciation of the motivational and attentional processes involved when performing under pressure. A development from the research by Nicholls and Polman (2008) is that the complete performance experience is captured as golfers provide think aloud accounts and reflect on a complete tournament round of 18 holes. By eliciting ‘real time’ accounts of golfers thoughts and feelings when performing under pressure, qualitative data will shed light on previous experimental research on performance under pressure as well as revealing the potential role of other variables that have not been previously identified.

5.3 Method

A general overview of the thesis methodology and methods can be found in Chapter 4. The methods reported here relate to Study 1 reported in this chapter.

5.3.1 Design.

The study utilised a qualitative design that involved the collection of data in two phases determined by an initial pilot study. In the first phase, think aloud data captured golfers’ verbalised thoughts throughout a competitive round of golf. In the second phase golfers took part in a semi-structured interview that further explored their performance experience and served as a methodological triangulation (Denzin, 1978).

5.3.2 Participants.

Participants were purposefully sampled from responses to advertisements at golf clubs across England and notification placed on the Professional Golfers’ Association (PGA) bulletin board. Experiences of performing under pressure were sought from a range of abilities from amateur golfer to elite player; consequently, participants included those defined as either Professional or Recreational in standard. Professionals were eligible if they competed on professional tours at the time of the study. Recreational golfers were

required to hold an official Council of National Golf Union's (CONGU) handicap and have been involved in competitive club golf for more than 12 months.

Participants were golfers (total $n=15$) aged between 25 and 60 ($M = 37.93$ years, $SD = 12.83$). The sample consisted of Professional Male ($n=4$; PM1 Richard, PM2 Mark, PM3 Luke, PM4 David) who were aged between 25 and 32 ($M = 27.75$, $SD = 3.10$), Professional Female ($n=3$; PF1 Chloe, PF2 Sarah, PF3 Holly) aged between 25 and 29 years of age ($M = 27.00$, $SD = 2.00$), Recreational Male ($n=4$; RM1 Simon, RM2 Oliver, RM3 Ben, RM4 James) who were aged between 36 and 58 ($M = 45.5$, $SD = 10.79$) with reported handicaps ranging from 6 – 14 ($M = 10.5$) and Recreational Female ($n=4$; RF1 Maria, RF2 Sophie, RF3 Jane, RF4 Alice) aged between 35 and 60 ($M = 48.75$, $SD = 12.20$) with reported handicaps ranging from 9 – 28 ($M = 18.5$).

5.3.3 Materials.

Think aloud accounts were collected through an Audio-Technica Lavalier Micro Cravate ATR3350 microphone and recorded on an Olympus DS-65 digital voice recorder. Participants took part in practice exercises detailed by Ericsson and Kirk (2001) to help them understand how they should verbalise thoughts during the study. The researcher completed these from a prepared script (see Appendix A), which included a definition of the nature of thinking aloud. Verbatim instruction was:

I want you to say your thoughts out loud from the moment you finish hearing a practice question until you say the final answer. I would like you to talk aloud as much as you comfortably can during that time. Don't try to plan or explain what you say. Just act as if you are alone and speaking to yourself. Keep talking while you are coming up with the answer to each question. If you are silent for a long time, I'll remind you to think aloud.

and practice questions, for example; 'please name five animals that live in the zoo'.

A semi-structured interview schedule was used to guide interview on completion of the round (see Appendix B) and to highlight motivational and attentional processes. The construction of the schedule incorporated key factors identified by Hill et al. (2010b) associated with the 'choking' experience but that also more broadly illuminated experiences of performing under pressure. These were the antecedents of 'choking' under pressure, mechanisms of 'choking' under pressure, consequences of 'choking',

moderators of ‘choking’ and interventions used. NVIVO software version 10.1 was used to assist thematic analysis of think aloud and semi-structured interview data.

5.3.4 Procedure.

Participants were contacted to establish that each had experienced ‘choking’ under pressure’ in the previous 12 months, with ‘choking’ determined using both the definition and primary and secondary indicators established by Hill et al (2009) and detailed in Chapter 4 (4.2.2).

A pilot study was conducted with one professional participant with the following aims; firstly to test the recording equipment suitability for capturing think aloud data whilst playing golf; secondly to assess the effect of wind on the quality of recording and finally to gain feedback on the demands of thinking aloud over 18 holes of golf as previous research had only gathered data over six holes (Nicholls & Polman, 2008).

5.3.4.1 Think Aloud.

Data collection took place at Professional and club tournaments held at 18 hole golf courses in the United Kingdom. Participants were contacted prior to the event and informed that the study aimed to explore the experiences of professional and recreational golfers during competitive play. Demographic information was gathered at this stage and assurances given that anonymity and confidentiality would be maintained throughout the study with no personal details being attached to either think aloud data or interview transcriptions.

Arrangements were made to meet one hour prior to the players’ normal preparation time on the day of the competition so as to minimise disruption to their preferred routines. At this time instructions for giving verbal accounts were given and practice exercises carried out (see Appendix A) to ensure that each felt comfortable with the requirements of the study. Participants were informed of their right to withdraw from the study at any time and that they did not have to provide verbal accounts if they did not wish to do so at any time during their round.

Recording began fifteen minutes prior to the start of the round and equipment was tested to check quality of recording. Participants were informed that their thoughts prior to and after shots were of most interest and that they should use the presence of the

researcher who would be a spectator as a prompt to continue providing thoughts aloud. In addition each player was asked after six and twelve holes the single question ‘what percentage of thoughts do you think we are capturing?’ to increase awareness and encourage thinking aloud.

Checks were made after every three holes to ensure that recording equipment was functioning effectively and recording was completed as players left the 18th green. During the round the researcher made notes of key behavioural indicators of sub-optimal golf or behavioural/emotional performance to discuss in the post round interview.

5.3.4.2 Semi-structured interview.

Semi-structured interviews were conducted in private with each player within 30 minutes of the completion their competition. Due to the demanding nature of the think aloud requirements the primary aims of the interviews were to follow up on the observations of the researcher and to further explore the experiences of each player of performing under pressure (see Appendix B). No minimum time limit was allocated and interviews ranged from 11 minutes 52 seconds to 36 minutes and 3 seconds in length ($M = 23$ minutes and 30 seconds).

Participants were again reminded of confidentiality and anonymity during this second phase and informed that the aims of the interview were to access some additional reflections of their performance and experience of playing under pressure. This would support the cognitive processes that had been captured through the think aloud exercise in phase one and represented a further opportunity to capture any thoughts that may have been missed.

Interviews concluded when all aspects of the schedule had been addressed and observations of note that had been recorded by the researcher from the competitive round had been discussed. An additional period was dedicated to fully debrief the participants, answer any of their questions and where possible support them with concerns that they had with their own game through applied sport psycho-education (e.g. use of mental skills).

5.4 Analysis of data

In a call to address the often poorly demarcated use of thematic analysis, Braun and Clarke (2006) encourage researchers to explicitly outline their position in the analytic process and to consider questions of; epistemology, analysis aims, induction or deduction, and thematic content. Braun and Clarke caution that researchers have to acknowledge their theoretical commitments, as data cannot be coded in an epistemological 'vacuum' and so the theoretical interest in motivation and attention are recognised in this study and influence a predominantly deductive approach to analysis. In addition, themes are identified at a semantic level. Players' explicit thoughts are described, analysed and interpreted with the significance of patterns highlighted together with the broader meanings and implications. Where new areas of interest emerge latent analysis is adopted to examine underlying ideas and assumptions and develop themes. Decisions as to what constitutes a theme are not solely established according to quantifiable measures but instead on whether the theme is considered to capture something important in relation to the cognitive experiences of participants.

Thematic analysis as described by Braun and Clarke (2006) and detailed in Chapter 4 was then conducted to analyse the data corpus that comprised data sets of think aloud and semi-structured interview transcriptions. Analysis, at this level, has been proposed to generate a more complex understanding of lived experience (Rapley, 2004; Sparkes, 2008), and so interpretation of during-performance and retrospective player experiences provided methodological triangulation.

The flexibility and ability of thematic analysis to provide a rich description of the data corpus and meet the wider study aims promoted its suitability over alternative approaches such as protocol analysis (e.g. Nicholls & Polman, 2008) in which relevance criterion are first established. This flexibility extends to the framework in which a thematic analysis is applied and so was considered complimentary to the mixed method approach taken in this thesis. As such the analysis conforms to a contextualist method to enable a reflection of reality for golfers performing under pressure whilst attempting to unpick the surface of that reality (Braun & Clarke, 2006). Therefore, all verbalisations were considered of interest for analysis in both phases one and two of the study with data transcribed verbatim (see Appendix C) and analysed in accordance with the six phases detailed in Chapter 4 (see Appendix D).

5.4.1 Trustworthiness.

Following the recommendations of Sparkes (1998) and the procedures adopted in previous studies employing think aloud techniques (e.g. Nicholls & Polman, 2008), trustworthiness was gained through the following methods. First the semi-structured interviews that followed the think aloud data collection acted as methodological triangulation of participant experience. In addition to a schedule that sought richer understanding of antecedents, mechanisms, moderators and consequences of ‘clutch’ and ‘choking’ events these acted as member checking interviews in which participants were asked a) To recall their thoughts in the moments prior to the round starting b) to comment on whether incidents that had been observed and identified as representing sub-optimal performance during the round, matched their own experience/beliefs c) what percentage of thoughts they believed they were able to articulate aloud and d) to what extent they felt the requirement to think aloud impacted their performance.

Second, participants were sent a full transcription of both the think aloud data and semi-structured interview together with a report on incidents that had been identified as pressure experiences or examples of inferior performance in the round. All were then contacted to comment on the accuracy of their reports. Third, to make explicit the researcher role throughout the process an explanation of researcher orientation and experience is provided in Chapter 4 and a reflexive journal was kept during the study. These took the form of detailed memos that both clarified how and why strategic methodological decisions were made as well as the emotional feelings and reactions that accompanied and inevitably shaped analysis (Etherington, 2004). Finally richly detailed descriptions and quotations from the semi-structured interviews are used to illuminate interpretation of the cognitive processes in presentation and discussion of results to enable readers themselves to judge the trustworthiness of the data (Gucciardi et al., 2008).

5.4.2 Presentation of findings.

The primary focus of this study was to explore the motivational and attentional cognitive processes of golfers during competitive performance to address the thesis aim of establishing if there is a relationship between achievement motivation and attention during performance under pressure and to answer two specific research questions. First, what are the motivational and attentional cognitive experiences of golfers performing

under pressure? And second, are golfers involved in multiple goals during performance under pressure?

Thematic analysis identified five main themes; Source of Pressure, Goal Intention, Goal Evaluation, Initiating Skill Execution and Performance Perceptions and are summarised in table 5.1. The five main themes consisted of 18 sub themes, which in turn were generated from 112 raw data themes (see Appendix D). The order in which these themes are discussed positions goal intention and goal evaluation together to enable analysis of goal directed cognitions and motivational experience collectively. In Table 5.1, however, these are presented temporally to better explain how cognitive processes of motivation and attention are influenced by pressure and impact performance outcomes. The analysis explores comparisons between elite and recreational golfers' cognitions and links between motivational and attentional processes. Finally a working conceptual model is proposed to explain possible connections between the pressure environment, motivational factors and thoughts that guide skill execution to inform further research in this thesis and applied practice.

Table 5.1 Summary of characteristics for each theme

Main Theme	Sub-Themes	Characteristics
Source of Pressure	<i>Context</i>	Interpretations of the performance environment, the demands of the sport and the individual's perceptions of ability to meet these demands.
	<i>External</i>	
	<i>Personal</i>	
Goal Intention	<i>The role of others</i>	Cognitive representation of how players define their objectives, measure success/competence and determine achievement criteria prior to performance.
	<i>Self-referenced</i>	
	<i>Toward success and enjoyment</i>	
	<i>Averting failure and disappointment</i>	
	<i>Multiple goal intentions</i>	
Initiating Skill Execution	<i>Decision making</i>	Thoughts both before and after the initiation of movement and skill execution that indicate attentional focus during this stage of performance. These represent the cognitive processes that instigate movement that lead to performance perceptions and are initiated by goal intentions.
	<i>Personal rules and implicit information</i>	
	<i>Technical and explicit information</i>	
	<i>Focus away from immediate challenge</i>	
	<i>Attention strategies and influences</i>	
Goal Evaluation	<i>Motivation hierarchy</i>	Immediate assessment of performance after skill execution and compatibility with previously set aims and objectives. This discrepancy or correspondence provides insight to the dominant goal involvement during performance and influences perceptions of competence and/or failure.
	<i>Reference to correct measures</i>	
	<i>Maintenance of achievement perceptions</i>	
Performance Perceptions	<i>Self-regulatory</i>	Thoughts relating to the positive and negative impact on behavioural, physiological, emotional, cognitive and competitive performance and beliefs regarding player ability to overcome challenges or maintain optimal standards.
	<i>Absolute</i>	

Evidence to support themes is provided in this section, supported by examples of comments made by participants during the ‘think aloud’ procedure and provided within the semi-structured interviews. These example quotations are presented within an analytic narrative of the descriptive interpretation of themes (Braun & Clarke, 2006). Quotations from the think aloud data set are presented in italics so that they can be distinguished from those taken from the semi-structured interview data set. Each is attributed to participants through coded initials that identify the skill level and gender. These are denoted by the codes; Professional Male (PM), Professional Female (PF), Recreational Male (RM) and Recreational Female (RF) and confidentiality is further maintained by the use of pseudonyms, where necessary, as detailed in section 5.4.2.

5.5 Theme 1: Source of Pressure

Source of pressure was identified as a main theme that dominated participants’ cognitive experience of competitive performance. This theme included three sub-themes created from the analysis of 19 raw data themes, context, external and personal pressures. The three sub themes encapsulate the different interpretations of the performance environment, the demands of the sport and the perceived capacity of individuals to meet these demands. The source of pressure main theme provides insight to the cognitive appraisals of multiple environmental and intrapersonal factors and their interactions that lead to temporal ‘pressure’ experiences.

5.5.1 Context Pressures.

Many of the pressures that all participants acknowledged during their performance were triggered by the game situation and factors either specific to the moment or unique to the challenges that they faced in their performance. These included ‘factors that add to shot difficulty’, ‘perceptions of challenge’, ‘preoccupation with score’, ‘thoughts that increase effort’, ‘opportunity to achieve’, ‘stage of round’ and ‘winning or losing salient’.

Factors that were verbalised as contributing to shot difficulty during the round reflected both the position of the players’ ball and the hazards that they had to negotiate to enable them to reach their intended target, as was evident in the deliberations of one recreational golfer:

Alright I have got a nice clear view, ball sat down a little bit mind you so I will have to be fairly er... selective with the club choice. The tree short of the ditch is 191 but I am not going to get a 4 iron onto that. So... actually I might... it is fairly loose behind it I think I might get a 5 iron on that. (RM3)

The lie of the ball was a consideration for all golfers throughout their rounds:

Ball's lying shit, just get it back in play. Not going to reach the green anyway. Just knock it up there and chip and putt. (PF1)

Covered in mud. Right I've got to get over that mound, the lie is quite good; I can get behind it in the rough. Need a good shot to get down the fairway. (RF3)

Additional contextual factors including the wind, course conditions and positioning on the hole, contributed to verbal accounts that inferred extra demands upon players' skill and decision-making as well as a decrease in situational comfort:

Downwind...in between clubs still [sigh]. Right this is the club straight at the pin good strike come on. I'm not happy with this lie. (PM4)

There's not much green there, this is horrid. Hardly any green to play with...come on! (RM2)

These factors were not only seen to place demands on players' skills but also influenced competitive objectives as was evident from one recreational players thoughts going into a shot and their reflections on their goals for the day:

Need to control the ball into the wind and take it up to the left hand corner. Not going to go for it today. 4 iron... it doesn't look like 150 to the water there... going to take a 4 iron. Just do that [practice swing].

I sort of had a game plan in a way in that I assume that it is going to be difficult and it is windy. I've got to choke down on my grips so I am going to give up on yardages, I will keep it in play. That was sort of my target, my game plan. I felt quite relaxed, to be honest it was windy but because I play at [other club] it doesn't bother me too much, I wasn't worried about it in a way. It's not easy but it doesn't bother me. (RF4)

Context pressures appeared to place greater demands on the recreational golfer as they evaluated their ability to meet the challenge ahead:

Ok now I'm in trouble I've got trees in front of me. Just got to get it over the trees and as far down as possible...easy. (RF3)

Now I can't slash at this one too much because that wind is coming across or is that wind...it's wind against fuck. Wind against is not good for me. (RM1)

The professional golfers' interpretation of the demand placed on them also provided understanding of how the context contributed to pressure perceptions. Certain challenges created a greater focus on the threats posed than others, depending on the players' confidence in that particular skill:

Perfect drive I am pleased with that. 248 to the green though. Not what I was hoping...hoping to be a bit nearer than that. Bunker on the right is the only problem here. (PF1)

Control needed on this one I think. A bit windy and flag up the back of the green on a step. Dubious about what to play because I have got to land it back there but not spin it so gotta to try and punch it in. Got loads of room right to try and draw it in. Should be quite a comfortable shot... (PM1)

When recalling moments at the start of the round that felt 'pressurised' one female professional golfer gave insight to her challenge appraisal:

My god this is really long, I didn't remember the first hole being like that, really long. (PF1)

Players referred to their score during the round, with previously set targets, expectations and standards contributing to the pressure environment:

Right this has got to be close. That was my third...my third on a par 4. Chip this close and one putt. It's all about the score. Right 5 iron let's get her on it. (RM1)

Again given myself a chance with the putt got to start making some of these. I keep thinking about score. (PM4)

5 over my handicap now can't afford to drop any more shots. (RF4)

This was emphasised by both recreational and professional golfers alike when asked what they believed contributed to feelings of pressure during the competition:

It almost felt like I went into a steer mode, you know as in I'm 4 over I've got 4 holes to go so let's just steer it round the last few and come in and try and come in as low as we can. (RM3)

Maybe I was a little more nervous because I was starting to make a score and I felt that I was playing alright so I don't know if that was a factor. Because I was thinking about score quite a lot today. (PM4)

Further evidence of pressure to perform came from player thoughts that encouraged an increase in effort:

214 yards. Uphill, make sure you get it all the way, 3 iron I think...it will be all of that too. Right so I am going to be aiming just right of the pin and let it draw in. Try and turn my shoulders and commit to it. (PM4)

Right 160 really try and get this one it's a long way. (RF4)

Differences were apparent in the opportunities that competitions presented to recreational and professional golfers. These opportunities were equally valued by players and consequently created a pressure to perform in order to obtain the desired outcomes. Professional golfers recalled pressure situations that were associated with career progression:

... just the idea that you could be two rounds away from playing in the Open. If you played your best golf. Because I am not, I am not a Tour Player, so it's not as if I can just go out there and get into the Open, I would have to play my socks off to get into the Open. It's just that feeling on the first tee of 'Right' I am on the same score as everyone else at the moment so if I have my best time ever, then I could do it...and I felt sick [laughs]. (PM3)

Recreational players referred to opportunities to reduce their handicap as heightening the importance of the situation:

Walking up to the 18th I was thinking give me a bogey after my drive I thought about a par would be even better and nice but in my mind I kept trying to bring myself back to no just stick to bogey and then there's no pressure I don't need to attack something which I don't need to attack, I've got to keep it settled, I've got a chance here. (RM1)

Different pressures were faced at different stages of the round with the first few holes challenging players to maintain control of their objectives:

I'm thinking do I go long or nice easy shot? It's my second shot, I don't want to fuck it up so I am going to have to go reliable. 6 iron just down the middle. I've only got to get it to 150...only got to get it to 150. Only got to get it to 150. (RM1)

Just wanted to get first one out of the way. (PM4)

The start of the round promoted cautious goals that aimed to keep players on target to achieve broader objectives for the competition:

1st tee thoughts were wind's not too strong, just get it down don't go for any spectacular shots over the bunkers just get it down the fairway that's all I wanted 1st shot. (RM2)

Erm...Just get off to a good start I was thinking, that's about it really. I wasn't worried about the tournament...I would have liked to have got top 10. (PM4)

The pressure felt in the early stages and prior to the round was epitomised by one professionals' recollection of thoughts before the competition:

I always feel nervous on that first tee. I get there... I think a lot more on that first tee than I do on others. (PM2)

The last few holes of a competition then create pressure to maintain performance standards and achieve player objectives:

Right it's getting serious now! You're about 3 under your handicap...2 or 3. You're coming up to the last 4 holes after this one, just think! (RM1)

Erm...5 iron? I'm thinking a little 5. Right last shot, make it a good one. (PM4)

Heightened experiences of pressure were recounted by players when winning and losing became salient towards the end of the round:

You are coming down the 18th the last hole and you are all square and you think that you just have to win; this is your club you are not going to let it... and that's when I feel most pressure. I have worked very hard in medal rounds or competition rounds not to know where my score is. Not to know that ok I am doing quite well coming down 16 or 17. (RF4)

Most pressure on a golf course ever? Erm... probably coming up the last few holes at [club] when I finished 3rd [European Tour Event] because there was a chance if I had a really good last three holes that I could get into a playoff ... (PM2)

The performance context provides a potential source of pressure to both professional and recreational golfers alike. The stage of round and the presenting challenge to skills are continually appraised for their potential threats to success and opportunities to achieve overall competitive goals. Whilst ability and skill level contribute to the evaluation of challenges throughout the round, both professional and recreational golfers are aware of the strengths and weaknesses of their game and as such global comparison of abilities (recreational / elite) do not appear to be appropriate.

Professional golfers, for example, do not acknowledge an equal level of proficiency or expertise across all skills of golf but instead consider each challenge within a round in relation to personal perceptions of competence to execute a particular skill (personal pressures). A positive or negative evaluation of the performance context by golfers, therefore, contributes to the pressure environment through the extent to which it either threatens players goal striving and challenges their skill specific ability or alternatively presents the opportunity to achieve competitive goals and demonstrate competence. The context pressure sub theme is uniquely characterised by how game specific challenges

influence players goal intentions, however, the direction of that appraisal will be determined by additional sources of pressure that contribute to a golfers' unique pressure profile.

5.5.2 External Pressures.

Pressure was found to be influenced by external sources and through; 'pressure created by others', 'pressure from the perception of others', 'pressure associated with expectation' and 'letting others down'. Playing partners, peers, teammates and family members were given as contributing to external sources of pressure. Sometimes pressure was evident from observing others performance:

Funnily enough I was talking to [partner] and I was saying to him about just playing the course and not thinking about what other people were doing...because he was walking off the 17th tee and I was saying you should have tunnel vision because we had just seen two people stiff it on the first I mean literally stiff it and you think I wish I could not see those things because that can affect you. (PM3)

There was also the belief that others were purposefully attempting to apply pressure:

It is not someone who plays better than me but it is someone who is trying to get something over on me and... you know they will say things like, we'll get to the 1st green and they'll say I'm 4 and you're 6... that sort of thing you know and I'll think, you didn't need to say that did you, you know and I wouldn't do that to anyone else. (RF1)

Pressure also came from thoughts that players had about how significant others would view their performance. This was captured by one professional's thought during his round and then reinforced in subsequent interview:

What am I going to score today...what are the membership going to think...about playing [course]...what my number is. Little bit anxious about that. (PM1)

Yeah well my probably most pressurised situation is what other people would think of me. (PM1)

One female professional further emphasised how wanting to impress others created a unique pressure:

Last 3 holes I remember feeling that my hands were like freak, like a boxer [laughs] I really felt like they were so tense, I was forever stretching my fingers out and stuff like that because I just felt so pumped from... you know just looking around there were just so many faces in the crowd that I knew really wanted me to do well and that's like, it's nice pressure to have don't get me wrong but it's still a pressure of them wanting you to do so well and if you don't

make it then you've got the whole 'oh well next time' [laughs] and there is nothing worse, for me there's nothing worse, because I want it now. (PF2)

Further evidence of the role of others came from players' expressions of embarrassment at their performance:

Right on the fairway about 150. Come on let's hit a good shot make a birdie, get it a bit more respectable. (PM4)

So crap. Verging on the major embarrassment here. (RM4)

Expectations for overall performance were also felt to contribute to pressure:

I thought like most normal games of golf but I felt totally different on that first tee. I think because of what is involved in the event... it's like a club major isn't it so again you have got the recognition of the gold boards up there erm... again coming in to reduce handicap, I've been playing well but it's this sort of over nervousness and tension feeling that I must do well. An expectation almost that I must do well. (RM3)

Although golf is primarily an individual sport, recreational golfers highlighted pressures of not letting others down when playing in club matches, whereas for professionals this sentiment was expressed in terms of not letting others down who had provided them with support:

The pressure was the team pressure because we were there on the final. 7 singles you play in this format and so it was a real pressure against the team it's not you yourself, you can't let the team down and that I feel is the biggest pressure. If I have a competition, if I go out in a single knockout for the club and it is just me then I don't feel the same pressure. (RF4)

Yeah it is obviously important 'cos you have got people looking and you don't want to let everyone down or myself. So it's not like I wanted to shoot a bad score so there was that sort of pressure but erm...I mean there is about 700 members at our club! [Laughs]...it's pretty nitty gritty our club to be honest. Then obviously family, not everyone in the family but obviously my father is a massive proportion of that who I respect a lot so yeah...there's quite a few people there that will be looking at that [score]. (PM2)

These external pressures both uniquely contribute to golfers' personal perceptions of pressure and heighten awareness of the threats and opportunities presented by the performance context. Whereas context pressures appear to place greater attention on skill specific aspects of performance, external pressures serve to direct attention towards the initial management of thoughts and feelings that are not of direct relevance to the immediate task and oriented toward imagined future outcomes. The extent to which these potential external pressures are acknowledged to energise goal striving will be

determined by the players' personal pressure profile. It is this source of pressure that appears to heighten awareness of context and external pressure cues during the competitive experience.

5.5.3 Personal pressures.

Golfers suggested that some pressures were either self-imposed, unique to them and were initiated by previous personal experiences. These experiences are encapsulated by verbal accounts during play and players' performance reflections that highlight; 'influence of confidence and expectations', 'demands upon the weakest part of game', 'previous experience influencing current thoughts', 'increased importance or meaning', 'need to achieve', 'maintaining personal standards', 'perfectionism and unrealistic goals', and 'beliefs about game and ability'.

There were times during the round when players of all abilities attended to thoughts that acknowledged low confidence in a required skill particularly when demands were placed on skills considered by players to be the weakest part of their game

Stop thinking negative thoughts. Chip and a putt, just don't feel comfortable. Got loads of negative thoughts with my chipping just don't feel comfortable. (PF3)

Right I am about 30 yards out, nothing in front of me. I could fly it but I have got no confidence on the course yet...what will that be...my 4th shot... (RM1)

This pressure to perform was reiterated when players were asked post round to comment on observed poor putting performance from the competition:

The putting side I knew my stroke wasn't great and I am a little bit receptive to if I don't feel confident, bad things happen and so the more pressure the worse that gets massively. (PM2)

[Putting] is a big pressure for me. Every time... you know I felt that I chipped on quite nicely today but I always ended up with something like an 8 – 10 ft putt for a one putt. (RF1)

Players' awareness of skill deficiencies in certain areas resulted in an increased effort to perform skills correctly:

The greens were bumpy and I hit first putt and it was jumping all over the place and then I was trying to put it back and get it in the hole and I lost it completely...then all my confidence was shattered and then I am back to the state that I am in at the moment. (PM2)

On the occasions when confidence was expressed in relation to presenting challenges this served to heighten expectation, producing more positive goal setting:

Nothing to stop you holing this, play it like a putt from half way. Pretty confident here. (PM1)

Past experiences often triggered by the context, were readily accessible during the round and created a need to manage these unwanted thoughts before addressing task specific demands:

I hate this hole. I absolutely hate this hole. Fucking hell this hole does my head in. (PF1)

Get all the negatives out of the way...I hate this hole! Stick to the routine, find a swing and knock it up the right hand side. (RM3)

On other occasions, players experienced additional pressure to make up for mistakes and or poor performance that they had become aware of during their round. These included perceived incorrect movement patterns or consistent strategic errors:

Uphill putt, make sure you commit to this putt. Left to right, little bit anxious after the last putt...I jabbed at it so commit to it. Hit a good solid putt. So its uphill, slightly left to right. Hands in front and just commit to hitting through the putt. (PM2)

These previous experiences from the round encouraged a reassessment of goals in both a positive and negative way:

Got a line on the first one. Ok back into the wind, you are into the wind for the next 4 holes, you have had a good start, you are 1 under par for the first 5, stick to target and try and be 1 under par through 9. (PM3)

Forget those last...6 holes left, let's finish strong. (PF3)

Players' thoughts consistently magnified the importance and meaning of specific challenges in relation to their valued goals and appeared to influence perceptions of pressure. One recreational male golfers' thoughts and reflections provided explanation for the increase in importance that he placed on a shot during his round:

Right, ok crucial now don't double bogey! You know you don't want one don't want to kill your round. It wouldn't do you no favours. (RM3)

It's more excitement than anything else, because I'm desperate to get my handicap down. I feel as though I'm better than 7. Erm... I just... when I get a card in my hand for a qualifying competition, I seem to want it too much. (RM3)

Players explained that sometimes shots and tournaments held different personal meaning and importance, which would impact their behaviours and goals for the round as typified by one professional golfer who explained how goals are affected:

When it means a lot I wouldn't do that. You know like at say Tour School, on the 1st tee the par 5, the first two days I didn't even hit a driver because I knew that I have got the ability to get there in two and that's my nature, so I completely eradicated that by hitting an iron so that I knew I could never go for the green in two. (PM2)

All participants provided explanations of pressure created by a need to achieve. Some accounts were based on unique personal experiences, as was the case with one professional who explained the importance of being successful:

I want to be successful. That's a massive part of my life. I don't think, for me personally, I don't want to be dad, because I know that... his life he hasn't been happy, I know that's individual it could be other PGA pros out there but I haven't met one yet who is really happy. So the only way I see it for me 'cos I have given most of my life to it, I feel it is all or nothing really. It doesn't mean it's going to give me happiness because you don't know until you get there but I believe that it is a massive part, well it is my life really and I have given everything to it. And now it feels like I am hitting the self-destruct button...all the time. (PM2)

Whereas others were associated with a need to attain specific targets in order to progress:

I know that as an assistant professional I have to play so many events at 4 over par or better and I knew that walking up 13 I was 4 over so it was kind of a... so you do you think that I need to par these last few holes. Then I went bogey... yeah I dropped 4 shots. I was 4 over which is actually ok, that's what I need to be doing and then I come in dropping 4 more shots. (PF3)

During the round thoughts frequently inferred a need to achieve from recreational and professional golfers alike:

Let's get this one close score depends on this shot. It all depends on this shot. PW...little pitching wedge have to grip right down it. (RM1)

Got to get my driving going, making this so hard. (PM4)

Post round discussions, however, suggested that perfectionist tendencies, unhelpful beliefs relating to expertise and unrealistic goals make feelings of competence and achievement difficult to obtain. These personal standards were often based on

subjective beliefs as to what constitutes acceptable performance as opposed to any objective measure as typified by the aims of one professional and one recreational golfer:

Improve...get it so that it's...whatever I am doing make it consistent so that every swing is consistent, it's the same, whether that's a big slice every time or whatever it is...consistently so I know that that is what is going to happen. (PM2)

I think two things; I'd had a couple of double bogies on the card and my head went down because of that, because I hate them, my aim is you know, no double bogies and then that pressure then that you put on yourself to make up the points. (RM2)

Despite high expectations for performance all players, regardless of skill level, gave indications of their personal limitations in meeting the demands that faced shot by shot:

17 yards on... wind against total distance 117. I think that this is a 2 club wind. This is where I wish I could play a low shot, I can't do that. Right relax those arms. (PM3)

Blimey this hole is long. 228 yards. Well no chance of getting there...Right into the wind. (PF1)

These limitations also influenced thoughts and beliefs prior to the start of the competition and the subsequent targets set for specific holes and stages of the round:

No, maybe the putting helps but just hitting balls doesn't seem to help me erm... but I struggle, always struggle with the first 4 holes here to try and get... and I felt as though I'm behind before I've even got going, if you know what I mean, so that's the thing that I have got to get across... for me is to try and score a bit on 3 out of the first 4 holes. (RM4)

Players expressed stable or fixed perceptions of ability within certain skill domains and this appeared to increase frustration shaping expectation and goals:

I can't see it and also I can't see myself doing it! I look at it and I think 'well I can't see you doing that'. Even on putts now, I am so used to rubbish that is going on that I have sort of resigned myself to...well it's not going to happen and then I start to doubt my reads, because I got to the point where I was reading so hard and then I knew I couldn't hit it on the line I wanted I thought well what's the point of reading it, you know you're not going to...you might as well just pick a line and be firm and just hit it. (PM2)

These fixed mind-set statements were a feature of the participants in this study but they had both a positive and negative effect on the goals that golfers of all skill levels set themselves. Players' thoughts aloud suggested that outcomes were pre-determined based upon feedback from sometimes only single events:

Just too quick. Tempo too quick. Just not settling into it, another typical round. Long way to go tough holes. Due an up and down anyway so... (RM2)

And in! [sigh]. Feels like I can take the rest of the course on now, nice par at the first. Now I know my putting's good I can take anything on this course. (RM1)

The personal pressure subtheme represents the thoughts attended to by golfers that are accessible as a result of their unique performance experiences and definitions of success and competence. These personal pressures represent an independent 'general' pressure to perform or pressure profile. Personal pressures were seen to make salient the most meaningful context and external pressure cues in the competitive environment to the extent that they represented a threat to goals or presented opportunities to achieve success or experience competence. As such the source of pressure main theme provides understanding of how competitive environments are appraised and perceived on a moment-to-moment basis through the lens of a personal pressure profile and how this appraisal in turn energises performance intentions and actions. Context, external and personal pressure sub themes, however, only provide insight into the sources of pressure that may impact decision making and/or increase anxiety to influence performance outcomes and do not in themselves provide explanation of skill breakdown or optimal performance. Golfers that perceive pressure during competitive performance still have the opportunity to positively influence skill execution if they are aware of the potential negative impact and have the skills and resources to regulate their emotions and behaviour.

5.6 Theme 2: Goal intention

The goal intention main theme encapsulates how players define the achievement context during their competitive rounds. It aims to explain how participants were motivated to perform skills and meet specific challenges within their round through the aims and objectives set prior to skill execution. Goal intention consists of five sub themes created from the analysis of 32 raw data themes that provide insight into how players cognitively represent the parameters for competence attainment before, discrete performance events. This main theme is distinct from, but influenced by the golfers' pressure profile and extends understanding of the cognitive processes involved in competitive performance.

Where players' perceptions of the competitive environment raise awareness of bespoke sources of pressure that motivate decision making and action; participants' goal

intentions describe the aims and desired consequences of those processes and actions. Goal intentions are understood through, 'the role of others' and the use of 'self-referenced goals'. Distinction is also made between goals that players adopt 'towards success and enjoyment' from those that aim to 'avert failure and disappointment'. Understanding of how competing motivational cognitions direct attention is gained from appreciation of 'multiple goal intention' which speaks to the debate on the orthogonality of achievement goals at the situational level (e.g. Harwood et al., 2001; Treasure et al., 2001) and to an understanding of how motivation influences attention and the initiation of movement and skill execution.

5.6.1 The role of others.

Playing partners, family members, coaches and club members all contributed to how players perceived success and determined competence and achievement. Participants expressed how 'wanting to demonstrate ability to others' and 'self-presentation concerns' were key motivators with this manifesting in different ways depending on skill level:

Because to me that's my mark, that's my goal. My goal is to get my handicap as low as I can, because to me that's the yard marker for your abilities as a golfer. Not the fact that you can play unbelievable shots... obviously that's the showing off part, but it's the fact that when someone says what do you play off? You can turn round and say I play off 3 or whatever; instantaneously it has got that recognition... that's where I want to be. (RM3)

It doesn't matter how well you conduct yourself on the golf course or how well you swing a golf club or see golf shots it's at the end of the day it comes down to who shoots the lowest score and earns the most money doesn't it. If I won today people would think that I am a good golfer, it doesn't matter if they haven't seen me they are gonna think you're a good golfer. (PM4)

The desire to demonstrate ability to others was distinct, however from a 'motivation to beat others' which was prevalent particularly in professional players:

Yeah probably felt that I needed to keep up with the others, normally I just ignore who I am playing with, just beat the course. I was probably trying to beat them rather than the course... I think because I had never been in that position before. (PF1)

This was also expressed through 'motivation from external reward' such as winning money or trophies which was also dependent on success in relation to others:

I want to get home to see [wife] but I want to have a good score, but if I have good score that means staying up here, so if you don't have good score you can get home to see wife...but if you earn some money you can make yourself feel good. So what's it going to be good score or seeing your wife? (PM3)

Thoughts highlighted how players were 'using information from playing partners' which emphasised the influence others' decision making and performance had on their own goals:

[Partner] going to show me the line which is nice. [Partner] going quite hard but that's nice. (RF4)

She's just hit a 5 iron and it is a bit long hmmm... going to go with a 6 I think. (PF1)

Good tee shot. 20ft for birdie, straight at hole, don't leave it short. Check it from both sides. Playing partners seemed to run out a bit. Looks quite quick. Not sure about...(PM4)

Players were affected by others behaviour from either observing their good and bad performance or from the impact of their actions on participants own routines:

Right ok aim at the tree, swing through, come on. Nice and steady, just swing through don't think about anyone else [partner just shanked] swing through. At the flag nice and positive. (PF3)

Back by the plate... strong wind. Ok I know we need to get a move on so based on last week and my thoughts... going to go with a club that is one more. (RF2)

The role of others influenced professional and recreational golfers in different ways. Whilst professional golfers shared the desire of recreational golfers to demonstrate ability to others this was to a greater extent determined by the attainment of external rewards regardless of performance or process goal measures. Recreational golfers' goal intentions were more concerned with the demonstration of specific golf skill ability (power, accuracy) and by the attainment of a low handicap as recognition of superior stable golfing ability. Valued others appear to influence players' goal intentions in different ways along the development pathway. For recreational golfers, the rate and quality of skill development may be determined in comparison with others and handicap used as a more global assessment of that progression.

5.6.2 Self-referenced goals.

Golfers attended to thoughts during their competitive performance that directed them towards the attainment of personally meaningful goals and targets. These provide insight into the performance standards; acceptable to them, that would represent playing to their potential and that would give them a sense of comfort, control and skill mastery. Many of the thought processes captured included reference to measures of success on multiple levels (i.e. outcome, performance and process goals), however, these were pertinent to this sub-theme in that they were framed in self-referenced terms with achievement not determined in comparison with others. A feature of these thoughts was the resultant process focus that was produced:

177 straight into the wind. Tough hole, best not to be short. Nice solid hit. Nice swing...nice relaxed swing. Come on this is a chance to get one back. Focus, concentrate. (PF1)

Looking at length...a little right to left. Just make a good solid putt. Just outside that marker. (PM4)

During the round players continually assessed the challenge ahead and adapted their shot intentions and success criteria in order to preserve the attainment of broader outcome goals:

Great chance of 4 here. If you walk off with a 4 you will feel like you have stolen a shot...if you make 5 you will be frustrated that you hit your second shot left. So there's really only one option; hole the putt. (PM3)

Recreational golfers evaluated challenges and set objectives in consideration of their ability to meet the demands of the shot. They acknowledged acceptance parameters that would enable them to maintain broader outcome goals:

I could go for the pin here... bit of a risky shot, water one side and bunker the other. 5 Is good enough here. Might be worthwhile just to go to the front of the green and then... even 3 putts from there will be ok. (RF1)

Professional and recreational golfers both expressed a motivation for self-improvement, a desire to maintain personal standards and to realise their potential as an overall aim when reflecting on how they measure success and development:

I just try and keep it going I suppose, try and actually improve. (PM4)

My passion now is my golf because I have retired and so that is... the competition I have... I don't feel in competition with anyone else, that's for me to improve what I do. So it is very important to me. (RF1)

Oh it's just satisfying, very satisfying. I feel is if I am...yes I hate not to be good at sport I mean I have always been good at sport you know I only took golf up in '97 and I was badminton before that in the premier league and so I have been good at sport all my life so I don't accept second best, I don't like to accept second best. I'd go out and want to play to the best of my ability. (RF3)

Professional golfers, however, maintained this self-referenced evaluation and commitment to development when competing by acknowledging the opportunity to meet a challenge and test their skills. Recreational golfers, despite setting personal skill development targets to meet specific challenges often suggested that these might be obtained at the cost of higher valued outcome goals:

Pin's quite far back. Right let's take some time now, the others are a long way away. The lies alright, can get your club to the back of the ball, Try and hit a nice soft cut. Little bit off the left. (PM1)

Another chance to make that nice soft draw. Start it out on those trees... just rhythm. (RM4)

Right I am hitting some quite nice shots and I want to keep that rhythm going. Same thoughts no need to change them at the moment. (RF1)

Today...today my expectations were to just hit good shots into the wind, I didn't think about the score at all because I didn't expect to be erm... shooting a 69 today or anything like that so it would have been silly and I normally try to come down with not too many expectations. (RF4)

Golfers reflected on a need to feel comfortable before they could start their golf swings and clearly felt that this self-referenced measure of 'readiness' contributed to successful performance outcomes and a sense of control. The thoughts indicative of this subtheme inferred an implicit or tacit knowledge of the desired technique. As such the verbalisations epitomised a self-referenced motivation with an ownership of knowledge expressed in terms of 'feel' and comfort' when executing the skill:

It is pretty much the same. Putting is a bit inconsistent, sometimes I stand there for...I mean there was one hole today where I was thinking about it loads, kept putting walked away and just didn't feel comfortable at all and hit a really bad putt, it was about 5ft short I think it was. (PM4)

I try and turn my body, get a nice smooth practice swing and then try and emulate that on the shot. It's all about the feel, especially going back to the driver again, I have to feel comfortable, if I'm not comfortable it's a bad shot and it always has been but whenever I have felt comfortable, ok it still might go a little bit bad but it never goes as bad, so yeah it's now all about my position

over the ball, do I feel comfortable and I'm relaxed. I have to relax myself over the ball before I can hit it. (RM1)

The desire to feel in control extended beyond the control of processes, (e.g. control of the golf club), to a control of outcome (e.g. control of score). This suggested the need to possess skills and qualities to turn things around or as one professional golfer explained, the ability to maintain control of performance levels before they start to deteriorate:

I think that it's knowing that point where you could spiral and see it before you spiral. Because you don't want to... for me I don't want to get to that point where I am starting to go down that slide and I, you know, I can't grip on to anything I am just like sliding and I don't know..... (PF2)

During competitive performance the desire for control influenced decision making and triggered personal rule-based information (e.g. club preference and knowledge of movement habits) and this guided self-referenced intentions prior to the shot. Both recreational and professional golfers interpreted control in terms of reducing risk and their goals were then set accordingly:

Little bit to the right. Right I need to aim left side of the bunkers, just remember to swing through because there is no water in front of you. 170... no point in chancing... just play an iron, most comfortable iron. (RF2)

Just get my rescue and see if I can poke it down there. Middle left of the fairway. (PF2)

Personal performance measures were also set in order to work towards skill mastery and development in specific areas relevant to each player. These thoughts were initiated by appraisal of the situation and the players' perception of their ability to meet the salient demands. The recreational and professional golfers below provide examples of how a context pressure such as factors that add to shot difficulty (i.e. playing the ball from sand) and stage of round, initiated a motivation to attend to skill relevant thoughts believed to be required to successfully execute the shot or maintain performance levels:

Ok I need to feel the hands loose on this bunker shot, sat quite nice but it is sat in wet sand so... it could be fairly heavy underneath, so set the clubface, set my feet. That's good there and commit to the shot. (RM3)

Well the objectives I set myself from the 2nd shot on 15 remained the same coming in. So I was basically trying to take the tension out of the swing, I was trying to relax, I was trying to focus on relaxed hands and arms on the practice swing and then again, stepping up to the ball 'trust your practice swing'. (RM3)

5.6.3 Toward success and enjoyment.

Participants' goal intentions prior to skill execution were framed in terms of achieving successful outcome, performance and process goals that could have either self-referenced or normative evaluation.

We have 140 yards...140. Is it down breeze or is it...you see I'm...I am going to say it's a cross wind and I am going to play it as a 140 shot. Wind is off the left. Looking for a nice loose rhythm. That's the one. Right so I am going left of flagstick, pick your line, and trust your shot. Commit to this one. (RM3)

I've never seen those bunkers before. 215 over that bunker, straight over there. Good swing commit to it, watch it fly. Pick your line hit the shot. (PM3)

15 yards from the green, pin in the middle. Hit 56 just try and land it on second level and let it release out. Come on stone dead. (PM4)

These goal intentions, however, were evident in the absence of perceived pressure, when there was a clear understanding of the challenge and an apparent positive appraisal of their ability to meet the demands of the task:

It's down breeze but very cold. Coming out of a roughish lie, just get this within...15 ft give myself a chance at birdie. (PM1)

Nice 7 iron from down there. Can't see this being a qualifier today, it would be nice to be a bit closer to the handicap. (RF4)

Drew too much...left of green but green high, not too bad. Oh it's run onto the green. Come on green in regulation! (RM3)

Players further demonstrated efforts to ensure these positive outcomes with professional golfers verbalising more personalised swing intentions compared with the more rule based instruction expressed by recreational players:

Right. Up the left hand side. Focus on rhythm; focus on not feeling anxious, just letting it go. Hands on the inside, swinging round to a full finish, up the left keeping hands on side. (PM2)

Again height, ball position, shoulders. Just check the alignment, ball position... (RF2)

5.6.4 Averting failure and disappointment.

A number of factors influenced players' avoidant behaviour and cognition including previous experience (e.g. avoid repeating previous mistakes), heightened awareness of worst possible outcomes (e.g. efforts to block out visual hazards) and a motivation to

maintain personal standards and acceptable levels of performance. These thoughts were often initiated following appraisal of shot difficulty:

Right lie...absolute shit, horrible fucking lie. Right how many bunkers are there? I am worried about this going left because there is a big claggy bit behind it. (PM3)

and this influenced decision making and set new criteria with which to measure success:

Got a mark a couple of inches left of the hole that's my line. Downhill so take a bit off it but don't quit. Pick your line, that's it and commit to a softer shot. (RM3)

54 uphill into the wind...don't fat it...don't fat it. I'm going to fat this [laughs] come on... pick your point, pick your point. (PF1)

Golfers' personal beliefs developed from their playing experience served as triggers for avoidance motivation during the round:

See if I can sink this, what is it 45 yards? Avoid getting a 10 on the card. Up into the wind slightly uphill should check a bit. (RM4)

and the recollection of previous failure and disappointment evidently played a dominant role in both professional and recreational golfers' motivation at key stages of the round:

There's nothing worse than messing up the last hole. And actually I did have a thought that I didn't mention that I played here in a region event a few years ago I finished with a 7 on the same hole and standing on 18 I did think of that bad last hole on there, because I shot 75...no 77 then, so I finished badly and I was like I don't want to finish badly today. So I put that little seed in my head [laughs]. (PM3)

Knowing that I've done it before...knowing that I've blown up on the last couple of holes so I suppose it comes back to you. At that time you are thinking this is where you usually blow up but I have also finished very strong but that's not what I remember. (RM1)

The goal of averting failure and disappointment led to a number of cognitive and behavioural strategies. Recreational golfers attempted to direct attention away from negative outcomes, however this was often verbalised in a way that instead, reinforced awareness of hazards rather than promoting a focus on desired outcomes:

See the ball see the flag. No hazards, nice and relaxed should be quite nice and easy shot. (RM1)

Little bit to the right. Right I need to aim left side of the bunkers, just remember to swing through because there is no water in front of you. 170... no point in chancing... just play an iron, most comfortable iron. (RF2)

This was also evident when recreational golfers wanted to avoid technical errors. Rather than focusing on adaptive movement patterns their focus was on avoiding the swing faults that often disrupt performance:

Well when I do my practice swing, I have been practicing at home, trying to get it rolling straight. Trying to think... this pendulum and not breaking my wrists at all and not... really hitting it and I think on the practice I probably do and then... it's almost like when I get over it I have to get it over and done with quite quickly... because it is going to be rubbish. (RF1)

The above player reflection also provides an example of how this avoidance motivation influences behaviour as the player sped up their routine in order to get the shot over and done with. Avoidant behaviour strategies were also employed by professional golfers on a number of occasions. By withdrawing certain behaviours and practices that they knew would be beneficial to technical performance a greater motivation was evident that enabled the avoidance negative emotions such as anxiety and panic:

If I go on that putting green at the moment before I am playing and I miss 2 or 3 putts it sets even more doubt. Like I am struggling as it is and then I go on the putting green and then miss more it's even...it's worse. So I just think I don't want to go anywhere near there. (PF3)

If I turned up to an event and I had to hit say 15 pitch shots then I would automatically judging how good those 15 pitch shots were...and if I say hit 14 bad pitch shots or 10 bad pitch shots, when I go out on the course I kinda feel like it would be in the back of my head. (PM1)

Even when performance was high or at acceptable levels and the attainment of higher level goals (i.e. low score, reduced handicap, or high finish position) were achievable the thoughts of participants in this sample represented a motivation to avoid loss and to not throw away the opportunity:

Shit 1st putt pace was wrong. I am so nervous because I am playing well, just thinking don't fuck it up. (RM1)

I was in the 5th from last group in the 2nd to last round so that was the highest that I had ever been and then I didn't have such a good score, let myself down a bit. (PF1)

Ultimately it appeared that the higher level goals dominated motivation during competitive performance. When these were perceived to be out of reach a desire to withdraw from the challenge was evident with no alternative motivation to compete or maintain effort levels apparent:

Ok, looking forward to seeing parents later. Left just tad left. Actually straight at it, got the line, pace. (PM3)

Ok let's stick this close get a 5 and get out of here. (RM2)

Come on wind. You've got to be kidding me. Rushed it again!! This is just a chop now. Nearly home. (PM1)

5.6.5 Multiple goal intentions.

Golfers' achievement targets have been presented in the main from explanations of desired movements and golf shot outcomes, however, other goals (e.g. performance goals, process goals) were valued and attended to in relation to motivational and performance intentions. As part of the decision making process during a players' pre performance routine tactical decisions were considered and initial success criteria were set in self-referenced outcome (e.g. desired score) performance (e.g. on green) or process (e.g. successful movement) terms:

Right this has got to be close. That was my third...my third on a par 4. Chip this close and 1 putt. It's all about the score.

15 on. Probably 1 club less but one club more for the upslope. Must be on the green. (RF4)

Ok up the slope to start and fairly straight once it gets up there about 30ft. I am going to go about 6 inches right of the cup and let it drift back down So put a good stroke on this one make sure you get it to the hole. (RM3)

Nice ridge here uphill from the left. Just get the pace...pace, pace, pace. (PF1)

Right 4 [shots] on the green 1 putt if possible. Right to left, not too much they don't seem to be breaking much at the moment. Slight...up to the hole, preferably in! (RF3)

Right 40ft putt so just make sure you get it inside the dustbin lid and if it drops it drops. just commit to a relaxed putting stroke. (PM2)

Players' verbal accounts when competing revealed multiple goal intentions prior to performance that included goal combinations on self-referenced/normative and approach/ avoidance dimensions. The initial goal intentions appear as responses to the players' unique source of pressure (context, personal, external) whereas subsequent goal intentions are set in consideration of the players own performance histories and habits. This subtheme outlines how avoidance goals influenced approach goals, how approach goals influenced avoidance goals and how process goals were used to achieve

performance goals. A feature of this subtheme and of these participants' goal directed cognitions is a focus on goals that would regulate internal demands as opposed to the specific performance demands. The principle motivation was to address personal and unique perceptions of pressure, manage maladaptive affect and avoid past negative experiences. So although these are framed in both avoidance and approach terms it is the focus of attention that may be associated with negative performance outcomes. The ability for attention to be focused on multiple goals was clarified with one professional golfer following her round:

Yeah I was thinking there is a hump behind the pin, don't leave it short. You know, get it up to the hole and leave yourself a nice putt and then I hit it like an idiot. I got right underneath it and left it short. Which really annoys me. Leaving something short really annoys me when I have thought get it past and then... (PF1)

So just so I am clear because there were a couple of thoughts there, first of all you said don't leave it short and then afterward you explained that you said to yourself don't leave it short get it up there. Can you recall having both of those thoughts or was it just one of them? (RESEARCHER)

Don't leave it short and get it up there, yeah both of them. (PF1)

Golfers of all abilities in the study verbalised thoughts that indicated competing motivational intentions. The avoidance of undesirable outcomes and consequences appeared to be the dominating factor, however, awareness of the negative effects of such a focus were evident in efforts to first direct attention towards approaching desirable achievement outcomes. The conflict seemed to exist between the goal to meet the demands of the task (golf shot) and the goal to avoid personal performance habits. One professional female golfer made consistent reference, in preparation, to the particular behaviours she was trying to avoid:

90 to the centre. Nice and smooth. On the green. Come on, don't quit just swing through. (PF1)

So come on then let's think positive, just think pitch...just pitch on the green and don't...don't quit come on (PF1)

An awareness of maladaptive behavioural patterns was a feature of the professional golfers multiple goal intentions with the avoidance goal content referring to specific processes that they were in control of and responsible for initiating, whereas recreational golfers referred to a greater extent, to the avoidance of negative outcomes or self-presentation:

Right. Driver up the right. Trying to feel calm...teeing it down low. Keep arms on the side turn through to a full finish. Make sure not to back away from it. (PM2)

Right 140 front flag, smooth 9 at the fag. Keep the rhythm going commit don't dolly this one (RM4)

Ok looks like a PW about 130 yards haven't got to think about what club to use just think nice and easy and get it on there. Make sure that I get that up and on that green. Don't want to lose it now! (RM1)

Ok positive putt. I know it is going to go left to right so I just need to line it up, positive through the ball but I don't want to be too firm. Pick your line (RF2)

One recreational golfer experienced a substantial dip in performance during one hole of his round and the post round interview sought to gain understanding of any differences in goal intentions. What was apparent from his and others accounts was that goals could be verbalised in approach terms but that this could be masking a more dominant underlying avoidance motivation that has a greater influence on behaviour and specifically skill execution:

I went through exactly the same thing... ok I might have had a swing thought, make sure I keep that left shoulder forward so I don't come to quickly across. And exactly the same thing almost repeated it third time. It didn't feel very much different no. (RM4)

It is possible, therefore, that the utility of approach goals needs to be considered in terms of task demands as opposed to regulating internal demands made salient by pressure appraisals. Although cognitively represented in approach terms the latter could in fact initiate motivational mechanisms more associated with avoidance.

There were instances where an avoidance goal influenced an approach goal in golfers' goal directed cognitions and the uniqueness of the pressure experience was evident in these examples. The personalisation of a players' pressure appraisal was exemplified by one recreational golfers' reference to 'my trouble' and 'my safe shot' in explanation of his thought processes and objectives when preparing:

From a routine point of view, after teeing the ball up I go and stand behind the ball and I am basically looking at the hole. I analyse what the weather is doing and so I look at where the wind is coming from, I look at where my trouble is, so I look at kind of where my safe shot is. (RM3)

This initial pressure or threat appraisal highlights an avoidance goal or goals but then in this instance initiates an approach goal organised in self-referenced terms with a motivation to feel comfortable:

Ok put all notions of water out of your mind, you are not going left. Nice easy hands at that little tree in the distance with a nice touch of draw. So pick your line... that's good. Nice and easy and trust that practice swing. (RM3)

Even when approach goals were the last verbalised thoughts prior to skill execution by the golfers in this study, there lacked a clarity or specificity that would make efficacy measurement possible or that would create a sense of control over their achievement:

The shadow is so annoying. Uphill...uphill from the right. From the right, uphill. Don't leave it short... do not leave it short. Give a good run at this one. Nice and smooth. (PF1)

Right clear that negative thought of hitting it into the bunker and duffing it. Hit a good chip shot. Ok good contact (PM3)

That's the same line I would like to take but it's a bit...risky. If it goes a bit left it's in the bunker. So I am going to go just right of that. (RF1)

There were very few occasions where performance objectives were set, followed by specific process goals directly within the players' control:

Right come on. Right come on middle of the fairway, keep the rhythm going and width. (RM2)

Ok don't want to leave it short because you want an uphill putt, but I don't want to go racing by so gentle because I am into the wind. (RF2)

5.7 Theme 3: Goal evaluation

Where the previous theme captured players' declared aims, objectives and targets for performance the goal evaluation theme provides insight into dominant achievement motivation that may underlie well learned cognitive representations of the most adaptive measures of success and competence in sport. This theme suggests that in some cases goal intentions may represent knowledge of the 'correct thing to say' rather than valued goals that initiate action. Goal evaluation consists of three sub themes created from the analysis of 21 raw data themes.

Verbal reports that reveal goal evaluations during competitive performance highlight instances of disparity and concordance between player definitions of achievement

parameters and how they subsequently appraise their efforts and performance. The themes of ‘motivation hierarchy’, ‘reference to correct measures’ and ‘maintenance of achievement perceptions’ include elements of achievement motivation that permeate the goal intention main theme (i.e. definition and valence) but are distinctly characterised by cognitions that reveal intrinsically valued goals at the situational level and schematics that maintain these achievement motives. Players’ goal evaluations are posited to influence both subsequent goal intentions and performance perceptions differentially depending on their correspondence or discrepancy with goal intentions and as such represent a possible mechanistic explanation of (sub)optimal performance and the ‘choking’ experience.

5.7.1 Motivation hierarchy.

Despite establishing success and competence criteria that would provide golfers with multiple measures of self-referenced and normative achievement, goal evaluations often revealed an outcome priority and comparison with others. The thought of one recreational male golfer demonstrated how his opinion of one measure of success i.e. skill execution, changed or decreased in importance in comparison with another; the result of the shot:

Oh thought that I had played that one well and it's gone about 12 ft past. (RM4)

This is understandable when score ultimately defines the success of the round but this is not commensurate with each player’s stage of development. In these situations there may be valuable learning opportunities lost and acknowledgement of skill development successes missed particularly for the recreational or novice golfer, when development is superseded by an environment that promotes outcome evaluation. Reinforcement of this idea is provided by the thoughts of professional and recreational golfers who overlook one aspect of performance failure i.e. skill execution when this is followed by a greater valued outcome assessment:

That's a great shot, thought I had caught it heavy (PM3)

Spin ball. Not bad. Gives me a chance. Didn't quite make good contact with it but that's good, it's alright. (RM3)

Better shot than I thought it was, a little short but 5 yards short and on the green. Cracking shot, I'll take that. (PM3)

Aw! Bit lucky there, mishit it but still in play. (RF1)

Particularly during periods of perceived poor performance, player attention was directed to 'comparison with others' which often diluted any personal achievement measures:

Well best drive by far today and I just decided to stand up there and hit it absolutely solid. No practice swing, just look at it and hit the fucking thing...and I've ended up about 40 yards behind [partner 1] and 70 yards behind [partner 2]. (RM4)

Frustration levels high...what am I +7 haven't hit it much worse than (partner) but what is there 5 or 6 shots between us? Whether it's an illusion or disillusion that I'm not hitting the ball so well...maybe I'm not hitting the ball so well but I don't feel like, other than a few swings that I have hit it any worse than him. Bit of rust around the short game...still nice golf course. As long as (friend) isn't doing better than me...gutted. (PM1)

The impact of outcome and score in particular on motivation, confidence and positive affect during the round was a feature of the stories players told of their performance when interviewed:

I put it in the water on the right, pathetic absolutely pathetic just waving the golf club around instead of hitting the ball, pumped the ball up to about 30 yards short and then chipped onto the green to about 6 inches and then lifted me again because I got a 5 but I had rescued it out of that. (RM2)

Within such narratives there was a failure to acknowledge valuable qualities and characteristics associated with optimal performance such as patience, commitment and mental toughness for example. Instead the outcome of these endeavours is held as the most valuable feedback and evidence of success, competence and accomplishment even when goals have not been set explicitly in these terms.

When reflecting on previous performances recreational golfers acknowledged that they played their best when score was not the main motivation, however even when enjoyment is posited as the driving factor the success of this goal is framed in terms of the positive affect that it had on scores suggesting that enjoyment goals were still dependant on minimum performance standards being maintained:

I can remember saying once we had walked off this was at the start of the 17th at [club] 'let's go out and have some fun' and I really wasn't bothered about the score at all and I shot something like 4 under handicap. It was a competition and

I was seemingly you know in a nice kind of state and erm I performed really well. (RM4)

Professional golfers in this sample appeared to aspire to control performance levels and although this included positive scores, that alone did not provide satisfaction. When asked what his specific goals for the competition had been one professional golfer explained:

Even if I had shot 2 or 3 under I probably wouldn't have been happy...to be honest because I realise its more...it's a deeper problem. So I would imagine, going into it, probably trying to find the answers really. Trying to find hope for moving and progressing forward. (PM2)

From the thoughts captured of both professional and recreational golfers and their subsequent reflections on their competitive round and performance histories, there appears to be a misalignment of how success and achievement are defined in preparation and determined when evaluating and reflecting. All golfers considered and included multiple goal types in their performance preparations, which served to direct and energise attention toward skill execution. For the recreational golfer higher order goals relating to their reason for participating in the sport (e.g. enjoyment) were never attended to cognitively during performance and goals to improve skills and avoid personal technical errors were goal intentions, however, achievement was ultimately determined by shot outcome and score. Professional golfers gave greater attention to the processes that would enable them to achieve their higher order outcome goals relating to low score and winning. Prior to skill execution, for example, goal intentions included the motivation to create optimum movement or to execute a specific game plan however; goal evaluation was cognitively represented, in terms of outcome even if these goal intentions were not attained. These assessment criteria only appeared to be used during competitive performance as in contrast, when reflecting on their rounds and past performances this group of players suggested that score was only one important factor and the ability to control performances and produce them in an 'acceptable' way was also necessary.

5.7.2 Reference to 'correct' measures.

In addition to setting normative and self-referenced goals and assessing performance in these terms, golfers' goal evaluations were also representative of a belief that there were

correct performances or standards that could and should be attained. The reference to ‘correct’ measures sub theme appears to represent a distinct definition of competence and as such, provides some support for the recent 3 x 2 elaboration of the achievement goal framework (Elliot, Murayama & Pekrun, 2011) that has separated absolute and intrapersonal definitions of competence within the mastery construct. Within this theme achievement criteria are set according to personal beliefs (self-referenced) about how they should perform in any given situation, however these beliefs are also influenced by a perception of the standards others (task and normatively referenced) are able to obtain and so suggests that there may be a need to acknowledge absolute perceptions of competence pertinent to the sport and relative to individual skill level but that are also influenced by the ability of others.

Thoughts that typify this sub theme initiate perfection and ‘should’ statements and inferences. Often thoughts explicitly reflected an intention to get everything correct:

Definitely today to begin with but then on the back 9 I then started saying to myself, right ok this is what I am thinking about, I need to check my ball position, check my alignment and then remember shoulders and just you know swing through the ball. So then, I literally then repeated those actions but didn’t think about it. (RF2)

Frequently, however, golfers set goals beyond the most immediate challenge in an attempt to make up for perceived errors or to ensure that they remained on target to achieve acceptable standards of performance:

Sit...to far, sit! Played that badly. Chip and a putt, chip and a putt. (PF1)

That must have been tight. Couple of feet, second cut then green. 25 ft again a little right to left. Knock it up and walk off with a par. (PM4)

Right 188 you have the opportunity to hit a great shot into the last hole and make up for the shocking ones that have gone before it. Good swing, come on good swing, one more good swing. (PM3)

The beliefs guiding these thoughts were evident when golfers were asked about their motivation following poor performance during their round:

I hate double bogies. 11th was ok and it all went Pete Tong on the 12th erm... and then my head went down because what I think is I’ve got to make up those shots...make up those shots so you’re putting more pressure rather than forgetting what you have done, you can’t change that just play your game, I tend to think, make those shots up got to make those shots up. (RM2)

It's disappointing but I always try and think ahead of where I can get a shot back you know and... like today I was thinking on that back 9 I had dropped a couple on the 12th I think it was, so I was thinking, like the par 3 I can get 3 on... thinking where I could get it back. (RF1)

In the absence of perceived pressure, golfers were directed toward self-referenced measures of comfort and control prior to skill execution as detailed in the previous main theme. Increased personal meaning and the need to maintain personal standards, however, appeared to contribute to the motivation in all players to adopt new strategies and to correct technique in an attempt get performance levels back on track. The subsequent attention to rule based, explicit information that has been extensively attributed to performance decrement in elite performers (e.g. Beilock & Carr, 2001; Maxwell & Masters, 2008) may therefore, be a function of underlying motivational mechanisms prevalent in elite 'choking' populations. Such a motivation should not lead to maladaptive attentional focus in recreational or novice performers and may instead serve as an adaptive strategy to maintain task focus and distract players from external stimuli that could potentially consume working memory. The thoughts of one professional golfer below are an example of a motivation to correct technique and are comparable with the goal intentions of recreational golfers:

Right leant into that and didn't commit through to it...came through the ball. So make sure on this one not to be worried and go through to a full finish. (PM2)

Oh that was shit. Really tried to hit that and it didn't happen. Right, calm it down you are trying to attack too much that is not what you should be doing. (RM1)

Not too bad. Went a little bit higher than I wanted, remember to turn your shoulders. (RF2)

The reflections by another professional golfer provide insight to the ineffectiveness of this strategy:

Yeah I just didn't know where a shot was going to go erm.... no matter how I tried to approach it, whether it was 'I'm going to try and cut this' or 'I'm just going to aim further right' it didn't matter what I did I would always get the same result, so I was at my wits end, I didn't know what to do and then I stopped striking it. (PF2)

During the period that the golfer was experiencing performance decrement, goal evaluations focused on the need to make up for these errors as quickly as possible. Completion of the hole, however, presented an opportunity to confine sub-optimal performance to that discrete episode and this in turn triggered thoughts that reassessed goals in accordance with higher level objectives:

So despite that nonsense on the second if I make a par here I might not have my handicap go up any more. Come on let's make a par finish. (RM4)

Into the wind I've been terrible today, just popping up all over the place. Come on you can shoot over par and still get a cheque. That's what you have got to think about get yourself a cheque for the day. (PM3)

This cognitive process appears to recalibrate player motivation for the remainder of the round, and to regulate emotion. The most personally meaningful goals for recreational and professional golfers become salient in these situations and provide perspective of the performance decrement.

5.7.3 Maintenance of achievement perceptions.

The verbal accounts that participants provided; post shot, on completion of a hole or when reflecting on their round provided insight into how players cognitively reinforced and maintained their perceptions of ability, competence and success through their performance evaluation and self-talk. The 'maintenance of achievement perceptions' subtheme, further emphasised the dominant outcome motivation of this golfing population.

Players frequently reappraised their performance when they received more information with which to determine their success. They acknowledged a premature assessment of their previous shot, however, subsequent re-evaluation was only ever with regard to the outcome and not their execution of the processes responsible for performance outcomes such as completion of behavioural routines, achievement of specific movement patterns and technical accomplishment:

Perhaps not as short as I thought I was so not the wrong club, just that I saw that coming from the right and it didn't. (RM4)

That's a really good miss that idiot. You have left yourself a horrible chip... nice. Not much in my favour, well done. Turning from the right [sigh]. (PF1)

25 ft, should have done better from there. (PM4)

All golfers' performance evaluations resulted, at some stage in the round, in frustration at poor performance, with thoughts placing the frustration in the context of the most valued outcome goals:

...and I've come right across it out right, another stinking shot. Now I'm feeling a bit pissed off. (RM4)

Frustrating. Double bogey finish. Oh [sigh]. (PM3)

Only big clump of heather and it must be where I've hit my fucking ball. Really frustrating now. Didn't think it was in any danger other than being a bit scruffy. (PM1)

The dominance of the broader objectives held by all golfers, for example, producing a low score or reducing handicap were evident in the attention to thoughts that either acknowledged that players were on target to achieve their goal,:

Don't feel so bad about the last hole now. 17 points with 2 to go.

If I can just keep it sensible and get a bogey then happy days. 20 points on the back 9 so far... (RM1)

confirmed their perception that they were not,:

If you want to keep the honour you are going to have make a storming up and down here sunshine. (PM3)

This is ruining my medal card (RM4)

or that they had missed an opportunity that would have taken them towards their target:

Misread. Good opportunity missed. (PF1)

Go, go, just short. Bit of a waste again, but that's a par. (PM4)

Oh don't do that! Could kick myself shouldn't have just gone at it. What a waste. How sickening. (RF4)

...this is why I think I walk off the golf course frustrated, I fritter away shots with the odd bad swing that really cost me or lots of little errors. You know, not getting the ball up and down from the fringe of the green on the par to make birdie. (PM1)

The noticeable relief in the performance outcome further emphasised the salience of these goals throughout the round even from the first shot as epitomised by the professional golfer below:

Yeah on the 1st tee shot. Hit it right up the middle and then hit a good second shot quite close. Yeah so it was more relief on the first and then I felt quite comfortable from that point. (PM4)

*That's good, great shot thank goodness for that well done. Concentrate, focus!
(RF4)*

*Ooh bit of a slap I'll take that. Pleased with that easy to turn into a disaster that
hole. (RM2)*

In addition to the inconsistent goal measures, there was also a failure to fully appreciate smaller achievements which may have served to increase self-confidence during the round and alter perceptions of achievement. These moments were often followed by a self-depreciation which served to further minimise any feeling of accomplishment:

Hooray there's a golfer in there somewhere! (PM4)

Yes, halleluiah...par. (RF2)

Pre shot *Worried about missing this. Just try and ignore it. Good putt come on!*
Post shot *[Sigh] Just! Not a great putt but it went in. (PM4)*

Safe. Very boring. Always my bail out that area...very boring. (PM1)

Actually up to the flag, well about 15 feet short. (RM4)

Players' outcome goals whether in relation to score, handicap or comparison with others dominated the thoughts that served to maintain player perceptions of achievement. These goals function as a reference point with which to interpret performance levels at any given point in the round and influenced feelings of frustration, perceptions of efficacy as well as decision making and the setting of new goals and targets. On reflection players were aware of how these goals could negatively affect performance and as this professional golfer epitomises, the assessment of where a player is in relation to these goals at any given time can have an impact on thoughts, feelings and behaviours:

I was probably a bit more tense, trying to force it a bit too much maybe with putts because I was losing it with my driver a little bit I went from 1 under to 2 over quite quickly and yeah I suppose it was putting more than anything just really trying to 'come on hit a good shot'. Maybe I tried to start forcing it but then I had a couple of birdies and I think I relaxed a bit. Then I got myself under pressure again when I dropped a couple of shots. (PM4)

The main themes of goal intention and goal evaluation provide understanding of the temporal cognitive experience of golfers who have performed sub-optimally under pressure. As such these themes remain unable to explicitly determine goal involvement during skill execution, however, analysis of players' goal intentions and their assessment of their performance in relation to these objectives has enabled greater

proximity to the performance experience and insight to dominant and underlying achievement motives.

Despite evidence of adaptive goal intentions that focused on mastery and self-referenced achievement measures it was apparent there was a motivational hierarchy in which outcome goals and beliefs regarding acceptable performance standards dominated evaluation. In addition players' verbal reports revealed goals constructed from a predominantly avoidance valence. Even when thoughts aloud yielded goal intentions framed in approach terms these were toward the regulation of internal states or to manage the identified unique source of pressure rather than the accomplishment of task success or in sole consideration of performance demands. Achievement motivation therefore, can offer explanation of the underlying mechanisms that lead to performance decrement but also proposes intervention that may resist sub-optimal performance.

The goal evaluation main theme revealed a consistent mismatch between how goals were set in preparation and how they were assessed after skill execution or the competitive performance as a whole. Golfers in the study appeared to lack cognitive strategies with which to organise their multiple goal possibilities into manageable and adaptive goal intentions commensurate with their level of ability. Goals were not referred to explicitly in performance (ego) terms during competitive performance, which suggests that goal involvement may differ from other levels of achievement goal definition (i.e. dispositional and environmental). Although mastery or task goals dominated goal intentions there was consistent reference to 'correct measures' of performance by all players in goal evaluations.

At the situational level (goal involvement) there is often an absence of salient normative cues with which to evaluate performance and instead it is proposed that an implicit absolute measure is accessible. This is particularly the case for recreational or novice performers who do not consistently play with players at an equal stage of development and ability or who are not able to see others performance during the competitive round as they do not have access to tournament scoreboards, for example. This suggests that players were aware of acceptable ability-relevant standards set by others at the same level of development. 'Others', at the situational level of achievement motivation, were defined by players' group association (e.g. professional, recreational golfer or handicap category) and all in the study consistently assessed their performance with regard to the beliefs and perceptions they held as to what others in this 'group' would do or expect.

Professional golfers in the study applied different criteria to the assessment of performance during the round and upon reflection. During the round goal assessment conformed to the motivational hierarchy placing outcome of greatest importance, however, post round interpretations in interviews contributed to alterations in perceptions of competence. Where score and the result of skill execution were held as primary indicators of competence during competitive performance these measures were then considered as less reliable indicators and instead the processes or quality of skill execution and actions, in comparison with perceived acceptable standards were promoted.

It must be emphasised that the outcome goal priority that is being highlighted here reflects the extent to which golfers expressed their most valuable or meaningful measures of achievement, success or competence. The goal intention and goal evaluation main themes together with multiple goal intention and motivation hierarchy subthemes provide further understanding of the potential orthogonality of achievement goals at the situational level (goal involvement). There is evidence from player verbal reports that multiple goals are considered and attended to in preparation for skill execution, that the goal definitions and valence that ultimately initiate skill execution are a function of players achievement goal intention profiles (e.g. dominant mastery avoidance intentions), and that goal evaluations reveal the most deeply held definitions of competence with which to assess performance.

All golfers attended to multiple goal types in preparation including performance goals such as successfully hitting fairways and greens and improving on personal best criteria. Process goals, more directly in player control do not permeate this theme, however, as they were not held as primary determinants of performance accomplishment. Instead the processes understood to enable the attainment of valued goals are embedded within the thoughts that initiate skill execution and are, as such, representative of the specific instructions to act toward goal achievement. It is at this stage of the players' cognitive experience that the motivation – attention relationship can be most closely examined with goal directed cognitions initiating skill execution.

5.8 Theme 4: Initiating skill execution

A discrepancy was highlighted in the previous theme between the players' cognitive accounts of goal intention and evaluation. The following main theme provides

understanding of possible reasons for the negative achievement perceptions of this sample as they evaluate performance in response to information irrelevant to their stated goal. The 'initiating skill execution' main theme offers insight into the golfers' thought process from intention to action and details where attention is focused in order to commence and complete successful skill execution as well as highlighting the salient factors that compete for player attention during competitive performance. The initiating skill execution main theme consisted of five sub-themes created from the analysis of 34 raw data themes; 'decision making', 'personal rules and implicit information', 'technical and explicit information', 'focus away from immediate challenge' and 'attention strategies and influences'. This theme consists of thoughts that, although sometimes appear similar in content to source of pressure and goal directed cognitions, differ in the extent to which they are either appraised as a threat to resources and ability with regard to the former or to which they are valued as a determinant of achievement in the latter. Instead the thoughts aloud in this main theme represent information attended to by the player in order to instigate and control successful movement or indeed thoughts that compete for that attention.

5.8.1 Decision-making.

As part of the decision making process both professional and recreational golfers gathered objective information about the challenge ahead and the demands of the task that considered, the lie of the golf ball, weather conditions, distances to the intended target area and any external stimuli or hazards to be negotiated:

21 on... 83 yards. 83 yards into the wind, 83... probably a 7 iron because of the wind. 83 is going to be too much with a 7 I will try my 8 and just trust it. (RF4)

Ok we have...wind slightly behind but off the left so left hand bridge is the aim and smooth and relaxed. (RM3)

Information was gathered through behavioural routines that enabled tactical and technical decisions to be made:

91. Doesn't look 91. I am going to do that again. It's actually 90 that yard is going to make all the difference. (PF1)

Ok straight putt...or is it just on left edge, inside left... read 3 lines there...inside left. Good roll. (PM3)

These routines provided an opportunity for new information to alter initial assessments and for both recreational and professional golfers to consider relevant factors and draw on their performance experience:

I am going to have a wander round this one. Looks like it's about level to start with, then coming in from the side, downhill. Now looking from behind it looks to be about level or even coming in slightly from the left. Look from behind the ball...looks like it's just going to come in from the right and where as I thought earlier that it was downhill towards the hole it now looks uphill, pretty much all the way. (RM4)

Look at it from the other side...obviously going towards the hole from right to left. About 30ft...green has been tined so it is going to bobble a little bit. (PF2)

Despite the evident utility of a structured routine, both professional and recreational golfers in this study did not report a disciplined approach to this aspect of preparation or express a full appreciation of the relationship between routine and performance:

I don't know I just do whatever I feel comfortable doing at the time to be honest [laughs]. I did go through a period where I was set in a routine, where it would be...whatever...but I can't seem to stick to that, I don't know why. I seem to...if I do feel nervous or something, I will back away or stop, but now it's getting to the point where I am used to that feeling so I just go ahead and do it anyway if that makes any sense. (PM2)

Erm... I think it will make me focus. I mean the whole idea was to focus over your shots and know what you were doing rather than just going up to the shot and hitting it you know, without even really thinking about it. But I have tried to do this anyway. (RM4)

There were occasions when decisions were verbalised in a simple and positive way. Outcome and movement intentions were clear and there was an absence of instruction with which to guide skill execution:

113. Right dead aim at the pin then. Dead aim at the pin, positive swing. Commit to the swing, positive swing, dead at the flagstick. (RM3)

Straight uphill. Commit to this one. Just go straight at it and commit to the putt. (RM3)

Straight in the back of the hole. Slightly to the left. (PF1)

Just knock the putt in. Hammer it home. Uphill right to left...c'mon. (PM4)

More frequently, however, recreational golfers' decisions were taken as a result of uncertainty and the consequent consideration of risk in shot selection as opposed to accurate interpretation of task demands:

Take my 9 iron, I don't want to above the pin with this one. A bit confused as to what line so go straight at the pin. (RF1)

15 on...got to get enough club to get it up there because of the slope and the elevated green. Wind against...lets go to the right because it's flatter there. (RF3)

If I pitch this there's a chance I won't make it... if I chip and run I know I can make it just depends how it reacts...5 iron just to get it moving forward more as that bank...got to get it over it. (RM1)

68... I want to play it low into the green, let it run on. Ok do I want to go high or low? Wind is taking it... right less risk go low. $\frac{3}{4}$ swing... (RF2)

Although professional golfers still considered risk when there was uncertainty over decision-making they did so without sacrificing performance objectives:

I really struggle to get my club right here. 126 to the pin, down the breeze but probably going to knock it down so playing like a smooth 130...smooth 130. Struggle with the club selection here but I have got a back stop so... (PF2)

The role of decision making in directing attention and ultimately the impact on behaviour, skill execution and the contribution to sub-optimal performance was epitomised in the verbal accounts of one recreational male golfer:

About 25 ft past downhill. Good result from where I was. Tricky one at least a couple of cups left. This one will be a nice one to roll in. Now I've come this side of the hole and the ball it doesn't look like it is going to come so much from the left. Maybe there's not that much in it. Ok keep it smooth.

Post shot

Lagged it, to be honest didn't know which way it was going to go. (RM4)

5.8.2 Personal and implicit information.

Verbal accounts immediately prior to performance often contained information that lacked objective meaning or explicit instruction with which to perform the skill. In contrast the content was indicative of personal rules and a more implicit source of information on which to focus attention. This attentional focus followed clear decision-making, the apparent absence of perceived pressure and when players portrayed

confidence in their ability to meet the demands of the task. The personal and implicit information sub-theme encapsulates how individual player histories and experiences are incorporated into both the decision-making process and subsequent focus of attentional resources. This is characterised by the following thoughts of recreational golfers who labelled challenges as difficult without providing justification from the specific demands of the shot:

Awkward one here over that ridge... think how I'm going to play this. (RM4)

Right last of the horrid 3... (RF1)

Cognitive processes were not captured during the golf swing, however, understanding was sought of the extent to which players felt that they did attend to specific thoughts during skill execution in their post round interviews. Professional golfers provided the richest accounts of their attentional focus, whereas recreational golfers in the study were either unaware of specific thoughts or reported key words of explicit instruction. The majority of professional thoughts in contrast, inferred an attention to key swing feelings demonstrative of the 'personal rules and implicit information' sub-theme:

I think that it was either commitment or tempo because they tend to be my 2 ones...that really my game...if I commit to the shot and I make a decent rhythmical swing...because I am quite flat and quite shallow so generally I don't have the clubface...I set it and then I just rotate through it and so my bad one is when I don't quite get fully turned, come over the top of it and snag it left, like on the par 5 or I sit back on it and I poke it right. I don't tend to hit snap hooks or really nasty shots, it's just where I don't quite commit to a swing and execute it properly... (PM1)

Some thoughts during the shot, however, were recognised as being a result of ineffective decision making in preparation:

Yeah there were a few like I was worried about club selection, while I was taking the shot. Especially 16, I just had completely the wrong club. I tried to hit a 4 wood out of it and it was just completely the wrong club and I was thinking that over it. There was a couple actually...in between, not 100% committed and thinking that while swinging I suppose. (PM4)

In preparation, swing feelings or analogies that appeared to encapsulate prior learning were employed. In isolation this information did not appear sufficient to initiate successful movement, however, the personal meaning that these thoughts evoked enabled players to rehearse a feeling, clarify intentions and guide skill execution:

Take a smooth grip, good swing. That's the one...right pick the line...here we go...smooth away and trust the practice swing. (RM3)

Ok I reckon that is right lip on line. Yep that's right lip, right lip slightly uphill try and use a touch of commitment on the putt. It's good for pace, trust that. Line up... good... go. (RM3)

Start at the window. Everything together. (RF4)

Bit of a wobbly putt... bit of a wobbly one. (PM1)

Often the shot demands presented external stimuli from which a picture emerged of how the player would like to play. In these instances previous experiences and imagined desired outcome in the form of a mental picture, combined to guide tactical intention:

54 degree...c'mon soft hands play the ball through. Right. Downhill, soft knockdown shot. Feeling quite relaxed about it. Pitch it just short and let it run down. Flip it on the front and let it release. (PM2)

Underneath those trees...150...8 iron. Right on the limit there. Should I go 7 and keep it under that tree? Float it there's a little bit of wind? Not a nice place to be is long from there so...it will be the 8 iron. Ok sitting nice; hit it out watch it come round. (RM1)

The information that golfers attended to for skill execution was also captured from a more general 'golf knowledge' that may have originated from personal playing experience, observation or beliefs influenced by others but nevertheless was an important influence on attention:

Ok so not in the sand in the rough, I've got about 130, wind's behind it's [the club] going to bounce so it's not going to stop out of this, so I will throw a 9 iron at it. (RM4)

Right think about your own game. Straight downwind again. 144 straight downwind, over those bunkers...127...easy 8 iron or hard 9. Easy 8. Choke down on the 8 iron...that's good, that's good. (PM3)

Always miles longer this hole, I might hit 4, a gentle 4. (RM2)

5.8.3 Technical and explicit information.

Attention to technical information for skill execution was both a dominant feature of the cognitive experiences captured during the competitive performance in the present study and also the focus of players' preparation:

Yeah well I spent the last couple of days practicing, hitting golf balls, did what I needed to make myself a little more secure in the technique that I was going to be doing and using and erm...yeah I played golf, I played the last 4 days running so...well apart from yesterday where I just practiced only. I have actually been filming myself a lot. The technical side a lot more intense than before. (PM2)

Despite attempts by recreational golfers to play 'naturally' there was an admission that during the shot itself their attention would turn to specific technical information and swing thoughts.

During the swing... I would be lying if I said no I didn't, I think I do, I think I do and I think it tends to be technique ones that flick in now and again. (RM3)

Players were not always aware of the extent to which they attended to this information with discrepancy between verbal accounts and post round reflections:

Yes I try not to think too much, I try to make it muscle memory. I think well you've done all your practice you should know what you're doing and hopefully the muscle memory will be able to clock in. I just try... I do try, I do think to turn on myself and then come through it so yes I am thinking of that but maybe 1 or 2 at the most not very many because otherwise you get clogged up and I think that is detrimental probably. (RF3)

Right gentle back onto the green just over the... just like [coach] showed me. Stance, forward and just a little... forward in your stance, forward... (RF3)

The technical information attended to by recreational golfers differed from that of professionals with regard to ownership of the knowledge. The technical instruction recalled by recreational players appeared as instruction reminders from, for example a coach whereas, although still technically constructed, professionals framed instruction in consideration of specific personal needs and movement habits:

Ok 216 yards to the green just hit it nice and straight, nice and straight is all I need. Nice easy...set up right...left foot is going to be a little bit low so if I can...still keep myself square on that...get the proper turn...can get that...I can get that and make it. (RM1)

136 downwind. Right PW...downwind, arms inside, commit into a full finish go straight through. (PM2)

Specific context demands but not necessarily pressures also encouraged technical reminders or alterations from 'normal' instruction required to execute skills:

Ok uphill but you have got the wind behind so that is going to motor... just nice and gentle. Wider stance, steady yourself, ok... (RF2)

Regardless, all golfers made use of pre shot technical key words to initiate desired movement throughout their rounds:

To the ditch lay up 123. Turn... (RF4)

Right edge. Ok right edge...stay down, chalk line, chalk line...chalk line. (PF3)

Right to left. Stay soft. (RM4)

Ok left centre up the hill, feeling a bit shaky again. Just focus. Back and through. (PM3)

The importance of these key words was emphasised in the ‘mantra-like’ way they were sometimes used to remind the player of what was needed to produce a successful shot:

That winds not too strong. Width, keep my width. Keep my width, remember that. Right keep the width...keep the width. (RM2)

There were frequent examples of how responses to sources of pressure initiated an attention to either the step-by-step process of the golf swing or multiple swing thoughts and feelings:

Another dropped shot, oh dear. Ok basically need to play the same shot as I did on the 5th. Grip down the club just a nice steady swing. Swing through the ball. Ok think about it, height of the tee, feet position with the ball and then shoulder turn. Good right line yourself up... I want to aim at the bridge. (RF2)

Now not a great...93 slightly heavy lie I think gap wedge. Just outside a divot here so... got to focus up and commit to hitting this one as clean as I can... smooth and solid. (RM4)

My very first golf teacher, he was from up north, he was lovely and on thing he always used to say to me was ‘relax them arms’ so that is one thing that I am thinking, put the club behind, relax them arms and then my immediate... just after this last lesson with [coach] about my weight on the front of my feet on the balls of my feet, which I wasn’t doing. So today that was my 2 thoughts, trying to get my arms relaxed and my feet, weight further forward on my feet and then... (RF1)

Come on then, silver birch back of the green, swing through. Nice and smooth, come on... nice and smooth, swing through. (PF3)

Right hands to the side, turn chest and through to a finish. Be free. (PM2)

The strongest indication of the importance of this sub-theme in understanding the cognitive experience of the participants in this study comes from players’ technical assessment of shot outcome. Although verbal accounts did yield personal rules and implicit information, the comprehensive focus on technical evaluation provides insight

into the dominant focus of attention during skill execution and where responsibility for outcomes is placed by this sample:

Aah! stood up out of it. That will be alright, short enough of the crap. That's fine. (RM3)

Aargh, come out of it more. Idiot...that's good well done. Damn. Awful swing, awful swing. (PF1)

Ooh no, kick left...sit. Shit! Wow where did that come from? I might be aiming that way. Come on. (PF2)

Oh Pete that's where you get right over the top of it. Wanker. Ok that's a reload. Fuck. (PM1)

A further indication of recreational and professional differences in the use of this technical knowledge is provided by one recreational player who explained how instruction is used in order to analyse performance or to provide understanding of performance decrement, rather than to direct desired movement patterns:

One of the things that I have been working on recently which has been working well in the lessons is... I have got a lot of movement... I have had a lot of movement on my transfer of weight. So what I have been focusing on is trying to snap this left leg back to try and give me something to work against. Every now and again, you... I would subconsciously get that sort of, as I was coming down I would... it would flash into my mind have I snapped the leg?... too late and I'm through and I can't remember whether I did or not. Just that glimmer every now and again where you think did I do that? (RM3)

Despite the attentional emphasis on technical swing thoughts, golfers acknowledged that this was not necessary or even desirable for optimum performance both during their round as captured by thoughts aloud:

Got to go. Stood over that for so long I put myself off. Thought about it too much and left it 3 ft short. (PM4)

Again didn't think about it just went straight in and ended up with a really, really clean shot. Pleased really pleased. (RF2)

and when recalling where their attention has been during their most successful performances:

I think when I just put my club down and then I think that the last time I think about it is when I take the club away and then I am not thinking of anything...I don't think![laughs]. Yeah its automatic, I just swing. (PF1)

Well I suppose I was a bit more... only a little bit more deliberate on the first 9 and on the back 9 I thought I am just going to stand up there and hit it basically. (RM4)

5.8.4 Focus away from immediate challenge.

The previous two sub-themes have highlighted how participants' focus of attention was on both technical and more personally meaningful information at different stages of their competitive rounds. In the absence of perceived pressure or when this pressure was met with perceived ability to meet the task demands, attention for skill execution was verbalised in a more personally meaningful way or in a way that suggested ownership of the knowledge. Information may still have been explicit in its form but served more as a checklist or mental routine rather than adherence to the step by step process of skill execution. Challenges appeared to arise when internal and external stimuli competed for this focused attention and initiated thoughts that took players away from the immediate performance challenge. These consisted of thoughts that took the players attention to what could happen or they would like to happen in the form of prediction thinking:

Go on ball...its fine almost on the green. Better than being over the green. 2 putt from there which will be fine. (RF4)

Straight at those guys. Got to make a birdie, at least one under for these next 3. (PM4)

When reflecting on their rounds both recreational and professional golfers acknowledged that their focus was often on others and future events rather than the present situation:

Walking to the 8th tee. I'm thinking ok I've saved my par on 7, got my 3 excellent good up and down... 2 pars will see me level gross and in a really strong position because the back 9 is my favourite 9... (RM3)

Yeah I was quite score orientated, regardless of who I am playing with I pretty much know who scores what everywhere erm... I have just always been like that. I started thinking about what [partner] was doing what her lie was, what the options and odds were I guess the last 5 holes. (PF2)

Whereas players' predictive thought patterns suggested a level of control of outcomes as it outlined what needed to be done to achieve their future goals, golfers in the study also attended to wishful thinking. When engaging in wishful thinking there was again a clear desired outcome but on these occasions responsibility for achievement was

considered to be outside of their control or not going to be a consequence of their actions:

Come on let's have a nice putt on this hole...please! (PF1)

Definitely not as close as I thought, uphill. Straight again...dead straight. Come on please get this one in. (PM4)

Please be good. Be in play. Now is the time to pray! (RM1)

Immediately post shot and in between shots attention was often taken by more negative interpretations of the performance situations that lead to either panic thoughts about the future:

Oh come on you had the line! Another double bogey, pissed off now. Falling to pieces...awful. (RM2)

Looks good, got a chance got a chance, come round. Not sure if that was too long, might have been too long. Where the fuck is it? (RM2)

or frustration, disappointment and anger in the form of hindsight thinking:

Sounded alright came off the clubface but not enough speed. Maybe I should have chipped. (RF4)

Ah! Lost it right. Lost it right on the short side...cock it! You've just got to be clear when you stand over a golf ball what you want to do with it. Straight at the flag...it's tight right of the green you have got everything left of you...hopefully it is far enough past the bunker. So important to be positive today, just keep positive. (PM3)

Players also provided examples of how external distractions such as unexpected changes to shot difficulty or the behaviours of other golfers took their attention away from relevant information for skill execution:

That's just a horrible swing, fucking terrible swing. Felt shit on the way back, shit on the way through and shit in the end! Other than that it was really good. Fuck sake, I am actually 40 yards short. I am blaming a kid...for walking his trolley...walk away start again. I am playing terrible into the wind. (PM1)

Normally there is more nattering but I don't like constant natter because that puts me off as well but in between I think you can relax a wee bit; I try to because otherwise you can focus for the whole time. (RF3)

5.8.5 Attention strategies and influences.

The information for skill execution main theme is dominated by verbal accounts and reflections that raise awareness of this golfing populations thought as they occurred during competitive performance and when playing under varying levels of perceived pressure. The thoughts within this theme provide insight into the contiguous information attended to prior to skill execution but a distinctive feature from the cognitive processes captured was the absence of consistent and extensive use of strategies to regain or direct appropriate attention. That is not to say that they were non-existent, however, an element of control permeated these thoughts as attention was focused on skills and strategies of play that the golfer felt able to accomplish. There were occasions when attention was away from the most immediate challenge or task but this was used in an adaptive way as players either recognised an opportunity that they had created or a specific challenge that initiated strategic thinking:

We are into the wind off the left hand side so I am going to aim slightly up the left... up the left hand edge of the fairway, let it drift back. (RM3)

Given myself a nice yardage so I want to hit 5 wood at the pin and give myself a nice pitch shot. (PF1)

172, slightly uphill, the wind's helping erm... I can make it with a 6 but I've got 188 to the back edge so I can certainly play a full smooth 5. Bring this in a touch from the right. (RM4)

Most often an external focus of attention was incorporated into the decision making process:

Right go over the bunkers at that little tree. (RF4)

Nice and loose on the hands. Pick my spot. Land it there...land it right there. Ok pick your spot and commit to that. (RM3)

Right come on. Nice birdie here. Last hole middle of the fairway, straight at the hut. (PF1)

Straight at the clubhouse. (PM3)

and a heightened awareness of negative thoughts and feelings that in themselves initiated self-regulation strategies and concentration thoughts:

Ok 195 straight downwind, surprised it's this far in thought it would be shorter. It's got to be 4 iron...mad thoughts going through my head...don't fat it...think positive! C'mon...focus on your set up. Just get a good swing. straight down wind, target line...go. (PM3)

Less nervous now... but still feel that things are moving a bit quick. Just getting a bit jumpy. Got time now to get a bit more rhythmical. Time to have a proper practice swing. (PM1)

Starting to feel nervous again, still for no reason. Long way to go. (RM1)

Ok...Aagh. Think about what you are doing, trying to find a flag that you can't see...walk away start again. (PM3)

Participants in the present study were characterised by a dominant attention to technical and explicit information for skill execution, a focus away from the immediate challenge and in particular, to skill irrelevant thoughts and a priority of regulating internal processes (e.g. negative thoughts, emotions and physical sensations). Players attended to technical and explicit instruction when in situations of perceived pressure, when presented with challenges that they considered they were unable to meet and when they were indecisive in their tactical intentions. Cognitive content was not exclusively technical and explicit in nature; there were situations in which players attended to personal rules and implicit information, however, this was in the absence of perceived pressure and when confidence in the ability to meet the challenge was apparent. This purposive sample had experienced substantial negative performance in their playing histories and therefore, may have perceived consistently high context and personal pressures. Consequently players would have been competing in a climate that promoted management of these perceived pressures rather than attention solely on the demands of the next shot.

Differences were apparent between recreational and professional golfers' use of this technical and explicit information, which suggest that the content in itself may not be adaptive or deleterious to performance. Instead the extent to which the golfer perceives ownership of that knowledge may provide understanding of the degree to which this cognitive process diminishes attentional resources during skill execution and may represent the attainment of proficiency or expertise within a specific domain. The professional golfers in this study produced verbal accounts in which attention for skill execution was technical and explicit in content but represented personal reminders for optimal performance whereas recreational golfers appeared to use this information as instruction of 'how to' perform a required skill.

The game of golf places demands on many different skills for both the professional and recreational golfer. It is possible, therefore, for a player to attain high proficiency in one or more skill (e.g. putting, chipping or driving) and yet maintain an overall low ability

level as this is determined by the outcome measure of gross score (total number of shots taken). Alternatively a player determined as being of high ability such as the professional golfers in this study, will not necessarily be proficient at all requisite golf skills and so will be susceptible to context, personal and external pressures initiated by these skill deficiencies. This means that unique personal performance histories, sources of pressure and achievement goals will influence cognitive content at different stages within a round that could influence maladaptive cognitive processes (self-focus/distraction, internal/external) for both recreational and professional golfers. Appropriate attention may not be determined by playing ability (i.e. professional status / handicap) but instead by the level of expertise a player has reached in each skill. This is supported by think aloud reports that demonstrated differences in players focus of attention to technical explicit cognitive content in preparation for some skills compared with more personal and implicit information in others that they appeared more comfortable with:

136 downwind. Right PW...downwind, arms inside, commit into a full finish go straight through. (PM2)

Feeling quite relaxed about it. Pitch it just short and let it run down. Flip it on the front and let it release. (PM2)

Analysis of think aloud data to this point has provided insight into the competitive performance experience of players that is characterised by an iterative motivational-attentional cognitive process. Attention to personally salient sources of pressure influence goal directed cognitions through intentions in preparation and assessment following skill execution. Goal intentions are verbalised at outcome and performance levels followed by processes that define attention to initiate successful skill execution and the attainment of these goals. When players assessed their goals in correspondence with their intentions they provided positive acknowledgement of the situation and outcome, recognised that they had either achieved or were on target to achieve their goal and accordingly experienced success. More often, however, player goal assessments were not aligned with intentions and this discrepancy lead to negative perceptions of performance.

5.9 Theme 5: Performance perceptions

Players' goal evaluations lead to further narrative on the impact skill execution had on performance criteria. The 'performance perceptions' main theme provides understanding of the key performance assessments and consequences that golfers were aware of both during their round and on reflection after their competition. The theme offers insight to the cognitive, affective and behavioural processes that may contribute to either isolated incidents of suboptimal performance or longer-term performance decrement including 'choking'. The 'performance perceptions' main theme consists of two sub themes 'self-regulatory performance' and 'absolute performance' created from six raw data themes. This theme captures the impact of skill execution and goal evaluations on intrapersonal, affective and competitive performance variables that include behavioural, cognitive and physiological processes and emotional, motivational, self-efficacy and absolute outcomes. Players underlying achievement motives and skill level are suggested to influence the relative attention given by players to process and absolute 'performance perceptions'. Goal intentions during the round may as a result be altered in response to this selected attention and the subsequent influence on salient personal pressures in the competitive environment. Positive perceptions of absolute performance can exist despite sup-optimal execution of self-regulatory processes and conversely self-regulation competences may not be acknowledged when performance is only evaluated through 'absolute' criteria.

Performance perceptions differ from goal intentions and evaluations fundamentally in their proximity to skill execution and specifically in their relation to different definitions of achievement. Where goal intentions and evaluations refer to the fluctuating aims of competence striving during competition and thus represent goal involvement, performance perceptions are made in reference to longer-term reasons for competitive action.

5.9.1 Absolute performance.

Absolute performance refers to those measures that are determined by the aims and normative standards of the sport, relative to skill level. The subtheme reflects players' perceptions of performance in relation to score and handicap, their position in the tournament and the stability that they ascribe to current performance levels:

Well I think really the day has been successful if you have scored well really hasn't it with a game like golf... You could still play well but not win perhaps, I think on a personal front. (RM4)

My success is always about trying to get my handicap down, that's the Holy Grail. (RM2)

I stood over the second chip shot and I set myself the challenge of hole it, make a 4 sign for 73... (PM3)

The purposive sample of golfers in this study had all had an experience of 'choking' in the previous twelve months; however, there were different accounts of the permanence of the performance decrement and the extent to which performance was in the players' control. One professional golfer reflects on her particular experience and captures the source of pressure and goal intentions that contributed to performance that she believed to be outside of her control:

Erm yeah last year I managed to finish dead last in an event and... it was one of the first events that I was playing that year erm and I had actually played my practice round with [player] and I played pretty well if I remember in my practice round, I played well and I teed it up and I felt this sort of pressure on; this is an event that I can win money at and move up the rankings and maybe change my ranking half way through the year. I had so much... I put so much pressure on myself that it not only cost me X amount to go over there but to play and earn money and the potential of what I can earn out there and I spiralled out of control. I did not know what was going wrong. I mean there was a point and I can be quite emotional erm, there was a point where I was close to almost sitting on the floor and crying, I didn't know what to do. (PF2)

A contrasting account also defined as a 'choke' by another professional outlines how the pressure environment influenced performance decrement but that this was not permanent as performance then improved within the same round:

It was so bad. Well it was...because it was my first pro event and the announcer is stood on the first tee 'introducing [name] making her professional debut!'...I shot 11 over for the first 9 and I was about to cry and then I shot level par back 9 (PF1)

When explaining how and why this felt like a 'choking' experience despite score improving, the player referred to personal aspects of performance that had dropped from normal standards:

I never really suffer with nerves but I can assure you when I had my first pro event, standing on the first tee, my stomach was going.

These negative emotions only dissipated when the player's primary goals were perceived to be out of reach and new objectives were set. The goal intention and initiating skill execution subthemes provide supporting accounts of how the pressure environment induces changes to 'normal' patterns of thought, decision making, attentional focus and behaviour and the following subtheme further explores the importance of these performance measures.

5.9.2 Self-regulatory performance.

From an achievement motivation perspective the ability to self-regulate and successfully execute required processes may be a significant measure of competence depending on the individuals' stage of development. The demonstration and experience of positive cognitive, emotion and behaviour management, therefore, represents a developmentally apposite accomplishment, which may in turn influence absolute measurements of performance. Successful execution of these intrapersonal and affective processes are not goals exclusive to the recreational or developing player but also to the players that have attained professional standards that infer a ubiquitous expertise when in fact these players maintain differing levels of ability across skill domains (i.e. putting, chipping, sand play and long game). This is epitomised by the attempts of one professional golfer to manage maladaptive thoughts ahead of a skill that she was not confident in executing:

54 uphill into the wind...don't fat it...don't fat it. I'm going to fat this [laughs] come on... pick your point, pick your point. (PF1)

Excessive rumination and a focus on negative past experiences were a feature of recreational golfers reflections in particular, with failure to manage unhelpful thoughts and emotions recognised as contributing to absolute performance failures:

I tried to put my chin up and look above the flag telling my body not my mind that everything is ok and force a smile. But that at one point a few holes later I remember thinking that I was still annoyed about it and that was bad but it crept into my mind because it really did annoy me a lot. (RF4)

Multiple process failures were identified in player accounts of absolute performance decrement with inefficient cognitive and emotion regulation often influencing maladaptive behaviours:

That was one of my... everything at impact went tight. I felt the wind at the last minute and on the way down tried to give it that little bit more. (RM3)

Golfers were on reflection, also aware of how attention to task irrelevant information and others contributed to process decrements:

Yeah I was rushing a little bit to be honest. I was thinking oh it was taking forever. Erm...worried about other competitors really you know, playing two balls and all this malarkey, it's obviously going to affect their day. So uhm...I was more concerned for them really. And a lot of time on the golf course I feel that way. (PM2).

Right that was awful, there for 3, still save par, feel like I am rushing slightly and bad club selection. Annoyed with what I'm scoring now, don't really deserve to be scoring what I'm scoring...never mind. 92 yards...85...52 or wedge, 52. (PM4)

The underlying goal intentions held by golfers were embedded in their performance perceptions and although these influenced the performance focus of each individual (e.g. absolute performance measures of greater interest to players with goals relating to score) self-regulation failures were a conscious part of the narrative. The thoughts of one professional golfer also indicate a degree of acquiescence as posited by Baumeister and Heatherton (2004):

I think that I just gave up... not as in I wasn't trying, I was like I have played shit as it is I might as well just go for everything and it came off. (PF3)

The relationship between self-regulatory processes and absolute performance perceptions appeared to be bidirectional in that there were self-regulatory consequences associated with negative perceptions of absolute performance. All golfers referred to the emotional impact of absolute performances evaluation:

Oh come on you had the line! Another double bogey, pissed off now. Falling to pieces...awful. (RM2)

Oh no it's getting worse, that's in the water there. Just sloppy swing...just embarrassing, fuck sake (RM2)

So crap. Verging on the major embarrassment here. (RM4)

I felt quite embarrassed at how I played today. Erm just because I am changing my swing and I would say that I wasn't very confident at all erm... but on a couple of shots today I was thinking that I was going to top it. (PF1)

This main theme suggests that there are important differences in how performance can be measured as a function of golfers overall ability, skill specific competence and goal intentions and clarity is therefore required to enable accurate assessment of optimal and suboptimal performance and instances of ‘choking’. Hill et al., suggest that the ‘choke’ can only be experienced when a player is striving for success it is therefore, imperative to understand the individuals’ goal intentions and success criteria for this performance decrement to be established.

The intrapersonal processes and affective responses identified as being within the control of the individual (regulation of thoughts, feelings and behaviour) clearly have an impact on performance outcomes such as quality of skill execution and score and further exploration of these elements is essential to understanding the mechanisms that contribute to ‘choking’. In addition to contributing to absolute performance outcomes that may be positively or negatively appraised by others, self-regulatory processes may be independently evaluated on a performance continuum from ‘clutch’ to ‘choking’. With knowledge of players’ goal intentions we will be better able to identify instances of self-regulation failure or ‘process choking’ such as dramatic reduction in behavioural, cognitive and affective regulation. The importance of this distinction is epitomised by the accounts of one recreational and one professional golfer. Their reflections raise the question of whether a ‘choke’ should be something that is defined by the observations of others or experienced by the individual and has important implications for appropriate intervention.

I was over thinking about the previous day where I know to do a soft shot because it’s a silly... it feels like a silly hole. I can’t really do a full shot on it unless you get bad weather conditions and then I can go at it. But you know I am playing a 58 degree wedge most of the time on that hole and then it’s like well is it a $\frac{3}{4}$ is it a $\frac{1}{2}$ swing... I’ve got to hit it. So I was conscious of the fact that the previous day it was a soft swing and I ended up... it’s like I’m going at it too much so I kind of gave up, decelerated and just quit on it. It went straight in the water and I have now potentially lost this hole, put us back to all square and I have been up all the time. (RF2)

Yeah they weren’t good thoughts I was thinking Jesus Christ...here we go again. Just a stupid error again. But then I was happy with the shot, I wouldn’t take the shot back. I was happy with the way I played it, it was over the pin, everything I pictured was good it just ended up going long and causing that so from that point I wouldn’t change the shot, obviously I would like to change the result, but I would like to say that I was committed on that one. I wasn’t nervous or anything, I saw the shot and I played it. It was probably one of the only good shots that I played all day really in that respect erm...but then, you know having a triple on the first is ridiculous really. (PM2)

Whilst many psychological processes are observable in player behaviour, goal intentions are not and access in this study to players' unique patterns of thought reveal that performance should perhaps only be determined in relation to the unique aims of the individual.

5.10 Discussion of findings from Study 1

Study 1 sought understanding of the motivational and attentional processes of golfers when performing under pressure. Participants were purposely selected following the recommendation of Mesagno and Hill (2013a and 2013b) that research into 'choking' under pressure should ensure that it examines those that have actually experienced it. It is important to note, however, that the research does not claim to analyse the 'choking' experiences of all participants but instead the performance experiences of golfers who have acknowledged that they have 'choked' in accordance with the definition of Hill et al. (2009) and are as a consequence susceptible to 'choking'. The think aloud method of data collection satisfied an additional aim of getting closer to the performance experience. This has, in turn, provided understanding of how players responded to perceptions of pressure in the competitive environment through thoughts that energised action and a focus of attention to initiate skill execution.

Think aloud techniques in Study 1 were selected to reduce errors associated with accounts collected solely from interviews including recall and memory decay. Previous research has recognised the difficulty of ascertaining thoughts during skill execution (e.g. Nicholls & Polman, 2008; Philippen & Lobinger, 2012) and so limitations of this method of data collection are acknowledged. The level 2 protocols (see Chapter 4.2.1) proposed by Ericsson and Simon (1993) were adopted and participants trained prior to data collection in order to elicit verbalisations that transform feelings and images into words. Whilst Ericsson and Simon accept that additional time is sometimes required, to complete this task, processes relevant to performance are importantly not replaced and in this case execution of the golf swing. Any additional time taken in processing verbal accounts, however, may have impacted behavioural regulation strategies (i.e pre and post shot routines) and so potential indirect effects on performance need to be considered. In the present study efforts were made to determine this with any noticeable observations of behaviour change explored in post round interviews. It is possible that the thought sequences reported by participants may have

been altered as they were directed to verbalise those specifically related to performance. This may have led to the exclusion of other significant influences on perceptions of pressure and challenge. Despite these limitations the analysis of cognitive intention and evaluation, supported by retrospective interviews in the present study, has provided, the most temporal account of the thoughts that contribute to performance outcomes under pressure.

5.10.1 Cognitive model of competitive performance.

The conceptual cognitive model of competitive performance below (see Figure 5.2) has been developed from the main themes established from thematic analysis in combination with evidence from contemporary research into performance under pressure. The intention is not to suggest a complete mechanistic account of performance but instead it is used to assist discussion of the main findings and the role of achievement motivation, which speak to current debates in the extant literature. Specifically these are; the orthogonality of achievement goals (e.g. Harwood et al., 2001; Treasure et al., 2001), the dichotomous nature of attentional focus and the influence of task complexity (e.g. Beilock et al., 2004) and clarity of performance decrement definitions (Buszard et al., 2013; Jackson, 2013; Mesagno and Hill, 2013a; 2013b). In doing so achievement goals are posited to have a fundamental influence on attention during skill execution and self-perceptions of performance outcomes.

In summary, players' unique appraisals of the performance environment constitute a personal pressure, influenced by motive dispositions (need for achievement / fear of failure), which heighten awareness of dynamic and challenging context and external pressures during competitive rounds. In response to identified achievement situations and pressure appraisals, players determine competence criteria for skill execution and outcomes. At the intention level goals are proposed to be orthogonal and the resultant goal profiles determine attention parameters in which focus has the potential to shift prior to and during skill execution. Following skill execution, golfers evaluate their competence either in correspondence with their goal intentions or by some 'other' criteria (discrepancy) that is posited to reveal underlying valued achievement motives. In a final performance process, the two cognitive evaluations (correspondence/discrepancy) contribute to performance perceptions in terms of level of performance and the stability of that performance. The 'choke' and 'clutch' performances are suggested to only be identifiable by the performer because of the need

to understand achievement motives and intrapersonal decrement that is required; therefore, observers can only establish standard performance and underperformance in relation to players' skill level.

Participants' appraisals of the performance context and external stimuli were both influenced by and contributed to, personal pressure during competition. Thoughts attended to during the study support previous research that has identified potential stressors including; event importance, high expectations, evaluation apprehension, specific performance challenges and psych-emotional concerns (e.g. Giacobbi, Foore & Weinberg, 2004; Hill et al., 2010a; Nicholls & Polman, 2008). These are contained within context pressures that were presented by the demands of the performance situation, external pressures that were not directly initiated by the requirements of the task and personal pressures that were initiated by more stable characteristics and past experiences. The competitive environment represented an achievement situation for all of the competitive golfers and consequently achievement motives at the global (dispositional) and environmental (motivational climate) were central to the source of pressure main theme and sub-themes and resultant goal involvement (situational). Pressure to perform was apparent when either the context or external factors provided an opportunity or threat to goal striving and equally players' achievement goals heightened awareness of these potential opportunities and threats. These were further illuminated by a dynamic motivational climate, influenced by playing partners, opponents and the stage of the round and served to promote the most meaningful measures of competence to each player.

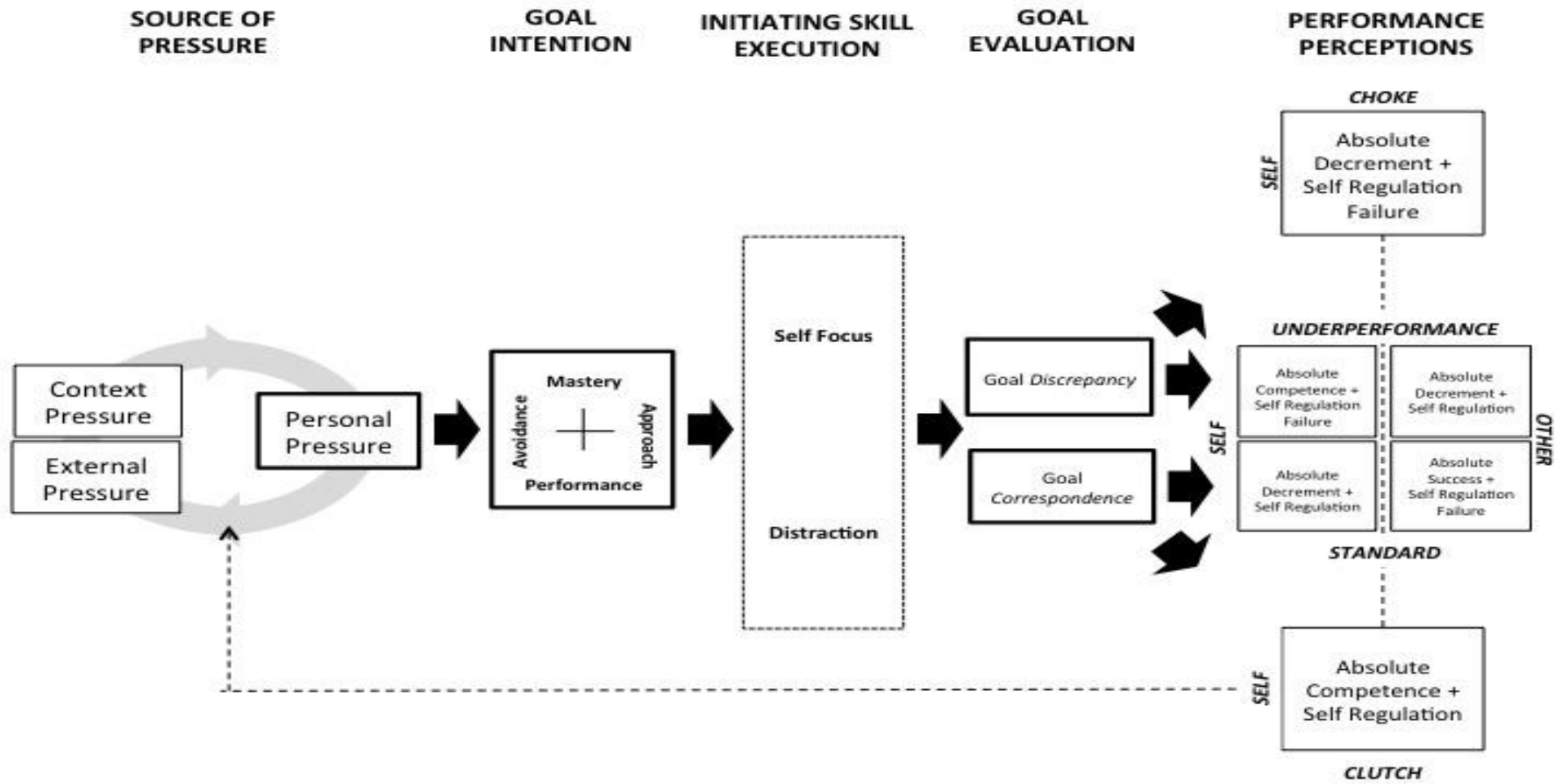


Figure 5.2 Conceptual cognitive model of competitive performance

All participants in the study performed below expected standards in the tournament when their overall score was assessed in relation to their playing ability. If we consider this as inferior performance then analysis revealed that anxiety, both cognitive and somatic, was not a necessary component of this underperformance. It is, therefore, proposed that various levels of performance decrement may be a consequence of inappropriate motivation rather than an inability to cope with anxiety or stress, particularly when others define this. Pressure is ubiquitous to the competitive environment, contained within the personal pressure sub-theme as a consequence of players' motive dispositions, and the need to achieve or fear of failure (hierarchical model of achievement motivation, Elliot & Church, 1997; Elliot, 1999). This motive however, may heighten perceptions of pressure but not evoke a full anxiety response. The cognitive model of competitive performance demonstrates that sources of pressure that may or may not be anxiety provoking, contribute to goal intentions and a motivation to act towards competitive objectives. These intentions will in turn direct attention towards either the attainment of competence or the avoidance of incompetence as a consequence of skill execution and can still lead to a full range of performance outcomes.

Think aloud data prior to and immediately after skill execution produced themes that separate situational achievement goals (goal involvement) into goal intentions and goal evaluations. These subthemes answer the request by Duda (2001) to classify goal involvement far closer to the performance experience than obtained in previous research (e.g. Hall & Kerr, 1997; Smith & Harwood, 2001; Williams, 1998) that has sought retrospective, reflections through questionnaires, self-report methods or made assumptions about goal involvement from measurements of the motivational climate. Players revealed achievement goal intentions following their appraisal of the competitive situation and at this level there appears to be support for the orthogonality and independence of achievement goals (e.g. Harwood & Hardy, 2001; Harwood & Swain, 2001; Nicholls, 1989) as multiple intentions emerged in terms of definition and valence.

The consensus in the achievement goal literature is that individuals should be encouraged to pursue mastery approach goals and discouraged to pursue avoidance (e.g. Dweck, 1999; Elliot et al., 2011; Harackiewicz, Barron, Tauer & Elliot, 2002; Patrick & Ryan, 2008) a position supported by the dominant, though not exclusive use of avoidance goals, by golfers in the current study. When approach goals were verbalised

these were towards self-regulation rather than performance outcomes. Verbal reports that reveal the consideration of multiple goal intentions offers the first insight into the real life relationship between goals at the situational level and provides insight to quantitative positions, for example, meta-analysis that has found performance avoidance goals to be positively related to performance approach goals (Papaioannou, Zourbanos, Krommidas & Ampatzoglou, 2012). Further study is needed to establish how initial pressure appraisals elicit primary goal intentions in response to perception of threat or opportunity and then how secondary intentions emerge as a cognitive strategy to meet achievement demands.

Greater understanding of goal intention profiles will provide greater predictive utility of goal involvement during skill execution as dominant goal intention profiles (e.g. high mastery/low performance) would be expected to influence attention towards those aims. For example, the golfer that sets achievement criteria as being predominantly through experiencing competence in mastering a specific skill may direct their attention inward towards skill relevant information and self-focus. For the golfer with a more dominant performance goal intention profile (e.g. high-performance/low mastery) a focus on demonstrating competence in comparison with others may direct attention to management of external and environmental cues and as such be a distraction from task-focused attention. When the goal valence is considered within these profiles (i.e. approach/avoidance) then the profile possibilities increase and arguably provide even greater understanding of attention options.

Attention directed to task relevant information was not always found to be deleterious to long-term performance and may only contribute to isolated instances of perceived performance decrement, and this may be for one of two reasons. First, if the player's achievement motive is to gain mastery over a particular skill or aspect of movement then if the outcome of that execution is evaluated appropriately (goal correspondence) then gains will be made and acknowledged in terms of feedback and learning. This engagement in the process was found by Gucciardi et al. (2010) to contribute to positive learning experiences. Second, this focus of attention may encourage explicit monitoring rather than conscious processing which is proposed to be an adaptive component of self-regulation (Heatherton & Baumeister, 1991) and as a consequence may only impact processing efficiency (Jackson, Ashford and Nosworthy; 2006).

The initiating skill execution main theme provided support for three specific positions

on attention and attentional control. First unlike previous research that has reported either self-focus (e.g. Beilock et al., 2004) or distraction (Hill et al. 2010b) as being the best explanation of skill breakdown or ‘choking’ in elite performers, golfers in the present study, verbalised consistent attention to both technical and explicit information and a focus away from the immediate challenge and toward task irrelevant information. This suggests that under pressure skill break down or performance decrement may be a function of the cumulative impact of reduced working memory capacity in response to distraction and management of task irrelevant information followed by overload from subsequent attempts to consciously control movement and as such, is better explained by the attention threshold hypothesis (Hardy, Mullen & Martin, 2001). Second, although the participants in Study 1 had different skill levels as defined by their playing ability status (professional or handicap) it was apparent that expertise was not a standard that could be applied to players’ golf games as a whole but instead was relevant to each sub-discipline (i.e. chipping, pitching, iron play, sand play, long game). The degree to which skills were reliant on working memory was therefore, dependent on players’ perceptions of competence in each skill and not their overall ability. This supports the suggestion that skills will break down as a function of reduced working memory capacity or conscious control of movement based on the task complexity (Beilock et al., 2004).

This distinction is important so that future research avoids over-simplistic explanations of elite and novice performance, as the processes that initiate skill execution and movement will differ depending on the level of competence attained in each. In addition ‘one-size fits all’ interventions (e.g. minimise self-focused attention in elite performers) will be reduced in preference for bespoke strategies that meet players’ specific skill profiles. A third finding from analysis offers support for strength-based models of self-regulation (Baumeister, Heatherton & Tice, 1994) in that attention to task irrelevant information and efforts to regulate thoughts, feelings and emotions come at a ‘psychic cost’ that may in turn have a negative impact on performance. Pressure does not only serve to reduce working memory capacity but also to deplete self-regulatory resources and in doing so will have two different performance outcomes (absolute and self-regulatory) that in various combinations will be perceived by the performer and others on multiple levels.

The initiating skill execution theme also supported research by Bernier, Cordon,

Thienot and Fournier (2011) who found that golfers used sequences of attentional foci, moving from one to another as they prepared, executed and evaluated their shots. These findings challenge static dichotomous conceptualisations of attention (e.g. internal or external focus) and propose a more dynamic and adaptive process in which golfers shift their attention in response to performance demands. This possibility emphasises a need to gain greater understanding of goal intention profiles. Dominant achievement motives may explain decisive attentional focus selections and the range of stimuli from which these are selected may be established from attention parameters that are set as a player appraises the achievement situation and formulates their objectives. Golfers with high-mastery/high-performance goal intentions, for example, would elicit broad attention parameters that will make them susceptible to both distraction and self-focus whereas, these parameters would be reduced for golfers with high-mastery/low-performance or low-mastery/high-performance goal intention profiles, with the inclusion of valence, again contributing to more accurate profiles.

The fundamental component within the conceptual model that provides understanding of performance evaluation and the proposed achievement motive mechanism is that of goal evaluation. The identification of the motivation hierarchy subtheme provided explanation of either goal discrepancy or goal correspondence as players' responses and reactions to skill execution were assessed in comparison to their goal intentions. In many cases there was a disparity between for example, self-referenced goal intentions (mastery) and subsequent normative (performance) evaluations, however, there was minimal reference to comparison with others in all the participants' accounts. This may be as consequence of either the individual nature of the sport or the absence of normative cues, particularly in the recreational golfers' environment but suggests that the competence measures available to golfers at the level of involvement may differ to those at dispositional and climate levels. There were consistent references, however, to more absolute criteria and expected standards according to ability and so further study is warranted to establish whether achievement goals at the situational level require further refinement to ensure that this competence definition is contained within the current 3 x 2 model (Elliot et al., 2011).

Goal discrepancy or correspondence ultimately influences players' performance perceptions and their underlying achievement motives will determine whether performance is considered in absolute or self-regulatory terms. Goal correspondence

was not found to only be associated with positive performance perceptions and goal discrepancy not only with negative performance. Instead correspondence appears to have an adaptive influence on self-regulatory processes even if absolute performance decrement is evident, whereas when goals were evaluated by criteria that differed from intentions (goal discrepancy) this appears to negatively influence intrapersonal variables and feelings of control, functioning as a misregulation failure (Baumeister et al., 2004), even when absolute performance criteria are met (e.g. gross score). In this conceptualisation goal correspondence and discrepancy contribute to standard and sub-standard performance perceptions of individual players (self) but will not be a factor in the performance appraisals made by others.

In a final process of the cognitive model of competitive performance, players' performance perceptions provide additional cognitive stimuli that will contribute particularly to context and personal pressure and the formation of new goal intentions. The consequences of goal evaluation and performance perceptions will determine the stability of any performance gains or decrement and, as such, may explain more substantial changes in performance levels and provide interventions to minimise the duration of suboptimal performance. Maladaptive goal evaluations could, for example, lead to a greater pressure to perform and rumination over perceived failure and in doing so elicit the 'choke' through a lapse activated response (Baumeister et al., 1994). These efforts to alter technique during a round could encourage a task focus and mastery goal involvement but will not explain the attentional mechanism by which the skill has broken down unless the ability of the golfer is known. As Buszard et al. (2013) caution a focus on skill relevant information (reinvestment) by an elite golfer may explain 'choking' through distraction rather than self-focus, as these are, in this instance, irrelevant cues with which to execute skills for this population. It is therefore, of paramount importance that more comprehensive skill profiles are established to ensure that appropriate goal intentions are made both from the outset of performance and in response to performance perceptions.

Baumeister et al.'s (1994) strength model of self-regulation further highlights the benefits of appropriate goal evaluation and the opportunity to minimise the effects of isolated performance decrement. Repeated exposure to pressure situations is proposed to develop strength in the intrapersonal processes required to deal with the situation.

‘the ability to perform under pressure is not an innate ability to cope with pressure but instead learned through successive approximations’ (p.43).

If this perspective of performance decrement is held, then players will be able to identify development opportunities and growth rather than a fixed mind-set or entity perception of ability that may lead to the withdrawal of effort and reduced motivation (Dweck & Leggett, 1998).

5.11 Chapter summary

Findings from the study reported in this chapter contribute to literature by getting closer to the performance under pressure experiences of competitive golfers that have reported consistent under performance and a susceptibility to ‘choking’. An understanding of goal involvement during skill execution remains unknown, however, the study reported in this chapter represents the closest known temporal analysis of achievement motivation during competitive performance and has revealed that golfers consider multiple goals prior to skill execution. The level of intention is proposed to provide greater utility in understanding attentional focus selection and comparison of goal intention and goal evaluation provides a far greater indication of underlying valued achievement motives. Achievement goals have been posited in this chapter as an essential mechanism by which to understand the cognitive performance experience and specifically the criteria by which golfers determine competence in skill execution. Consequently achievement goals are further explored, in this thesis, for their potential prophylactic utility in preventing self-regulation failures that contribute to all standards of performance decrement.

6. STUDY 2: THE RELATIONSHIP BETWEEN DISPOSITIONAL REINVESTMENT AND ACHIEVEMENT MOTIVATION IN COMPETITIVE GOLFERS

6.1 Chapter overview

Study 1 proposed achievement motivation as playing an integral role in golfers' competitive experiences, through their perceptions of the competitive environment, the identification of achievement situations that lead to goal intentions and the subsequent direction of attention to initiate movement and execute skills. In accessing thoughts during the performance experience, Study 1, contributed to the debate regarding the orthogonality of achievement goal involvement (e.g. Harwood, Hardy & Swain, 2001; Treasure, Duda, Hall, Roberts, Ames & Maehr, 2001). It highlighted that golfers considered multiple achievement goals prior to skill execution. In addition, these goal intentions are proposed to influence attentional focus selection. Further exploration of potential relationships between achievement motivation and attention are, therefore, a principle aim of Study 2.

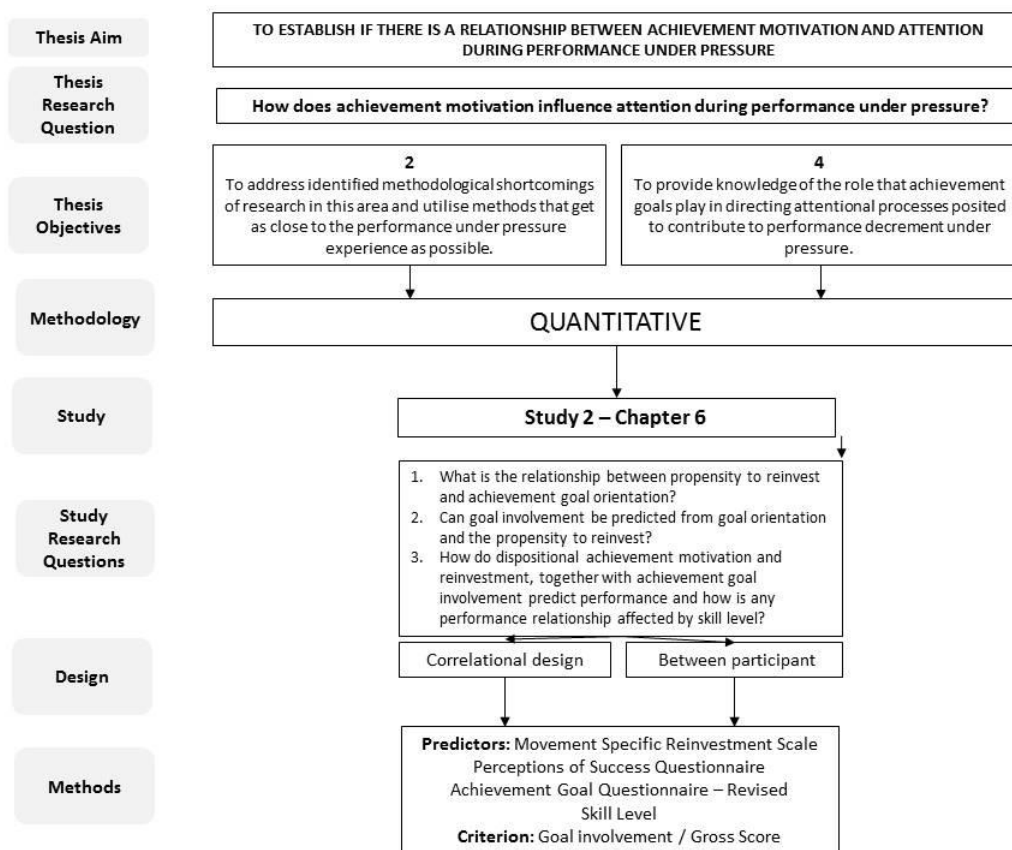


Figure 6.1 Diagram representing how Study 2 addresses thesis aim, question and objectives

This chapter reports the second study in this thesis. Achievement motivation of competitive golfers is assessed at the dispositional level (goal orientation) together with their propensity to reinvest rule-based explicit information. This permits a greater understanding to be gained of how these characteristics are related to achievement goals at the situational level (goal involvement) and to performance outcomes. The specific aims of the study are first detailed to clarify how they support the thesis objectives and address the main research question. Hypotheses are formulated from extant theory relating to achievement motivation and reinvestment (see Chapters 2 and 3), empirical observation and abduction from Study 1 in this thesis. The method section that follows details the design of the study to test these hypotheses, the purposive sample of competitive golfers recruited and the materials used for data collection. A clear structure of analysis is then provided with the results discussed in relation to research questions, hypotheses, extant literature and the aims and objectives of both the study and thesis.

Study 1 highlighted the temporal relationship between participants' motivational and attentional cognitions in terms of how golfers contemplated and evaluated skill execution. Study 2 builds on these findings and was designed to determine whether a relationship exists between the two constructs central to this thesis: achievement motivation and attentional focus. Study 2 specifically addresses objectives two and four of the thesis. First it gets closer to the performance under pressure experience and, second, it provides knowledge of the role that achievement goals play in directing attentional processes. While previous research has investigated the antecedents and consequences of dispositional, environmental and situational achievement motivation (see Chapter 3) and of attentional focus (see Chapter 2), it has not investigated specifically the relationship between achievement motivation and attention, or how these combine to influence performance outcomes. The focus of this chapter will be on addressing this shortcoming through the following specific study research questions:

1. What is the relationship between propensity to reinvest (disposition) and achievement goal orientation (disposition)?
2. Can goal involvement (situational) be predicted from goal orientation (disposition) and the propensity to reinvest (disposition)?
3. How do dispositional achievement motivation and reinvestment, together with achievement goal involvement predict performance and how is any performance relationship affected by skill level?

6.2 Introduction

With respect to the relationship between reinvestment and achievement motivation dispositions (Research Question 1), the extant empirical observations and associated theory do not make any explicit predictions in this regard, however positive predictions are made about adaptive achievement motives and related cognitive constructs that require attention allocation policy (e.g. metacognitive regulation, Ommundsen, 2006; Stoeber et al., 2009). In addition there appears to be a correspondence between definitions of achievement goals and the subscales of the Movement Specific Reinvestment Scale. The normative lens with which ego goals are evaluated is evident within items of movement self-consciousness (e.g. I am concerned about what people think about me when I am swinging the golf club) and the self-referenced quality of task goals permeates conscious motor processing items (e.g. I am always trying to figure out why my golf swing has failed). Study 1 also suggests that these dispositions may be related although it is not clear whether this is at the dispositional or situational level. For instance, verbal report data highlighted that goal intentions that consider combinations of mastery and performance goals, precede thoughts initiating skill execution. These include verbalisations about, or references to, movement self-consciousness and conscious motor processing. The intention of this analysis was to determine whether this relationship had any dispositional basis. Whilst this is primarily an exploration of the relationship between achievement motivation and reinvestment dispositions, based on the verbal report data, there was a tentative expectation that task goals would be related to the conscious motor processing subscale and that ego goals would be related to the movement self-consciousness subscale of the Movement Specific Reinvestment Scale.

With respect to the second research question, the relationship between dispositional and situational goal involvement are well established (see Roberts, 2012) hence these were expected to be replicated. What is not known is how dispositional reinvestment (and/ or combined with dispositional achievement motivation) relates to situational achievement goals. Although predictions cannot be made from extant theory in this regard, a central tenet of Achievement Goal Theory is that goal involvement is initiated as a result of the interplay between situational and individual difference variables (Treasure et al., 2001). As such, the same relationships expected above, between task/ego and the subscales of dispositional reinvestment are tentatively expected in relation to mastery and

performance measurements of achievement motivation at the situational level for the same reason. Relationships that have been found in empirical research have established positive associations between motives to achieve success and mastery approach goals (Thomassen & Halvari, 2007; Halvari & Kjormo, 1999) and fear of failure and performance goals (e.g. Conroy et al., 2003; Conroy & Elliot, 2004) and although there is limited knowledge of the antecedents and consequences of mastery avoidance goals, positive relationships have been found with fear of failure (e.g. Kaye, et al., 2008; Nien & Duda, 2009). Hence, there is a tentative expectation that dispositional reinvestment will relate to established maladaptive achievement goals.

In terms of whether an individuals' propensity to reinvest and achievement goal orientation collectively predict achievement goal adoption at the situational level (Research Question 2), it was expected that achievement motive dispositions would account for the large proportion of variance in situational achievement goals, as these are established and large effects. Consistent with research that reports the deleterious effects of self-focused attention on performance in elite athletes (e.g. Liao & Masters, 2001; Koedijker, Oudejans & Beck, 2007; Mullen, Hardy & Oldham, 2007) reinvestment was expected to account for additional variance over and above dispositional achievement motives. Since the extent to which this would account for additional variance in situational achievement goals has yet to be documented, the magnitude of this effect was unknown. In line with previous expectations the subscales conscious motor processing and movement self-consciousness were expected to explain additional variance in mastery and performance goals, respectively.

With regard to understanding how dispositional and situational variables predict performance outcome, and how these are influenced by skill level (Research Question 3), previous research has focused on how either the motivational profiles or reinvestment dispositions (defined as being either high or low, irrespective of subscale) independently influence performance outcome. Achievement Goal Theory (Elliot & McGregor, 2001; Elliot, 2005) predicts positive relationships between goal profiles that include either high or moderate task at the dispositional level and performance outcome. It also predicts positive relationships between such profiles and approach goal involvement (irrespective of mastery or performance) at the situational level and performance outcome (gross score). Empirical observations (e.g. Hodge & Petlitchkoff, 2000; Harwood, Cumming & Fletcher, 2004; Smith, Balaguer & Duda, 2006) investigating the role of skill indicate that that elite performers are more highly

represented in high or moderate task profiles at the dispositional level of achievement motivation and report the use of more approach goals. Reinvestment theory (e.g. Maxwell & Masters, 2008) posits that propensity to reinvest explicit declarative knowledge during skill execution will have deleterious effects on performance outcome as skill level increases; however no explicit predictions are made at the subscale level.

In terms of whether dispositional and situational achievement motives together with dispositional reinvestment collectively predict performance outcome, this has not been examined previously. However, based on the separate literature bases, it was expected that dispositional achievement motivation would account for a large proportion of variance in performance outcome, and that reinvestment would explain additional variance in outcome. This is expected to be dependent on the relationship between the specific reinvestment subscale score (i.e., conscious motor processing or movement self-consciousness) and mastery and performance goals, respectively. Specifically, those high in task orientation (irrespective of ego orientation) will be expected to perform poorly when scoring high on conscious motor processing scale and having mastery goal involvement, whereas those high in ego orientation (and low in task orientation) will be expected to perform poorly when scoring high on the movement self-consciousness scale and adopting performance goals. These effects were expected to be affected by skill level in the following way: high skilled participants that are also high reinvesters (irrespective of MSRS subscale) are expected to perform at a higher level when adopting performance goals but not when adopting mastery approach (at situational level).

6.3 Method

A general overview of the thesis methodology and methods can be found in Chapter 4. The methods reported here relate to Study 2 reported in this chapter.

6.3.1 Design.

A multivariate (regression) design was used to predict achievement goal involvement and golf performance from measurements of achievement goal orientation, dispositional reinvestment and skill level.

6.3.2 Participants.

Data were collected before and after a round of competitive golf with a total of 147 golfers (male = 126, female, 21) participating in the study with an average age of 41.97 years (range = 18-76 years; SD = 16.2) and a total of 128 (male = 108, female = 20) completing all measurements. Players volunteered to participate in response to advertisements displayed at their home golf course prior to club competitions and reported different levels of playing ability. Eligibility required them to either be a professional golfer or have held an official Council of National Golf Union (CONGU) handicap for a minimum of 12 months ($n=147$, $M = 9.77$, $SD = 8.6$) with handicaps defined by CONGU in five categories.

Professional golfers played on European, Challenge and Satellite tours ($n = 32$, 21.8%, $M = -1.41$, $SD = 1.04$); Category one, + handicap (hcp) to 5.4 hcp ($n = 14$, 9.5%, $M = 3.71$, $SD = 1.33$); Category two, 5.5 hcp to 12.4 hcp ($n = 51$, 34.7%, $M = 9.14$, $SD = 2.12$); Category three, 12.5 hcp to 20.4 hcp ($n = 33$, 22.4%, $M = 15.97$, $SD = 2.57$); Category four, 20.5 hcp to 28.4 hcp ($n = 14$, 9.5%, $M = 24.36$, $SD = 2.65$) and Category five, which was applicable to female golfers only, 28.5 hcp to 36 hcp ($n = 3$, 2%, $M = 31.67$, $SD = 3.06$). Participants' frequency of play and coaching differed with the majority of golfers playing between once and three times per week ($n=88$, 80.3%) and receiving coaching less than once per month ($n=101$, 68.7%). A breakdown of the sample demographic according to playing category is reported in Table 6.1.

Table 6.1 Participant information by playing ability category

Playing Status	<i>n</i>	Mean			Mode		
		Age	Hcp	Gender m/f	Years Playing	Rounds per wk	Coaching Frequency
Professional	32	23.00	-1.41	31 / 1	10 – 15	2 – 3	2 – 3 per week
Category 1	14	35.00	3.71	12 / 2	20 +	2 – 3	< 1 per month
Category 2	51	46.90	9.14	44 / 7	20 +	Once	< 1 per month
Category 3	33	50.45	15.97	28 / 5	20 +	Once	< 1 per month
Category 4	14	52.00	24.36	11 / 3	15 – 20	2 – 3	< 1 per month
Category 5	3	52.67	31.67	0 / 3	< 1yr	2 – 3	< 1 per month
Total	147	41.97	9.77	126 / 21	20+	2 – 3	< 1 per month

6.3.3 Materials.

Participants completed a battery of questionnaires and inventories entitled the Golf Performance Under Pressure Survey (GPUP-S see Appendix E). This consisted of The 12 item Perception of Success Questionnaire (POSQ; Roberts, Treasure & Balague, 1998), an adapted (for golf) version of the 12-item Achievement Goal Questionnaire – Revised (AGQ-R; Elliot & Maruyama, 2008), and the ten item Movement Specific Reinvestment Scale (MSRS; Masters, Eves & Maxwell, 2005).

When completing POSQ, each participant responded to the stem ‘When playing golf I feel most successful when...’ with items on the task scale including ‘I overcome difficulties’ and ‘I perform to the best of my ability’. Both the task and ego subscales of the POSQ have demonstrated acceptable internal consistency across a variety of samples with mean alpha coefficients of 0.81 and 0.82 respectively (Duda & Whitehead, 1998). When completing the AGQ-R golfers were asked to only endorse statements that truly represented the goals that they have when playing tournament golf and items were altered with permission of the authors to be golf specific. Items on the AGQ-R assessed goal adoption in relation to the 2 x 2 achievement goal framework (Elliot & McGregor, 2001) and included items such as; ‘My goal is to play as well as I possibly can’ (mastery approach), ‘My aim is to avoid playing as badly as I could’ (mastery avoidance), ‘I am striving to do well compared to other players’ (performance approach) and ‘My goal is to avoid being one of the worst performers’ (performance avoidance). The MSRS was again adapted to ensure golf specificity with the authors permission and asked participants to read a number of statements about their golf swing such as ‘I am always trying to figure out why my golf swing has failed’ and ‘I am self-conscious about the way I look when swinging the golf club’ and to select the answer that best described how they felt about each statement. All inventories required responses on a ‘Likert’ type scale; the Perceptions Of Success Questionnaire used a five point scale from *strongly disagree* to *strongly agree*; an adapted version of the Achievement Goal Questionnaire – Revised, a seven point scale from *not at all like me* to *completely like me*; and the Movement Specific Reinvestment Scale a six point scale from *strongly disagree* to *strongly agree*. Finally participants reported their gross and their net score (gross score – handicap allowance).

6.3.4 Procedure.

Data was collected from golfers taking part in professional and amateur competitions. Participants were informed that the study aimed to gain understanding of how golfers of different abilities thought about performing in competition and what criteria they used when defining competence. All participants provided informed consent and were given the opportunity to ask any questions prior to completing the questionnaires. Confidentiality was assured with responses recorded anonymously and only identifiable by a personal code chosen by the golfer. Participants were reminded before and after their round of golf of their right to withdraw from the study at any time during data collection and a date was provided for participants to withdraw their data from analysis.

Pre-performance data collection: Prior to each golfer commencing a competitive round s/he completed the first part of the Golf Performance Under Pressure Survey (GPUP-S), which consisted of personal and historical playing information and the POSQ, AGQ-R and the MSRS. Finally they were each asked to assess their competency expectations for the round ahead. They were each instructed to stop the survey at this stage and informed that they would complete the final six questions immediately after their competition round.

Post-performance data collection: Within 1 hour of finishing the competition participants completed questions to assess competence perceptions, report gross score and the par for the course was recorded so a net score could be calculated for each player.

6.3.5 Data analysis.

The relationship between reinvestment and achievement motivation dispositions (Research Question 1) was examined using multiple Pearson correlations; specifically a total of six correlation analyses were conducted between task orientation and the movement specific reinvestment scale subscales and total (conscious motor processing and movement self-consciousness) and between ego and the movement specific reinvestment scale subscales and total.

To examine whether goal involvement (situational) could be explained by dispositional achievement motivation and reinvestment (Research Question 2), in the first instance the relationship between dispositional and situational goal involvement were examined using multiple correlations. Specifically eight Pearson correlations were conducted between the two subscales of the POSQ (task/ego) and the four achievement goals at the situational level. Likewise, the relationship between dispositional reinvestment and situational goal involvement were initially examined using multiple correlations. Specifically twelve Pearson correlations were conducted between the MSRS total, movement self-consciousness subscale, conscious motor processing subscale and the four achievement goals at the situational level.

Four separate hierarchical linear regressions were used to predict each level of achievement goal involvement. When a mastery goal was used as the outcome variables, the predictor variables were entered in three blocks in the following order: i) task and ego orientation, ii) conscious motor processing (CMP) and iii) movement self-consciousness (MSC). In this way it was possible to determine the predictive utility of conscious motor processing, controlling for goal orientation as well as the additional predictive utility of movement self-consciousness. When a performance goal was used as the outcome variable predictor variables were again entered in three blocks albeit in order to address the specific predictions made: i) task and ego orientation ii) movement self-consciousness iii) conscious motor processing.

To examine research questions one and two at the profile level of dispositional achievement motivation, cluster analysis was first conducted to produce achievement goal profiles and interaction terms created between each of the goal profiles and the subscales of the Movement Specific Reinvestment Scale. Eight separate regression models were used to predict each level of achievement goal involvement. When a mastery goal was used as the outcome variable, the predictor variables were Goal Profile x Conscious Motor Processing interactions and when a performance goal was used as the outcome variable, Goal Profile x Movement Self-Consciousness interactions were entered into the model. In each case the high / high goal profile was used as the constant as the extant research posits this profile as the most adaptive for psychological and performance outcomes.

In order to explore how dispositional and situational variables predict performance outcome and how achievement goals at the situational level (involvement) combine to

predict performance (Research Question 3), a hierarchical linear regression model was constructed. Predictor variables were entered in six blocks: i) task and ego orientation, ii) movement self-consciousness (MSC) and conscious motor processing (CMP) iii) MApp goal involvement iv) PApp goal involvement v) PAv goal involvement and vi) MAV goal involvement. In this way it was possible to determine the predictive utility of goal involvement and multiple goal involvement, controlling for dispositional measures.

Two Pearson's correlations were carried out to test two specific predictions. (1) Participants with high scores in task orientation (irrespective of ego orientation) were expected to perform poorly when scoring high on the conscious motor processing scale when adopting mastery goals. (2) Participants with high scores in ego orientation (and low in task orientation) were expected to perform poorly when scoring high on the movement self-consciousness scale when adopting performance goals. To test this prediction two Pearson's correlations were carried out following the selection of specific cases for analysis. In the first analysis individuals were selected who scored high on the conscious motor processing subscale of the Movement Specific Reinvestment Scale (MSRS) and who reported high mastery goal involvement. High conscious motor processing was determined by median split calculation and high mastery goal involvement determined first by adding mastery approach and mastery avoidance subscales, followed by median split calculation. A correlation was then conducted between task orientation and gross score.

In the second analysis individuals were selected who scored high on the movement self-consciousness subscale of the MSRS, low on task orientation and who report high performance goal involvement. High movement self-consciousness and low task orientation were determined by median split calculations and performance approach goals were first added to performance avoidance goals prior to a median split. A correlation was then conducted between ego orientation and gross score.

The role of skill level in achievement goal involvement and performance was assessed in the following way. First the independent influence of playing category on goal orientation, dispositional reinvestment and goal involvement was examined through three one-way between groups multivariate analysis of variance. Second, to test the prediction that highly skilled golfers that report a strong propensity to reinvest would be expected to underperform when adopting mastery goals but not when adopting performance goals, two Pearson's correlations were carried out. The first correlation

assessed the relationship between mastery goal involvement and gross score. This followed the selection of cases that only included high skilled participants (defined as professional and category 1 golfers) and high reinvesters, following median split calculation of the Movement Specific Reinvestment Scale total. A second correlation considered the same cases and assessed the relationship between performance goal involvement and gross score.

6.4 Results

6.4.1 Descriptive statistics and reliability analysis.

The internal consistency of the items representing each of the different constructs measured in the study was determined by calculating Cronbach's alpha (Cronbach, 1951). The internal consistency was considered acceptable for the task and ego subscales of the Perceptions of Success Questionnaire (POSQ), and for the movement self-consciousness and conscious motor processing subscales of the Movement Specific Reinvestment Scale (MSRS) with values of 0.80, 0.85, 0.83 and 0.71 respectively. The performance approach (α 0.81) and performance avoidance (α 0.89) scores from the Achievement Goal Questionnaire – Revised (AGQ-R) also displayed the often reported internal consistencies of >0.7 (e.g. Kline, 1999) however, the mastery approach and mastery avoidance subscales displayed lower alphas of 0.58 and 0.52 respectively. Low alpha scores on mastery subscales have been previously observed (e.g. Stoeber, Stoll, Salmi & Tikka, 2009) and explained by the expected high reporting of mastery goals by the sporting sample as was the case in this study. There is the suggestion however, that scores as low $\alpha = 0.5$ are acceptable in the early stages of research (Nunnally, 1978) and Cortina (1993) cautions that the number of items in a scale will impact alpha and so must be interpreted with that in mind. As an alpha value provides us with information regarding the extent to which each item in a set of items correlates with at least one other item, the fact that there are only three items within each subscale of the AGQ-R will have an influence on alpha values. As achievement goals within the 2 x 2 framework were central to the research aims, objectives and questions they were retained despite the low alpha consistent with previous research (Stoeber et al., 2009).

Descriptive statistics, zero order correlations and internal reliabilities for all variables are presented in Table 6.2. In general golfers reported having higher task ($M = 4.21$, SD

= .56) than ego orientation ($M = 3.41$, $SD = .78$) and reported the adoption of mastery approach (MAp) goals to a greater extent than any other achievement goal ($M = 5.96$, $SD = .82$). In comparison performance avoidance (PAv) goals were the achievement goals least adopted by participants ($M = 4.13$, $SD = 1.90$). Participants also reported higher scores for conscious motor processing ($M = 18.17$, $SD = 4.89$) than movement self-consciousness ($M = 13.86$, $SD = 5.56$) on the Movement Specific Reinvestment Scale.

Table 6.2 Descriptive statistics, zero order correlations and Cronbach's alpha values

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1 Task	4.21	0.56	(0.80)									
2 Ego	3.41	0.78	.46**	(0.85)								
3 Mastery Approach (MApp)	5.96	0.82	.49**	.36**	(0.58)							
4 Mastery Avoidance (MAv)	4.90	1.36	.06	.01	.25**	(0.52)						
5 Performance Approach (PApp)	4.86	1.40	.02	.32**	.14	.52**	(0.81)					
6 Performance Avoidance (PAv)	4.13	1.90	-.14	.09	-.03	.68**	.64**	(0.89)				
7 Conscious Motor Processing (CMP)	18.17	4.89	.22**	.18*	.26**	.32**	.34**	.29**	(0.71)			
8 Movement Self Consciousness (MSC)	13.86	5.56	.12	.18*	.11	.29**	.23**	.19*	.53**	(0.83)		
9 Dispositional Reinvestment (MSRS)	32.03	9.13	.19*	.20*	.21*	.34**	.33**	.27**	.86**	.89**	(0.84)	
10 Gross Score	86.48	11.04	-.28**	-.40**	-.13	.22*	.09	.26**	.12	.03	.08	
11 Playing Ability	9.77	8.60	-.35**	-.44**	-.17*	.28**	.12	.33**	.12	-.01	.06	.85**

Note. Cronbach alpha values are presented in the diagonal. * $p < .05$, ** $p < .01$

6.4.2 Research Question 1: The relationship between dispositional reinvestment and achievement goals.

The relationships between ego and task orientation and dispositional re-investment (measured by the subscales and total of the MSRS) were investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There were significant weak positive correlations between ego-orientation and conscious motor processing ($r = .18$, $n=147$, $p<.05$); ego-orientation and movement self-consciousness ($r = .18$, $n = 147$, $p<.05$) and ego-orientation and MSRS total ($r = .20$, $n = 147$, $p<.05$). There was also a significant relationship found between task-orientation and conscious motor processing ($r = .22$, $n = 147$, $p<.01$) and between task-orientation and MSRS total ($r = .19$, $n = 147$, $p<.05$) but not with movement self-consciousness ($r = .12$, $n = 147$, $p=.14$).

In order to replicate the previous established findings between achievement motivation at the disposition (orientation) and situation (involvement) levels, the relationship between ego and task orientation (measured by the POSQ) and achievement goal involvement (measured by the AGQ-R) was carried out using Pearson product-moment correlation coefficient. Consistent with prior research (see Roberts 2012) there were significant moderate positive correlations between ego-orientation and approach goal involvement for mastery ($r =.36$, $p<.01$) and performance ($r =.32$, $p<.01$). No relationship was observed between ego-orientation and avoidance goal involvement for mastery or performance. There was a significant moderate positive relationship found between task-orientation and mastery approach (MApp) goals ($r =.49$, $p<.01$) with no significant relationships found with mastery avoidance (MAv), performance approach (PApp) or performance avoidance goals (PAv) goals.

The relationships between dispositional reinvestment and achievement goal involvement were investigated using Pearson product-moment correlation coefficient. There were weak positive correlations between conscious motor processing and both MApp and PAv goals ($r = .26$, $n = 147$, $p<.01$; $r = .29$, $n = 147$, $p<.01$ respectively) and moderate positive correlations between conscious motor processing and both MAv and PApp ($r = .32$, $n = 147$, $p<.01$; $r = .34$, $n = 147$, $p<.01$ respectively). In addition weak

positive correlations were found between movement self-consciousness and MA_v ($r = .29, n = 147, p < .01$), PA_{app} ($r = .23, n = 147, p < .01$) and PA_v ($r = .19, n = 147, p < .05$). Finally there were weak positive correlations between MSRS total and MA_{app} ($r = .21, n = 147, p < .05$) and PA_v ($r = .27, n = 147, p < .01$) with moderate positive correlations found between MSRS total and MA_v ($r = .34, n = 147, p < .01$) and PA_{app} ($r = .33, n = 147, p < .01$).

6.4.3 Research Question 2a: Predicting goal involvement from motive and reinvestment dispositions.

Analysis of achievement goal orientation relationships with dispositional reinvestment were separated to look at both dominant goal intentions and achievement goal profiles. In this section dominant achievement goal orientation relationships are reported.

6.4.3.1 Predicting mastery approach goal involvement.

A hierarchical linear regression was used to predict golfers' adoption of mastery approach goals. The independent variables were entered in three blocks: i) task and ego orientation, ii) conscious motor processing (CMP) and iii) movement self-consciousness (MSC). In this way it was possible to determine the predictive utility of conscious motor processing, controlling for goal orientation as well as the additional predictive utility of movement self-consciousness. Task and ego orientation explained 26% of the variance in MA_{app} goal involvement, $R^2 = .26, R^2 \text{ Adjusted} = .25, F(2,144) = 25.51, p < .001$. Both task orientation $\beta = .41, t(146) = 5.11, p < .001$ and ego orientation variables $\beta = .17, t(146) = 2.06, p < .001$ emerged as significant independent predictors of MA_{app} goal involvement. The addition of the conscious motor processing led to a small increase to 28% in the amount of variance explained in MA_{app} goal involvement $R^2 = .28, R^2 \text{ Adjusted} = .27, F(2,144) = 18.65, p < .001$. The inclusion of CMP resulted in the beta weight for ego orientation becoming non-significant with CMP found to be a significant independent predictor suggesting that the ego orientation effects were fully mediated by CMP. Finally the inclusion of MSC did not lead to an increase in the amount of variance explained $R^2 = .28, R^2 \text{ Adjusted} = .26, F(2,144) = 14.01, p < .001$ with task orientation and CMP maintaining a significant contribution to the regression equation.

6.4.3.2 Predicting mastery avoidance goal involvement.

The conscious motor processing subscale of the Movement Specific Reinvestment Scale was predicted to be associated with mastery goal involvement and so the independent variables were entered in the same three blocks as the previous analysis (6.4.3.1) in a hierarchical linear regression to predict golfers' adoption of mastery avoidance goals. Only the second and third blocks produced significant models with task orientation, ego orientation and CMP explaining 10% of the variance in MAV goal involvement, $R^2 = .10$, R^2 Adjusted = .08, $F(2,144) = 5.37$, $p < .01$. CMP was the only significant independent predictor of MAV goal involvement $\beta = .32$, $t(146) = 3.94$, $p < .001$. The inclusion of MSC in the full model resulted in a small increase with 12% of the variance explained $R^2 = .12$, R^2 Adjusted = .10, $F(2,144) = 5.00$, $p < .001$, however CMP remained the only significant independent predictor of MAV goals $\beta = .23$, $t(146) = 2.46$, $p < .05$.

6.4.3.3 Predicting performance approach goal involvement.

To predict the adoption of performance goals the independent variables were again entered in three blocks: i) task and ego orientation ii) movement self-consciousness iii) conscious motor processing. MSC was entered before CMP as it was predicted that self-consciousness would be associated with competence framing defined by performance goals. Task and ego orientation explained 13% of the variance in Papp goal involvement, $R^2 = .13$, R^2 Adjusted = .11, $F(2,144) = 10.32$, $p < .001$. Only ego orientation was observed to be a significant independent predictor $\beta = .40$, $t(146) = 4.54$, $p < .001$ in this model. The inclusion of MSC increased the variance explained to 16% and all three independent variables emerged as significant independent predictors of achievement goals. Task orientation was observed to have a significant negative relationship with Papp, $\beta = -.17$, $t(146) = -2.00$, $p < .05$ and MSC, $\beta = .19$, $t(146) = 2.44$, $p < .05$. The addition of CMP in the full model resulted in an increase to 23% of variance explained in Papp goal involvement by the independent variables $R^2 = .23$, R^2 Adjusted = .21, $F(2,144) = 10.39$, $p < .001$. The inclusion of CMP resulted in the beta weight for MSC becoming non-significant with CMP found to be a significant independent predictor $\beta = .31$, $t(146) = 3.49$, $p < .001$, suggesting that the movement self-consciousness effects were fully mediated by conscious motor processing.

6.4.3.4 Predicting performance avoidance goal involvement.

Independent variables were entered in the same order as for performance approach (PApp) in a hierarchical regression to predict performance avoidance (PAv) goal involvement. When controlling for task and ego orientation 8% of the variance was explained with the inclusion of MSC in the model, $R^2 = .08$, R^2 Adjusted = .06, $F(2,144) = 4.11$, $p < .01$. Task orientation was found to be a significant independent predictor with a negative relationship with performance avoidance goals, $\beta = -.23$, $t(146) = -2.56$, $p < .01$ and MSC was also a significant independent predictor $\beta = .19$, $t(146) = 2.27$, $p < .05$. With the inclusion of CMP in the full model the variance explained increased to 15%, $R^2 = .15$, R^2 Adjusted = .12, $F(2,144) = 6.02$, $p < .001$. Task orientation maintained a significant negative relationship with PAV goals in the model and the inclusion of CMP again resulted in the beta weight for MSC becoming non-significant. CMP emerged as a significant independent predictor $\beta = .31$, $t(146) = 3.30$, $p < .001$, suggesting that the movement self-consciousness effects were fully mediated by conscious motor processing.

6.4.4 Research Question 2b: Predicting goal involvement from goal profiles and reinvestment dispositions.

Goal profile groups were created using cluster analysis rather than using traditional mean- or median-split procedures (e.g. Roberts, Treasure & Kavussanu, 1996) and this has increasingly become the popular method of producing goal orientation profiles (e.g. Harwood, Cumming & Fletcher, 2004; Hodge & Petlichkoff, 2000; Smith, Balaguer & Duda, 2006). This analytical approach enables the production of groups that possess the greatest amount of within-group similarity (homogeneity) and the greatest amount of between-group dissimilarity, using goal orientation as the characteristic of interest (Hair, Anderson, Tatham & Black, 1998).

In accordance with the steps outlined by Hair et al. (1998) all of the dependent measures were standardised prior to analysis using z scores. The univariate and multivariate distributions of all variables were inspected for normality, missing data and outliers that could distort the cluster solution and as there were no observed extreme scores, or

differences between mean and 5% trimmed mean, the original sample was retained for analysis (n = 147).

A combination of hierarchical and non-hierarchical procedures was then employed to generate goal profiles. First a hierarchical cluster analysis using Ward's method of linkage and squared Euclidean distance was adopted to identify the number of cluster groups that should be formed by the data. Aldenderfer and Blashfield (1984) propose the Ward algorithm as it minimises within cluster differences and avoids problems with forming long chains found in other methods. The squared Euclidean distance is further posited as the most suitable similarity measure to use with Ward's method of clustering. The hierarchical cluster analysis provided graphical representation of results in the form of a dendrogram, which suggested that a three- or four-cluster solution might exist in the data. It was concluded that a four-cluster solution best fitted the data as the agglomeration schedule revealed that a larger increase in the agglomeration coefficient occurred from a four-cluster to a three-cluster solution (Hair et al., 1998).

6.4.4.1 Validation and interpretation of the cluster solution.

In order to validate the four-cluster solution a non-hierarchical cluster analysis (e.g. K-means cluster) was conducted in line with published goal profile research (e.g. Harwood, Cumming & Fletcher, 2004). Using the mean score of clustering variables in a particular cluster (cluster centres) resulting from the hierarchical analysis as the seed points, a K-means cluster analysis generated new cluster groups. A four-cluster solution was confirmed as the best fit after consideration of the similarity between the final cluster centres resulting from the K-means solution to those in the hierarchical analysis, and the interpretability of the solution. The stability of the four-cluster solution was then further tested by performing a second K-means cluster analysis with a random selection of 67% of the sample. Results of the second cluster analysis revealed that over 95% of the sample were correctly reclassified confirming the stability of the four-cluster solution. The means, standard deviations and standardised scores for the four cluster solution are presented in table 6.3.

Using a criterion z score of $\pm .5$ (Harwood et al., 2004; Hodge & Petlichkoff, 2000; Wang & Biddle, 2001) goal profile groups were interpreted as being higher or lower on

the two goal orientations. As a result, Cluster one contained golfers (n = 21) with a Lower-ego/Lower-task profile, Cluster two contained golfers (n = 38) with a Lower-ego/Moderate-task profile, Cluster three contained golfers (n = 45) with a Higher-ego/Moderate-task profile and Cluster four (n = 43) contained golfers with a Higher-ego/Higher-task profile. A MANOVA was then calculated to determine that significant differences existed between cluster groups on their task and ego orientation scores. A significant multivariate effect was found for goal orientations, Pillai's Trace = 1.27, $F(6, 286) = 83.08, p < .001, \eta^2 = .64$, with an observed power of 100%. Significant univariate effects were found for both Task $F(3, 143) = 126.03, p < .001, \eta^2 = .73$ and Ego orientation $F(3, 143) = 89.57, p < .001, \eta^2 = .65$. For Task orientation post hoc tests revealed that golfers in Cluster four (Higher-task) had significantly higher task orientation than golfers in Clusters two (Moderate-task) who in turn had significantly higher task orientation than golfers in Clusters one and three (Lower-task). For Ego orientation, golfers in Cluster three and four (Higher-ego) had significantly higher ego orientation than golfers in Clusters one and two (Lower-ego). In sum, the Cluster groups accounted for over 65% of the variance in achievement goal orientations, representing a large effect size (Cohen, 1998) and confirmed the appropriateness of the labels assigned to the groups during cluster analysis interpretation.

Table 6.3 Characteristics of cluster membership

Clusters	Demographics								POSQ Scores				
	N	P	Playing Category					Ego			Task		
			1	2	3	4	5	M	SD	z	M	SD	z
Lower-ego/Lower-task	21	0	2	6	9	3	1	2.56	.60	-1.25	3.29	.44	-1.56
Lower-ego/Moderate-task	38	3	3	14	10	7	1	2.91	.50	-.81	4.20	.34	.11
Higher-ego/Moderate-task	45	7	6	19	10	3	0	4.10	.28	.59	4.01	.24	-.37
Higher-ego/Higher-task	43	22	3	12	4	1	1	3.97	.50	.71	4.76	.22	1.05

6.4.4.2 Goal profile differences in achievement goal involvement.

As preliminary analyses revealed differences in goal adoption according to playing ability (Hcp category) a multivariate analysis of covariance (MANCOVA) was calculated to explore differences among the cluster groups after adjusting the means of

the achievement goal indices (subscales) for differences in playing ability (Tabachnick & Fidell, 1996). The covariate was significant, Pillai's Trace = .16, $F(4, 139) = 6.71$, $p < .001$, $\eta^2 = .16$. A main effect was also found for the Goal Profile Cluster groups, Pillai's Trace = .37, $F(12, 423) = 4.94$, $p < .001$, $\eta^2 = .12$. As with the preliminary analysis a Bonferroni adjustment (.05/no. dv) was employed resulting in an alpha level of .0125 (Vincent, 1999). Univariate analyses of the main effect revealed significant results for MApp $F(3,142) = 16.37$, $p < .001$, $\eta^2 = .26$ and PApp, $F(3,142) = 4.86$, $p = .003$, $\eta^2 = .09$.

Post hoc tests were then calculated to determine whether the means for reported goal involvement varied significantly across the four Goal Profile Cluster groups. The results indicated that golfers in Cluster one (Lower-ego/Lower-task), Cluster two (Lower-ego/Moderate-task) and Cluster three (Higher-ego/Moderate-task) did not significantly differentiate from each other on their reported use of MApp goals but that Cluster four (Higher-task/Higher-ego) did report significantly more use of MApp than all other Goal Profile Clusters. Golfers in Cluster four (Higher-ego/Higher-task) also reported using significantly more MAV goals than golfers in Cluster one (Lower-ego/Lower-task). Papp goals were used significantly more by golfers in Cluster three (Higher-ego/Moderate-Task) than Cluster one (Lower-ego/Lower-task) and Cluster two (Lower-ego/Moderate-task), however Cluster groups could not be differentiated significantly by their reported use of PAV goals. The effect sizes calculated (Partial Eta Squared) ranged from $\eta^2 = .09$ to $\eta^2 = .25$ and therefore represent small to medium effects.

6.4.4.3 Goal profile differences in dispositional reinvestment.

A MANOVA was conducted to examine whether any Goal Profile differences existed in golfers dispositional reinvestment scores as measured by the Movement Specific Reinvestment Scale (MSRS). The dependent variables consisted of conscious motor processing (CMP) and movement self-consciousness (MSC) subscale scores and a MSRS total score. No significant multivariate effect was found Goal Profile, Pillai's Trace = .05, $F(6, 286) = 1.09$, $p = .37$.

6.4.4.4 Predicting goal involvement from Goal Profile x Dispositional Reinvestment interaction.

A total of eight linear regressions were conducted to predict each level of achievement goal involvement (Mastery Approach, Mastery Avoidance, Performance Approach, Performance Avoidance) from achievement goal profile and Movement Specific Reinvestment subscale interactions (conscious motor processing and movement self-consciousness). In the first four regression models, predictor variables were entered as: Low-ego/Low-task x Conscious Motor Processing interaction, Low-ego/Moderate-task x Conscious Motor Processing interaction and High-ego/Moderate-task x Conscious Motor Processing interaction. The second four regression models predicted each achievement goal from goal profile interactions with movement self-consciousness and were entered as: Low-ego/Low-task x Movement Self-Consciousness, Low-ego/Moderate-task x Movement Self-Consciousness interaction and High-ego/Moderate-task x Movement Self-Consciousness interaction.

The regression model of Goal Profile x Conscious Motor Processing interaction on mastery approach goal involvement was statistically significant $R^2 = .22$, $F(3, 143) = 13.14$, $p < .001$, R^2 Adjusted = .20. Of the Goal Profile x Conscious Motor Processing interactions included in each of the models, the Low-ego/Low-task x CMP interaction explained the largest amount of variance in mastery approach goal involvement $\beta = -.51$, $t(143) = -6.08$, $p < .01$, neither Goal Profile x CMP or Goal Profile x MSC explained any of the variance in mastery avoidance or performance avoidance goal adoption. A statistically significant model for Goal Profile x MSC interaction was found in the prediction of performance approach goal involvement $R^2 = .06$, $F(3, 143) = 3.15$, $p < .05$, R^2 Adjusted = .04, however, independent predictions were not statistically significant.

6.4.5 Research Question 3: Predicting performance from dispositional reinvestment, achievement motivation and skill level.

A total of 128 (male = 108, female = 20) provided post round performance data. This was defined as a players' gross score and represented the total number of shots taken for their round before handicap allowance was taken into consideration ($M = 86.48$, $SD = 11.04$).

An investigation of the relationship between achievement goal involvement (measured by the AGQ-R) and performance was carried out using Pearson product-moment correlation coefficient. There were significant weak positive correlations between mastery avoidance (MAv) goals and gross score ($r = .22$, $n = 128$, $p < .05$) and performance (PAv) goals and gross score ($r = .26$, $n = 128$, $p < .01$) but not between either, mastery approach (MApp) or performance approach (PApp) goals and gross score.

In order to explore how dispositional and situational variables predict performance outcome and how achievement goals at the situational level (involvement) combine to predict performance, a hierarchical linear regression model was constructed. The predictor variables were entered in six blocks: i) task and ego orientation, ii) movement self-consciousness (MSC) and conscious motor processing (CMP) iii) MApp goal involvement iv) PApp goal involvement v) PAv goal involvement and vi) MAv goal involvement. In this way it was possible to determine the predictive utility of goal involvement and multiple goal involvement, controlling for dispositional measures.

Task and ego orientation explained 17% of the variance players' gross score, $R^2 = .17$, R^2 Adjusted = .16, $F(2, 125) = 12.70$, $p < .001$ and the addition of dispositional reinvestment scores (MSC and CMP) resulted in a small increase of 5%, $R^2 = .22$, R^2 Adjusted = .19, $F(2, 125) = 8.46$, $p < .001$. An increase in variance explained was not observed when MApp goal involvement was added to the model however, a 3% increase emerged with the inclusion of PApp goal involvement, $R^2 = .24$, R^2 Adjusted = .21, $F(2, 125) = 6.50$, $p < .001$. In this model both ego orientation $\beta = -.45$, $t(127) = -4.54$, $p < .001$ and PApp goal involvement variables $\beta = .19$, $t(127) = 2.09$, $p < .05$ were significant independent predictors of golf performance, however, the inclusion of the PAv and MAv variables although not themselves, significant independent predictors of Gross Score, resulted in the beta weight for PApp goal involvement becoming non-significant suggesting that the PApp goal involvement effects were partially mediated by PAv and MAv goals in the final model with ego-orientation maintaining a significant contribution to the regression equation.

A Pearson's product-moment correlation was run to assess the relationship between task orientation and gross score in golfers that report a high propensity to reinvest through

conscious motor processing and a high adoption of mastery goals. The small negative correlation observed was not significant $r(43) = -.244, p = 0.057$.

A second Pearson's product-moment correlation was conducted to assess the relationship between ego orientation and gross score in golfers who report a high propensity to reinvest through movement self-consciousness and a high adoption of performance goals. The small negative correlation observed was not significant $r(19) = -.256, p > .05$.

6.4.5.1 The role of skill.

Three one-way between-groups multivariate analysis of variance were conducted to examine whether any playing ability differences existed in the variables (goal orientation, goal involvement and dispositional reinvestment) measured in the present study. Playing category served as the independent variable with Category Five players (>28.4 hcp) removed from analysis because of a small sample size ($n=3$). In the first MANOVA task and ego subscales of the Perceptions of Success Questionnaire (POSQ; goal orientation) served as the dependent variables and a significant multivariate effect was found, Pillai's Trace = .22, $F(8, 278) = 4.27, p < .001, \eta^2 = .11$. Cohen (1988) suggests guidelines for interpreting an eta square value (η^2) as .01 representing a small effect, .06 a moderate effect and .14 indicates a large effect, therefore, the finding that $\eta^2 = .11$ indicates that 11% of the total variance in achievement goal orientations is accounted for by playing category differences and this can be classified as a moderate to large effect. To control for Type 1 errors when making multiple comparisons a Bonferroni adjustment (.05/number of dependent variables) was used and an alpha level of .025 was adopted (Vincent, 1999). Univariate analysis revealed significant effects for both the ego subscale, $F(4, 139) = 6.19, p < .001, \eta^2 = .15$ and the task subscale $F(4, 139) = 6.51, p < .001, \eta^2 = .16$ which indicated that Professional golfers ($M = 3.89, SD = .57$) reported higher ego orientation than Category Three ($M = 3.07, SD = .71$) and Category Four players ($M = 3.14, SD = 1.03$) and higher task orientation ($M = 4.56, SD = .37$) than Category Two ($M = 4.21, SD = .51$), Category Three ($M = 3.94, SD = .57$) and Category Four ($M = 4.06, SD = .54$) players.

The MANOVA was followed up with discriminant analysis which revealed two discriminant functions. The first explained 98.6% of the variance, canonical $R^2 = .22$, whereas the second explained only 1.4%, canonical $R^2 = .003$. In combination these discriminant functions significantly differentiated the playing ability categories, $\lambda = .78$, $\chi^2 (8) = 34.31$, $p < .001$, but removing the first function indicated that the second function did not significantly differentiate the playing ability categories, $\lambda = .99$, $\chi^2 (3) = .53$, $p = .91$. The correlations between discriminant functions revealed that both Ego and Task functions loaded more highly on the first function (Ego, $r = .80$; Task, $r = .82$) than the second function (Ego, $r = .60$; Task, $r = -.57$).

A second MANOVA was conducted with MApp, MAV, PApp and PAV Indices of the AGQ-R serving as the dependent variables (goal involvement) and a significant multivariate effect was found, Pillai's Trace = .25, $F(16, 556) = 2.29$, $p < .01$, $\eta^2 = .06$. A Bonferroni adjustment was again used and an alpha level of .0125 adopted, with univariate analysis revealing significant effects for MAV, $F(4, 139) = 3.78$, $p < .01$, $\eta^2 = .10$ and PAV, $F(4, 139) = 5.31$, $p < .01$, $\eta^2 = .13$. An inspection of the mean scores indicated that Professionals reported less MAV goals ($M = 4.26$, $SD = 1.43$) than Category Four golfers ($M = 5.45$, $SD = .89$) and also that they reported less PAV goals ($M = 2.98$, $SD = 1.86$) than Category Two ($M = 4.36$, $SD = 1.80$), Category Three ($M = 4.46$, $SD = 1.82$) and Category Four ($M = 5.24$, $SD = 1.68$) players.

Discriminant analysis again followed the MANOVA which revealed four discriminant functions. The first explained 82.2% of the variance, canonical $R^2 = .19$, the second explained 14.7% of the variance, canonical $R^2 = .04$, the third 2.9%, canonical $R^2 = .008$ and the fourth only 0.1% of the variance, canonical $R^2 = .0004$. In combination these discriminant functions significantly differentiated playing ability categories, $\lambda = .76$, $\chi^2 (16) = 37.41$, $p = .002$, however removing the first function indicated that subsequent functions did not significantly differentiate the playing ability categories, $\lambda = .95$, $\chi^2 (9) = 7.21$, $p = .62$. Correlations between outcomes and the discriminant functions revealed that MApp loaded fairly evenly and moderately across functions ($r = -.45$; $r = .37$; $r = .65$; $r = .48$), PApp loaded evenly and moderately across first ($r = .46$), third ($r = .43$) and fourth functions ($r = -.32$) and more highly on the second function ($r = .71$). MAV loaded more highly on the first ($r = .64$) and fourth functions ($r = .60$),

than the third ($r = .24$) and moderately on the second function ($r = .41$). PAV loaded more highly on first ($r = .78$) and third ($r = .62$) functions than second ($r = .02$) and fourth functions ($r = -.02$).

A final MANOVA was conducted with the MSRS total, conscious motor processing and movement self-consciousness subscales serving as dependent variables (dispositional reinvestment), however no significant multivariate effect was found, Pillai's Trace = .04, $F(8, 278) = .75, p > .05$.

Table 6.4 Means and standard deviations of Movement Specific Reinvestment Scale scores for each playing category

Playing Status	Conscious Motor Processing		Movement Self Consciousness		Movement Specific Reinvestment Total	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
	Professional	16.94	4.01	13.28	5.36	30.22
Category 1	16.86	4.77	12.57	5.43	29.43	7.40
Category 2	19.06	5.47	14.90	6.17	33.96	10.24
Category 3	18.09	4.27	13.67	4.74	31.76	8.15
Category 4	19.00	5.68	13.86	6.07	32.86	10.63

With regard to how skill level was represented in achievement goal profile (clusters) preliminary analysis had suggested that there were playing category differences in the variables used to cluster the data and therefore, the next step as suggested by Harwood et al. (2004) was to describe the characteristics of each cluster based on data not included in the cluster procedure (Hair et al., 1998). Category Five golfers ($n = 3$) were removed from analysis in a Chi square test to examine whether differences existed in cluster membership because of small sample size. A significant result $\chi^2(12) = 50.00, p < .001$, for playing category revealed that the percentage of Professionals and golfers with Category One to Category Four handicaps were not evenly distributed across cluster groups. After further inspection it was evident that Cluster four (Higher-task/Higher-ego) contained the highest ratio of Professionals (53.3%) to Category One (8.9%), Category Two (26.7%), Category Three (8.9%) and Category Four (2.2%) whereas Cluster one (Lower-ego/Lower-task) contained the lowest ratio of Professionals (0%) to Category One (5%), Category Two (30%), Category Three (50%)

and Category Four (15%). In addition Clusters two (Lower-ego/Moderate-task) and three (Higher-ego/Moderate-task) consisted of the highest percentage (ratio) of Category Two players (35.3% and 53.6% respectively)

Pearson's product-moment correlation was carried out to assess the relationship between mastery goal involvement and gross score in highly skilled golfers that reported a high propensity to reinvest. There was a moderate negative correlation between mastery goal involvement and performance defined by gross score $r(26) = -.44, p = 0.01$ and when these were further defined as mastery approach goals $r(26) = -.33, p = 0.05$. Significant negative relationships were also found between mastery goal involvement and gross score when cases were further classified as high reinvesters through conscious motor processing $r(14) = -.55, p = .02$, and through movement self-consciousness $r(14) = -.51, p = .046$.

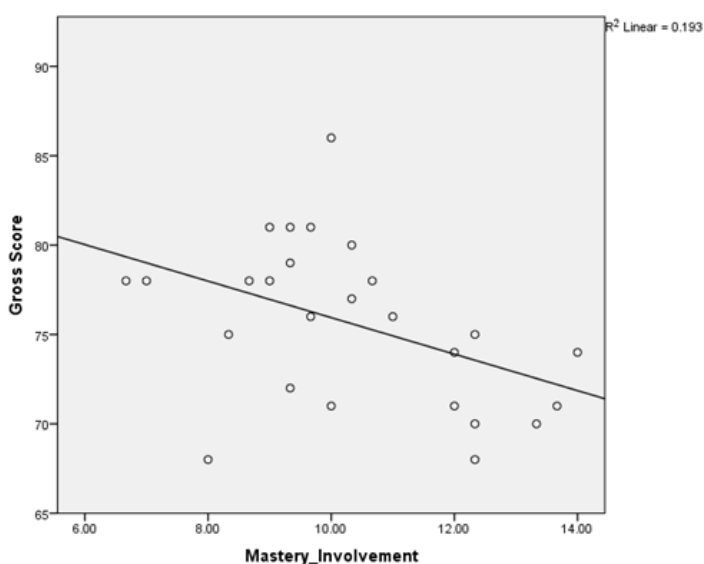


Figure 6.2 Scatterplot depicting the relationship between mastery goal involvement and gross score in highly skilled golfers that reported a high propensity to reinvest

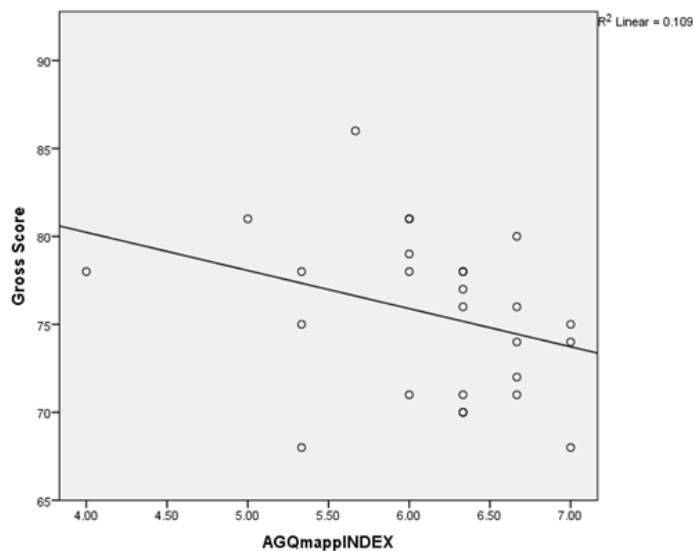


Figure 6.3 Scatterplot depicting the relationship between mastery approach (Mapp) goal involvement and gross score in highly skilled golfers that reported a high propensity to reinvest

Pearson's product-moment correlations were carried out to assess the relationship between performance goal involvement and gross score in highly skilled golfers that reported a high propensity to reinvest, and when classified through conscious motor processing and movement self-consciousness. These relationships were not significant.

6.5 Discussion of findings from Study 2

The purpose of the study reported in this chapter was to examine whether individual differences in achievement motivation and a participant's propensity to reinvest conscious, explicit information to control movement were related to achievement motives at the situational level (goal involvement). A further aim was to gain an understanding of whether these variables could predict performance outcomes in competitive golfers. Masters and Maxwell (2008) suggested that psychological pressure is considered to be a dominant antecedent of reinvestment. Particular interest was, therefore taken in these variables as achievement goal and reinvestment disposition were posited to influence individuals' perceptions of pressure and be related to competence striving at the situational level (goal involvement).

A strong rationale for the exploration of these relationships was evoked by the suggestion that reinvestment is underpinned by an individual's motivation to make successful movements (Wong et al., 2009). Based on the verbal report data and analysis in Study 1 together with proposed construct compatibility between reinvestment and achievement goal involvement subscales, there was a tentative expectation that task goals would be related to the conscious motor processing subscale and that ego goals would be related to the movement self-consciousness subscale of the Movement Specific Reinvestment Scale (MSRS). Partial support for this prediction was observed in the following ways. At the dispositional level, significant relationships were found between task orientation, ego orientation and conscious motor processing, however, ego orientation was related to movement self-consciousness whereas, task orientation was not.

The potential unique relationship between ego/performance goals and movement self-consciousness was further evident at the situational level as mastery approach goals were the only achievement goals that did not relate to movement self-consciousness. A player's awareness of specific factors in the competitive environment (e.g. awareness of being watched by others, importance of successful skill execution) may not only be influenced by perceptions of the motivational climate but also by their propensity to reinvest. These perceptions may consequently influence a player's competence striving and goal involvement. Specifically it was proposed that elite and recreational golfers could ultimately experience performance decrement through different dimensions of the Movement Specific Reinvestment Scale. This suggests that attending to the specific aspects of movement may be underpinned by the self-referenced striving of task or mastery goals. Ego orientation was also, as expected, related to movement self-consciousness which was posited to elicit more normatively referenced competence striving, however, this relationship was also evident with conscious motor processing.

Within the 2 x 2 achievement goal framework (Elliot & McGregor, 2001) the mastery avoidance construct has received comparatively little research attention. Empirical findings, however, suggest a more negative pattern of associations with motivational processes and outcomes compared with mastery approach goals (Moller & Elliot, 2006; van Yperen, Elliot & Anseel, 2009). Support for this was found in the present study with conscious motor processing and movement self-consciousness as well as MSRS total observed to be moderately related to mastery avoidance goal adoption. Mastery

avoidance goals may, therefore, provide understanding of the motivational mechanisms that contribute to attention selection in those with a high propensity to reinvest.

As predicted, task and ego goal orientation were related to corresponding mastery and performance goal involvement but only with the approach dimension. The mean responses for task and ego orientation for all participants, although higher than those summarised by Duda and Whitehead (1998), were similar to those found by Harwood et al. (2004) and reflective of what would be expected in a competitive sample focused on achievement oriented activities. Golfers were classified according to their achievement goal orientations through a cluster analysis procedure in this study, with four cluster groups emerging from the analysis. These groups were labelled as being lower, moderate or higher in their respective task and ego orientation scores and according to a z-score criterion of $\pm .5$ (Hodge & Petlichkoff, 2000; Wang & Biddle, 2001; Harwood et al., 2004). Harwood et al. note caution in the interpretation of these cluster groups, as labels are created in relation to the z-scores and so 'may not correspond to the actual strength of the goal orientation when viewed as an absolute mean value' (p. 328). The four cluster groups represented very different goal profiles, golfers in Cluster 1 had a Lower-ego/Lower-task profile, golfers in Cluster 2 had Lower-ego/Moderate-task profile, Cluster 3 consisted of golfers with Higher-ego/Moderate-task profile and golfers in Cluster 4 had a Higher-ego/Higher-task profile.

When examining the unstandardized means and standard deviations of each group, the range between a lower ego ($M = 2.56$) to higher ego ($M = 4.10$) and that of lower task ($M = 3.29$) to higher task ($M = 4.76$) orientation is quite large, however the range between the lower task ($M = 3.29$) and moderate task ($M = 4.01$) orientation cluster label is only 0.72 of the unit from 3 (*neither agree nor disagree*) to 4 (*agree*). It should be noted therefore, that the "lower" label given to the task score in Cluster 1 represents a moderate task orientation when considered in an absolute sense. Despite this, significant differences were found between the task scores in each cluster group. The findings of this study therefore, support the use of cluster analysis in determining truly distinct groups; however the caution in interpretation recommended by Harwood et al. is also echoed here and highlights an appreciation of cluster labels as being sample specific.

Participants with a Higher-ego/Higher-task profile reported the most adaptive achievement goal involvement with the use of mastery approach (MApp) to a greater extent than all other clusters and the use of significantly more mastery avoidance (MAv) goals than those with a Lower-ego/Lower-task profile. The Lower-ego/Lower-task profile cluster, that are considered most at risk of maladaptive consequences also reported significantly less use of performance approach (PApp) goals than other clusters. These findings support previous research that posits high task orientation as an essential component of the most adaptive motivational profiles (e.g. Fox et al., 1994; Harwood, Cumming & Fletcher, 2004; Hodge & Petlitchkoff, 2000; Smith, Balaguer & Duda, 2006) and that of Pensgaard and Roberts (2000) who suggest that elite athletes are most likely to report this profile.

It was expected that achievement motive dispositions would account for the large proportion of variance in situational achievement goals, as these are established and large effects (see Roberts, 2012 for review) with dispositional reinvestment subscales accounting for additional variance. Support was found for the dominant role of goal orientation in predicting goal adoption across all four achievement goals. Task orientation and conscious motor processing were the largest independent predictors of mastery approach goal involvement with movement self-consciousness not explaining any additional variance. When considering goal orientation from a player's profile (cluster analysis), those players with a Lower-ego/Lower-task profile combined with high reinvestment through conscious motor processing, significantly adopted less mastery approach goals. This supports the consistent finding that the Lower-ego/Lower-task achievement goal profile is associated with maladaptive outcomes (Pensgaard & Roberts, 2000; Smith, Balaguer & Duda, 2006) as mastery approach goals have consistently been associated with positive psychological wellbeing variables and were not as readily adopted by this group.

Support was also found for the hypothesised reinvestment subscale and goal involvement relationship as conscious motor processing explained additional variance in mastery avoidance goal involvement above goal orientation. Conscious motor processing remained both an independent predictor and contributor to the movement self-consciousness explanation of mastery avoidance goal involvement. Also in support of the posited relationship between Movement Specific Reinvestment Scale subscales and achievement goals were findings from the prediction of performance approach and

performance avoidance goals. In the former only ego orientation was an independent predictor and task orientation, expected to be associated with self-referenced defined mastery goals, was negatively related to performance approach and avoidance goals. Although movement self-consciousness did, as predicted, explain additional variance in both performance approach and avoidance goal adoption this was fully mediated by conscious processing. At the profile level of goal orientation support was again found for the interaction with movement self-consciousness on performance goal involvement although it was not possible to determine which goal profile provided the best explanation.

A focus on the orthogonality of achievement goals has been encouraged (e.g. Barron & Harackiewicz, 2001; Harackiewicz, Barron, Pintrich, Elliot & Thrash, 2002) in order to better understand how goals combine to promote achievement and motivation. No support was found for the idea that golf performance could be explained through the combination of mastery and performance approach goals. In contrast to research that has established positive effects of performance goals in academic performance (Elliot & Moller, 2003; Harackiewicz, et al., 2002; Porath & Bateman, 2006; Van Yperen, 2006) ego orientation and performance approach (PApp) goals were found to make unique contributions to the prediction of golfers' performance. However, whereas high ego orientation was related to improved performance, the adoption of PApp goals were associated with an increase in gross score.

Commensurate with previous expectations regarding achievement motivation and reinvestment subscale relationships, specific negative performance predictions were made. The relationship between task orientation and performance in players that reported high propensity to reinvest through conscious motor processing and who adopted mastery goals was not observed to be in the expected direction and instead appeared to be related to lower gross scores, although this relationship was not significant ($r(43) = -.244, p=0.057$). The relationship between ego orientation and performance yielded a similar unexpected pattern, although not significant, in players that reported high ego orientation and that adopted performance goals ($r(19) = -.256, p >.05$). One explanation of this failure to statistically support predictions was the reduced sample size that was a consequence of selecting specific cases that met the hypothesised maladaptive profile.

The role of skill was expected to contribute to all of the achievement goal, reinvestment and performance predictions. Elite golfers were expected to report greater ego orientation and performance goal involvement than golfers of lesser ability as at early stages of learning there is a focus on task mastery until skills reach automaticity. Professional golfers' did report higher ego orientation than golfers of lesser ability, however there was not a significant difference between categories in the use of performance goals, however, professionals reported less use of avoidance goals than golfers in other categories.

The membership for each goal orientation cluster was profiled for differences in playing ability defined by a golfer's handicap category. Players of all abilities were found in each cluster group except for professionals who were not represented in the Lower-ego/Lower-task cluster. A larger proportion of professional golfers were included in the Higher-ego/Higher-task cluster and moderate task profiles were also more evident in lower handicap golfers. This supports the hypothesis that elite golfers and those of higher ability would be characterised by more adaptive goal profiles (Pensgaard & Roberts, 2000). The dominant presence of higher handicap golfers in the maladaptive profiles was again expected with those golfers with handicaps of 12.5 to 20.4 most represented in the Lower-ego/Lower-task category. It is possible that category four players (highest handicap and least ability) were represented in adaptive profiles as a result of the necessity to be more task-focused when skills have not been mastered.

It was predicted that golfers with the goal profiles highlighted as being most at risk of maladaptive consequences and performance outcomes would report higher dispositional reinvestment and perform more poorly in competition in comparison with golfers who report more adaptive profiles. The Higher-ego/Higher-task cluster did perform (Gross score) significantly better than both the Lower-ego/Lower-task and Lower-ego/Moderate-task groups; however, these differences were not evident after controlling for playing ability. As expected a players' handicap accounted for the greatest variance in gross score and as such was a more substantial determinant of performance than motivational profile. Goal profile differences did not emerge in dispositional reinvestment scores; however there were higher reported mean scores for the conscious motor processing subscale of the MSRS than that of movement self-consciousness across all playing categories.

The extant literature posits reinvestment and self-focused attention to provide the best explanation of performance decrement in elite performers (e.g. Hill et al., 2010; 2013; Masters and Maxwell) and research from the academic domain has reported the beneficial utility of adopting performance goals (e.g. Hulleman, Schrage, Bodman & Harackiewicz, 2010). Support was not found, however, for the subsequent prediction that highly skilled golfers that report a high propensity to reinvest would experience greater performance when adopting performance rather than mastery goals. In contrast there was a significant moderate negative relationship between mastery goal adoption and gross score, specifically when valenced in approach terms and this was not found for performance goal adoption.

As Roberts (2012) highlights, there has to some degree, been an assumption in achievement goal research that orientation and/or motivational climate are accurate predictors of goal involvement. Although the relationships found in this study would lend some support to this, other antecedent variables such as dispositional reinvestment suggest a more complex influence on goal adoption. Although causal influences cannot be made from these data about the effect of goal orientation and dispositional reinvestment on goal involvement or of all these variables on golfing performance, conclusions can be drawn on the relationship between these variables. This study has provided support for previous research that has suggested that goal profiles that include higher task components are associated with elite performers and that lower task profiles are related to maladaptive outcomes. In the present study, these maladaptive outcomes, consisted of an increased reporting of performance goals which themselves contributed to poorer golfing performance.

The higher reported use of mastery avoidance goals by both elite golfers and those golfers with the adaptive Higher-ego/Higher-task goal orientation profiles in this study also emphasises the need to better understand how these under researched achievement goals influence performance. These goals are consistently reported across sport, business and education domains (Anseel, Van Yperen, Janssen & Duyck, 2011; Van Yperen & Renkema, 2008) and were evident in the verbal report data in Study 1 as players considered multiple goal intentions. The finding in Study 2 that the predictive utility of performance approach goals on gross score was mediated by performance and mastery avoidance goals, adds to the debate regarding the orthogonality of achievement goals at the situational level (e.g. Duda, 2005; Harwood, Hardy & Swain, 2000;

Treasure, Duda, Hall & Roberts, 2001). It is acknowledged, however, that there are limitations to the extent to which relationships with performance outcomes can be both understood and generalised as a consequence of how golf performance was defined in Study 2. Data were collected on different days and golf courses, exposing golfers to a wide range of challenges as a consequence of, for example, course design/difficulty and weather conditions. Future research must continue to separate suggestion and conclusions made about antecedents on macro and micro levels of performance; distinguishing those that provide understanding of successful skill execution that contribute to these global measures of success in sport.

It appears from these findings and those from Study 1, that all golfers may report the use of mastery avoidance goals, however, these may initiate additional approach or avoidance valenced goals that ultimately energise and direct attention to skill execution. Although the present study attempted to get close to the performance experience by asking participants to report their goal involvement immediately before a competitive event, future studies need to gain greater access to the moment to moment framing of competence striving in order to understand how goal states and attentional focus interact to affect discrete performance events.

In the sporting domain research into the antecedents of goal involvement has been dominated by motive dispositions such as need for achievement and fear of failure (Morris & Kavussanu, 2008). This study proposed dispositional reinvestment as an influencing factor and revealed that goal involvement may be uniquely related to the two dimensions of the Movement Specific Reinvestment Scale as a function of the normative and self-referenced attentional demands of conscious motor processing and movement self-consciousness. The present study found initial support for this achievement motivation – attention relationship and further research as to the impact on performance is warranted.

In summary; task orientation and mastery approach goals were uniquely associated with the conscious motor processing subscale of the MSRS, task orientation and conscious motor processing independently predicted mastery approach and mastery avoidance goal involvement; mastery approach goals were predicted by Goal Profile x Conscious Motor Processing interactions and performance approach goals by Goal Profile x Movement Self-Consciousness interactions. The present study did not support findings

from recent research in the academic domain that has determined a positive impact of performance goals on performance (Hulleman, Schragar, Bodman & Harackiewicz, 2010; Senko et al., 2011) and highlighted different relationships between goal orientation and goal involvement with performance. Although ego orientation was predictive of lower gross scores, performance approach goal involvement was associated with poorer performance. The utility of mastery goals for elite golfers with a high propensity to reinvest was reinforced as mastery goals were related to lower gross scores. Finally the tentative prediction that mastery goal and performance goal involvement would be detrimental to performance for conscious motor processing and movement self-conscious reinvesters respectively was not supported. Instead there was partial support that these goals were related to improved performance. Care should be taken in interpreting these findings as providing insight into the achievement goal and attention relationship with optimal performance as gross score improvements were determined relative to the overall performance of the sample.

As a result of this preliminary investigation into the achievement motivation – attentional focus relationship, achievement goals are posited as a relevant area of continued investigation. The cognitive and affective responses to achievement experiences that Duda (2005) suggests reflects the purpose underlying peoples' behaviour may therefore include reinvestment through conscious motor processing or movement self-consciousness. Golfers may in turn, through self or normatively referenced competence striving be able to initiate adaptive attentional focus.

6.6 Chapter summary

Study 2 has answered three specific research questions with which to address the aim, research question and objectives of this thesis. Findings from Study 2 established a relationship between an individual's propensity to reinvest and their achievement motivation and propose that the goal that a golfer adopts during performance under pressure may be influenced by these dispositions. These findings have, therefore, contributed dispositional reinvestment as a factor to consider within the antecedents of achievement goal literature. In addition further evidence has been provided that suggests multiple achievement goals may interact at the situational level when assessment is made prior to the discrete performance experience.

In the final study in this thesis (Chapter 7), design elements are included that allow the manipulation of goal involvement during skill execution in order to examine the effects of these achievement motivation states on attentional processes ‘in action’ rather than an individuals’ propensity to reinvest. As such, the consequences of achievement goal adoption are investigated for their influence on attention selection and golf performance under pressure.

7. STUDY 3: ACHIEVEMENT GOAL EFFECTS ON PUTTING PERFORMANCE AND THE CORTICAL EFFICIENCY OF ELITE MALE GOLFERS

7.1 Chapter overview

In the previous chapter the relationship between a golfer's propensity to reinvest and the adoption of achievement goals was identified in relation to competitive performance. Relationships were identified between the sub dimensions of the Movement Specific Reinvestment Scale and the 2 x 2 achievement goal framework. These data suggest that goal involvement may have a role to play in the influence of optimal and sub-optimal attentional focus of golfers of different skill levels.

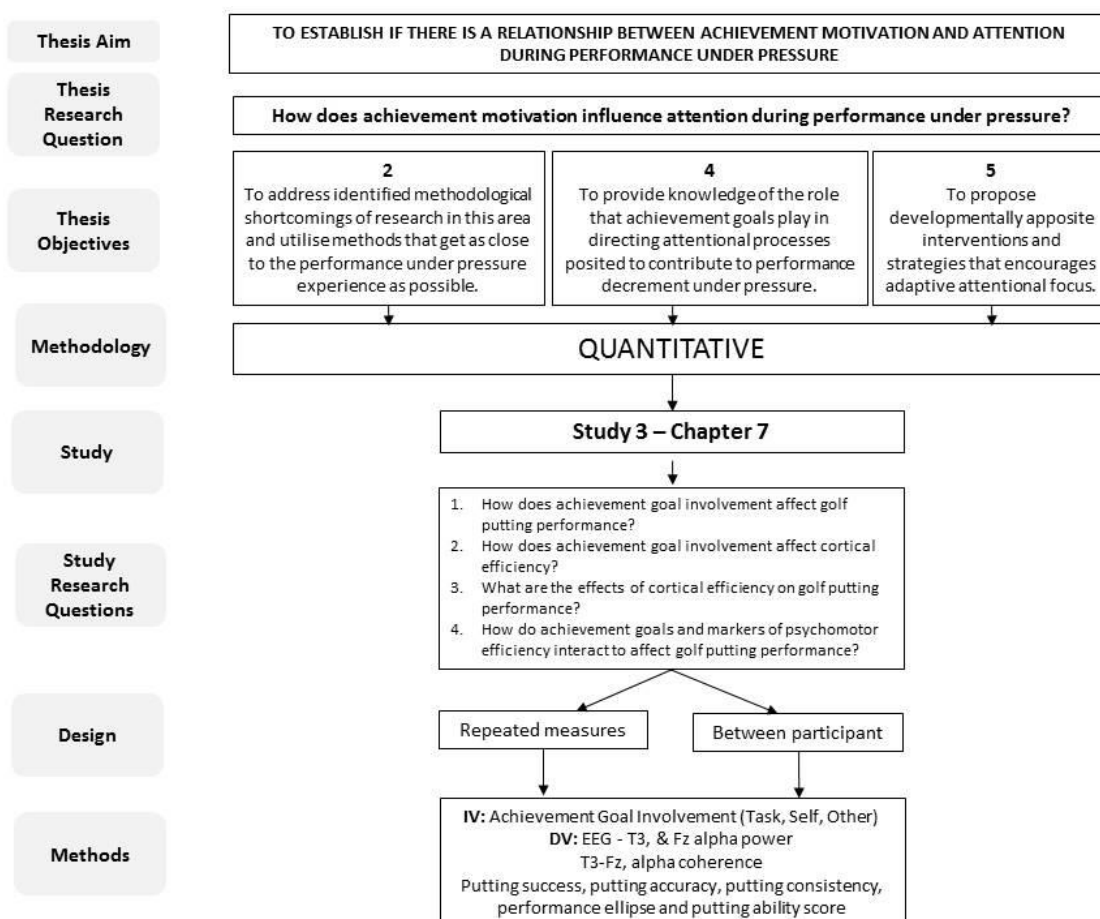


Figure 7.1 Diagram representing how Study 3 addresses thesis aim, question and objectives

The final study, reported in this chapter, further investigates the association established between achievement motivation and attentional focus in the first two studies of this thesis. Study 3 specifically attempts to determine differences in cortical efficiency (an indicator of reinvestment) and golf performance as a function of achievement goal adoption. A golfer's propensity to reinvest was assessed in Study 2 and there is a progression in Study 3 to investigate attentional processes during skill execution. The most salient theories related to reinvestment and achievement goals are first outlined to provide a context for these outcomes (see Chapters 2 and 3 for full review). An overview of relevant empirical observation is then presented to inform both the research questions and predictions of Study 3, and the broader aims and main research questions addressed by this thesis. The method section details the conditions of the experimental design and operation of variables, the purposive sample of elite golfers and the methods of data collection. A concise analytical structure is outlined to appropriately test stated predictions with the results discussed in relation to hypotheses, extant literature and the study and thesis objectives.

In Study 2 (Chapter 6) it was acknowledged that observation of performance standards were limited to over and underperformance, for several reasons. Findings from Study 1 (Chapter 5) suggested that both 'choke' and 'clutch' experiences would require an evaluation of intrapersonal criteria and such evaluations were not accessible through the self-report questionnaires completed by participants. The electroencephalographic data collected in the Study 3 provides an opportunity to infer the attention mechanisms posited to best explain 'choking' in elite golfers. The intention in Study 3 was not to capture state-level data that solely represented 'choking' or underperformance in situ from skilled individuals, irrespective of their history with such phenomena. Instead, the intention was to recruit elite participants that had reported previous experiences of 'choking' under pressure and, as such, may have a propensity to experience, or at least have experienced performance decrement when putting.

Each study in this thesis has attempted to get closer to the performance experience when assessing players' achievement motives and attentional processes. Where Study 1 achieved this through 'real time' verbal reports that gave insight to key motivational and attentional cognitions, Study 2 administered achievement goal involvement measurement (AGQ-R) immediately prior to golfers' competitive performance. Study 2, however, only explored an individuals' propensity to reinvest. Having established

relationships between dispositional reinvestment and achievement motives, Study 3 has been designed to enable inference of attentional processes in elite golfers during performance under pressure. As a consequence, the intention is to gain access to the mechanisms that contribute to performance outcomes as opposed to self-perceptions of dominant attention style. There is a continued emphasis on self-focus and reinvestment theories in line with current explanations of skill breakdown in this elite population (e.g. Hill et al., 2010b; Hill et al., 2013).

The design of Study 3 further advances research into Achievement Goal Theory by incorporating Elliot, Murayama and Pekrun's (2011) expansion of the 2 x 2 achievement goal framework (Elliot & McGregor, 2001). This framework proposes definitions of competence to be absolute, intrapersonal or interpersonal. Specifically, mastery goals are posited to contain two different standards of evaluation, which are bifurcated to include mastery goals that focus on the attainment or avoidance of (i) task-based and (ii) self-based competence and incompetence respectively. Performance goals, on the other hand, focus on the attainment or avoidance of 'other' based competence or incompetence. In line with the Elliot et al conceptualisation (2011), goal adoption is evoked through manipulation of the motivational climate in Study 3 in order to examine the impact achievement motivation (defined as task, self or other-based goals) on attention and golf performance.

Study 3 specifically addresses objectives two, four and five of the thesis (see Chapter 4.1) through the manipulation and measurement of variables during the performance under pressure experience and via the observation of a purposive sample of elite golfers who have reported experiences of underperformance and 'choking'. In addition, it assesses the influence of disparate achievement motives on attentional processes during performance. Recent methodological advances have provided psychophysiological evidence for the Theory of Reinvestment. However, research has focused on elite-novice differences in cortical efficiency and the benefits of implicit learning in resisting conscious processing (e.g. Hatfield & Hillman, 2001; Hatfield et al., 2004; Hung et al., 2005; Zhu et al., 2011). To date there have been no known published studies that have investigated the effects of achievement motivation and goal striving on attentional processes. None have specifically examined the utility of these constructs in evading reinvestment of explicit rule-based knowledge during performance under pressure.

The focus of this chapter is on advancing knowledge in this area. The final study in this thesis has been designed to specifically address the following research questions:

1. How does achievement goal involvement affect golf putting performance?
2. How does achievement goal involvement affect cortical efficiency?
3. What are the effects of cortical efficiency on golf putting performance?
4. How do achievement goals and markers of psychomotor efficiency interact to affect golf putting performance?

7.2 Introduction

With regard to the first research question, the consensus within the achievement goal literature is that there should be encouragement of mastery goal involvement particularly when positively valenced (e.g. Dweck, 1999; Harackiewicz, Barron, Tauer & Elliot, 2002; Patrick & Ryan, 2008). Task-based goals have been promoted over self-based approach goals within the 3 x 2 framework (see Elliot et al., 2011). The adaptive relationship with mastery goals however has largely centred on psychological rather than performance variables. For example, strong positive correlations have been observed between mastery goal involvement and positive affect (Ntoumanis & Biddle, 1999), with concomitant reductions in anxiety (Pensgaard & Roberts, 2000). In contrast, performance goal involved individuals have reported greater anxiety, worry and concern over making errors (e.g. Abrahamsen, Roberts & Pensgaard, 2008; Smith & Smoll, 2007).

In the education domain empirical observations of students engaged in valued academic tasks predict more adaptive consequences of performance goal adoption. These are often associated with high persistence, effort and achievement (e.g. Hulleman, et al., 2010; Senko et al., 2011). Mastery goals, on the other hand, are consistently found to be unrelated to academic performance. Elliot and Moller (2003) suggest that negative performance outcomes that have previously been attributed to the adoption of performance goals are uniquely associated with performance avoidance goals. Research in the sport domain as to the impact of performance goal involvement has been comparatively limited but has however, yielded similar significant effects of performance goals on competitive performance (e.g. Stoeber et al., 2009; Stoeber &

Crombie, 2010). Based on these theoretical predictions, empirical observations, and the findings from Study 2 (i.e., higher ego orientation in elite participants) it is expected that when individuals participate in the ‘other’ goal condition with reference to interpersonal standards (Elliot et al., 2011), golf putting performance will be better than when participating in either mastery-task or mastery-self goal conditions.

Support for the notion of reinvestment of cognitive resources into task performance (the so-called progression-regression mechanism) has been found in studies that have observed elite and novice differences in neural activation measured through electroencephalography (e.g., Hatfield, Haufler, Hung, & Spalding, 2004; Haufler, Spalding, Santa Maria, & Hatfield, 2002; Kerick, Douglass, & Hatfield, 2004). The cortical efficiency of experts has been characterised as ‘the reduction of neuromotor noise’ (Masters & Maxwell, 2008, p. 166) and has been further defined as both a decrease in alpha and beta band oscillations over sensorimotor cortical areas (e.g. Haufler et al., 2000) and low coherence or communication between the verbal-analytical (T3) region of the left hemisphere and the motor planning frontal region (Fz) of the right hemisphere (e.g., Deeny, Hillman, Janelle, & Hatfield, 2003; Hatfield et al., 2004; Hung, Lin, Lo, Kao, Hung, Chen & Lai, 2005). The implication here is that there is less conscious control of movement in expert performance and that reinvestment is dependent on contributions from left hemisphere processes (e.g. Steenbergen & van der Kamp, 2008).

With respect to performance decrement, the Theory of Reinvestment and empirical research posit that expert motor performance is represented by unique EEG activation patterns. Expert performers are observed to receive input from the verbal-analytical regions of the left hemisphere prior to movement but not during movement, importantly. In cases where movements fail (e.g., ‘chokes’), these verbal-analytical regions are thought to remain active (see Chapter 2 for review). The Theory of Reinvestment makes no specific predictions regarding the beta frequency bandwidth. Empirical studies have, however, shown that experts exhibit higher levels of alpha and lower levels of beta in the temporal region and specifically at site T3 and that perceptive, cognitive and motor processes are related to the parallel functional coupling of alpha and beta (e.g. Deeny et al., 2003; Haufler et al., 2000; 2002; for review see Nakata, Yoshie, Miura & Kudo, 2010).

With regard to the second research question that asks how achievement goal involvement affects cortical efficiency, Achievement Goal Theory (Elliot & McGregor, 2001) would again promote mastery goal involvement as having a positive influence on psychological outcomes. In addition established relationships found between performance goals and for example, concern for mistakes may suggest that negative cortical activity would be expected. Findings from Study 2, however, suggest that relationships exist between mastery goals and the conscious motor processing subscale of the Movement Specific Reinvestment Scale and the pressure environment created in the present study has been designed to elicit self-focus (DeCaro, et al., 2011) that has been posited as the best explanation of skill breakdown in elite performers. As such there is a tentative expectation that the task-based condition that defines competence in the attainment of skill relevant criteria will elicit reinvestment and specifically decreased alpha power and increased beta power at T3 region of the left hemisphere and increased coherence between T3 and Fz.

With regard to the third research question addressed in this study, cortical activation patterns in relation to T3 and Fz brain regions were expected in line with mechanistic explanations of underperformance and ‘choking’ put forward by The Theory of Reinvestment (Masters & Maxwell, 2008). Specifically it was predicted that decreased alpha power and increased beta power at T3 and Fz brain regions, and increased coherence between, T3 and Fz regions would be associated with unsuccessful putting performance across achievement goal conditions. Whilst there has been consistent evidence for the maladaptive performance consequences of increased alpha coherence between T3 and Fz regions, previous research into tasks that place a demand on visual aiming, such as marksmen and archers (e.g. Deeny et al., 2003) has found that there is relative activation of the right temporal region, T4, as this region is thought to mediate visuospatial processes. These findings of coherence between the visuospatial processing (T4) and motor planning (Fz) regions, reinforces the use of EEG to determine situational reinvestment. It suggests that cortical efficiency in expert performance is not determined by a global reduction in cerebral activity but instead by an appropriate allocation of neural resources to meet specific task demands and consequently a reduction in irrelevant processing (Zhu, et al., 2011). The putting task in the present study was proposed to place similar demands on visual aiming and so the relationship between the T4 region of the right hemisphere and motor planning in elite golfers was

also considered. Increased coherence between T4-Fz regions was therefore not expected to be detrimental to putting performance across achievement goal conditions.

Whilst the extant literature has not examined the specific effects of achievement goals on self-focused attention; reinvestment and achievement goal theories make predictions regarding performance under pressure and psychological processes respectively. With regard to the final research question, based on a consideration of theoretical predictions, recent empirical research into each construct (e.g. Elliot et al., 2011; Malhotra et al., 2015) and findings from Study 2 in this thesis, inferior putting performance in elite golfers was expected to be explained through conscious motor processing and as such would be a function of task-based goal involvement and high T3-Fz alpha coherence. It was further predicted that the 'other-based' goal condition would elicit the most adaptive psychomotor efficiency in the elite sample.

7.3 Method

A general overview of the thesis methodology and methods can be found in Chapter 4. The methods reported here relate to Study 3 reported in this chapter.

7.3.1 Design.

A within-group design exposed all participants to one baseline and three achievement goal involvement conditions: task-based, self-based and other-based. Putting performance and cortical efficiency were measured through the following dependent variables and analysed independently. Putting performance was measured through putting accuracy, putting consistency, performance ellipse and a playing ability score (accuracy and consistency composite). Cortical efficiency was measured through electroencephalography relative power estimates (EEG PRPow) and EEG coherence between T3-Fz and T4-Fz channel pairs at four levels; low alpha1 (8-10Hz), high alpha2 (10-12 Hz) low beta1 (15-18Hz) and high beta2 (18 – 25Hz) bandwidths.

7.3.2 Participants.

Golfers responded to an advert at golf clubs in the South East of England that sought participants who were experiencing sustained sub-optimal performance in putting and who had experienced ‘choking’ under pressure. A purposive sample was selected from 20 volunteers who expressed an interest in taking part in the study. Participation was specifically requested from golfers that reported higher scores for conscious motor processing (CMP) than movement self consciousness (MSC) on the Movement Specific Reinvestment Scale (MSRS) and that scored above 19.1 on the CMP subscale as this mean score has been reported as denoting high propensity to reinvest through conscious motor processing in previous research (e.g. Malhotra et al., 2015a; Zhu et al., 2011). Nine male right-handed elite golfers meeting this criteria agreed to take part. Participants were aged between 18 and 54 ($M = 29.33$, $SD = 13.70$) years. Participants’ elite status was defined as being a professional golfer ($n = 8$) or having a category one playing handicap or less ($n = 1$). Each golfer provided informed consent prior to the study.

7.3.3 Materials.

Participants were tested indoors in a sport science laboratory on a synthetic grass surface, measuring 2m x 4m and running at a stimpmeter reading of nine feet (2.74m). The distance between the starting point of the ball and the hole was 3m and the hole was cut into the surface and was 108mm in diameter (standard size). All participants used their own putters but golf balls (Titleist Pro V1) were provided by the experimenter. Kinematic data were captured at 200 Hz using a 10-camera (Oqus 3), retroreflective motion capture system (QTM, Qualisys, Sweden) and EEG was recorded by means of a Mitsar (Mitsar, Ltd.) amplifier. The 3 x 2 achievement goal questionnaire (Elliot et al., 2011) was adapted for golf specificity and used to assess the effectiveness of the condition in eliciting task, self and other-based goal involvement.

7.3.4 Experimental conditions.

Previous research has explored whether achievement goal orientation or climate perceptions are better predictors of achievement related cognitions, affect and behaviour

at the situational level (see Roberts, 2012). Findings suggest that the nature of the dependent variable is largely influential. For example when looking at athletes' self-esteem this measure is more dispositional and so goal orientations have a greater predictive utility, whereas, when assessing levels of enjoyment in a particular sport setting, perceptions of the motivational climate account for more variance (Duda, 2005). In Study 3 it was considered that perceptions of the performance environment and pressure are central to evoking attentional focus and therefore, it was expected that the motivational climate would be of greatest influence to participants' achievement motives.

All participants were exposed to the baseline and three achievement goal involvement conditions in which they had to hit a total of 30 putts in 3 x 10 putt blocks per condition resulting in 120 putts being taken in the experiment. Putting was divided into 3 x 10 blocks so that players could stretch and rest in between and to ensure that there remained good electrode connectivity for continued EEG recording. In the baseline condition golfers were informed that their performance was being recorded and would be analysed by a panel of sport science experts and a PGA advanced golf professional and they were to attempt to putt as well as they could. In the remaining three conditions golfers were reminded that their performance was being recorded and would be analysed but were told that differing criteria would be used to measure success/competence. All participants first putted in the baseline condition and thereafter conditions were counterbalanced to minimise practice effects. All achievement goal climates were designed in accordance with goal definitions of Elliot et al. (2011) and all positively valenced (approach rather than avoidance striving).

In the task-based goal condition golfers were asked to rate their putting out of ten immediately on completing the stroke, in relation to a positive self-referenced measure of competence that they provided at the start of the experiment. Participants were asked up to three questions in order to elicit this self-referenced measure of putting competence: When putting, how does your stroke feel when you know that you are putting well? How does your putting stroke feel when you know you are not putting well? What is the difference between your good and bad putting strokes? In the self-based goal condition golfers were asked to record a personal best score for putts holed out of ten, using their performance in the baseline condition as a reference.

In the other-based goal condition, a leader board was positioned 2 metres to the right of the hole so that it was visible at all times. The leader board contained 15 first names of players who, participants were told, had completed the experiment previously with scores that ranged from 5 to 19 putts holed out of a possible 30. Each participant was informed that they should strive to finish as high up the leader board as possible.

7.3.5 Performance measures.

Prior to 3D motion capture a volume of 24 square meters (m^3) was calibrated (average residual of 0.8 mm) using a Cartesian co-ordinate system (i.e., Z-vertical, X-horizontal and Y-mediolateral). Five 12 mm retroreflective markers were fixed to the right forearm and 5 non-collinear markers to the putter. Golf balls were also marked with retroreflective tape. Pose data was defined from marker coordinates recorded from each subject standing in the anatomical zero position holding the putter, at the same time the XY coordinates of the hole were also identified. All pose and trials were tracked and exported to the appropriate file format (C3D) for data processing and analysis in Visual 3D (C-Motion, USA). The marker coordinates used in this study allowed a simple 2 segment (6 DOF) link model to be defined for each subject for the right forearm and putter.

The position of any markers not captured during recording (gaps in the marker motion trajectory) were spline interpolated by applying least-squares fit of a 3rd order polynomial to the data. The data were subsequently smoothed using a 2nd order, low-pass Butterworth Bidirectional filter (resulting in a 4th order filter) with a cut-off frequency of 6 Hz. The final ball position relative to the golf-hole centre was the parameter of interest for this study and was used to calculate putting success, putting accuracy, putting consistency, performance ellipse and putting ability score.

Putting success was determined by the number of putts holed out of a total of thirty in each condition, putting accuracy represented the average of the final position distances (resultant) from the hole in meters, putting consistency was classified as the standard deviation of the resultant in meters, and a performance ellipse was calculated in labview to represent outcome dispersal that included the putting data within two standard

deviations and rotated for best fit. This was recorded in meters squared (m²), (see Figure 7.2). Finally a putting ability score was calculated as $\sqrt{\text{consistency} + \text{accuracy}}$, commensurate with previous research in this area.

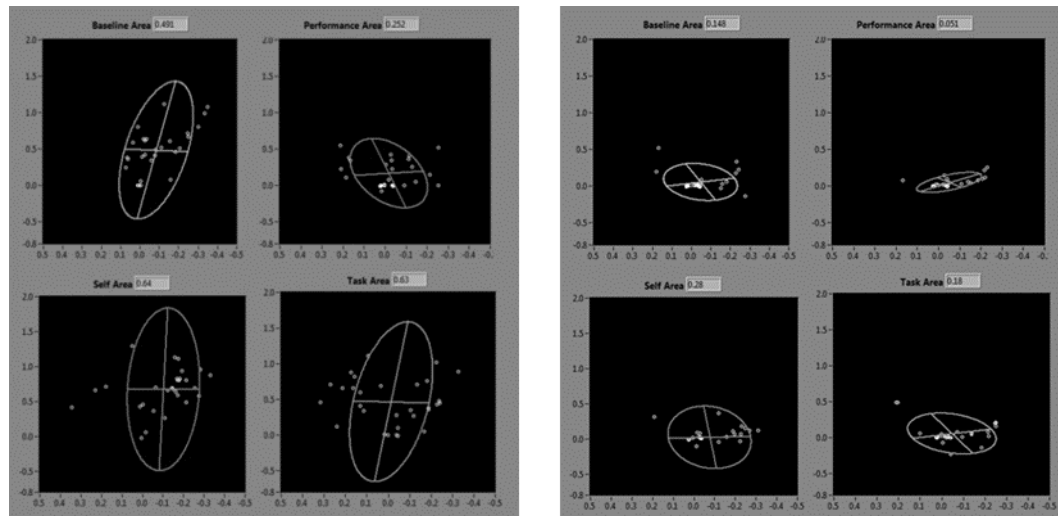


Figure 7.2 The putting performance ellipse calculated for two participants across four conditions

7.3.6 EEG measures.

EEG was recorded by means of the Mitsar (Mitsar, Ltd.) amplifier from 19 electrodes (Fp1, Fp2, F7, F3, Fz, F4, F8, T3, C3, Cz, C4, T4, T5, P3, Pz, P4, T6, O1, O2) sites in the International 10-20 system (Jasper, 1958; see Figure 7.3) with 500 Hz sampling rate in 0.3 – 70 Hz frequency range in the following conditions: 1) eyes opened (EO) – at least 5 minutes, 2) eyes closed (EC) – at least 5 minutes, and 3) throughout the four conditions of the experiment. A microphone was connected to ECG channel of the Mitsar amplifier in order to determine strike of putt. Changes in the brain state during continuous putting movements (epochs) as a whole were investigated, rather than phasic changes that are referred to as ‘event-related’. Epochs were determined as 4 second prior and 1 second after the ball had been struck. Prior to analysis these epochs were labelled at the strike point and as successful or unsuccessful putts depending on whether the putt was holed or missed.

The data were stored on the hard disk in the linked ears reference montage and processed offline by means of WinEEG software. Absolute and relative magnitude spectra and coherences in all conditions were computed and compared with the

parameters of a corresponding age group from the Human Brain Index (HBI) reference database. The reference database includes data of about 1000 healthy people of 7-89 years of age.

The analysis consisted of the following steps: 1) eye movement artifact correction and elimination: a) using spatial filtration technique based on zeroing the activation curves of individual Independent Component Analysis (ICA) components corresponding to horizontal and vertical eye movements, as well as b) excluding epochs with excessive amplitude of EEG and excessive faster and slower frequency activity; 2) Fast-Fourier Transformation (FFT) of the corrected EEG for extracting EEG power and coherence for all 0.25 Hz bins in the frequency band from 0.5 to 30 Hz.

The spectra were computed as follows: 1) The interval in EO condition was divided into equal parts (epochs). The length of an epoch was 5 seconds. Overlapping of the epochs was set to 50% so that the first 50% of each epoch overlaps the final 50% of the previous epoch. 2) To suppress energy infiltration through boundaries of epochs, each epoch was filtered by the Hanning time window. 3) The power spectra were computed by means of the fast "Fourier transformation" (FFT) algorithm. 4) Finally the averaged (over time of recording) spectra were calculated for each EEG channel separately.

In line with previous research that has explored T3-Fz coherence in participants with a high propensity to reinvest, the alpha bandwidth (8-12Hz) was of particular interest in the present study (Zhu, Poolton, Wilson, Maxwell & Masters, 2011). The focus on the alpha bandwidth was further defined by high and low alpha. Low alpha (alpha1 8 – 10Hz) is associated with general arousal and high alpha (alpha2 10 – 12Hz) with task specific attentional processes and therefore of relevance to the current study. All coherence values were subjected to a Fisher z-transformation prior to analysis to ensure normal distribution.

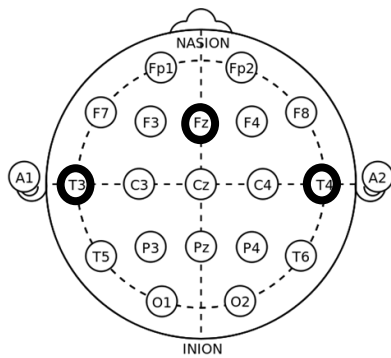


Figure 7.3 The cortical locations of interest for the current study

Fz - frontal midline premotor region (motor planning); T3 - left hemisphere temporal lobe (verbal-analytical processing); T4 - right hemisphere temporal lobe (visuospatial processing).

7.3.7 Procedure.

Participants volunteered to take part in a study that sought understanding of psychomotor performance differences between successful and unsuccessful putting. They were informed that the aims and benefits of taking part in the research were to gain understanding of potential psychological influences that may 1) enhance putting performance under pressure and 2) resist co-cortical communication understood to contribute skill breakdown in elite performers. Golfers were informed that they would be fully debriefed on completion of the study and that time would be given to explain these processes and any areas of interest in greater depth.

Participants were provided with instructions in the week prior to the study (see Appendix F) that detailed how they should prepare the night before and on the day of the experiment. These included getting a good night sleep and avoiding excessive alcohol, washing hair and avoiding caffeine consumption. To enable consistent EEG recording each participant took part in the study at 09:00 hours and on arriving at the lab provided informed consent, and answered questions relating to current medical issues and the items to elicit the success/competence measure in the task-based goal condition. Participating golfers then had the opportunity to practise and get an understanding of the speed of the green by having 10 practice putts.

The electrode cap was then fitted to each participant's head and a Mitsar amplifier attached to their lower back with a Velcro strap holding it in place around the waist. Participants were given a further opportunity to practice 5 putts to ensure that recording equipment did not interfere with the putting stroke. Participants were next seated and a baseline of cortical activity (EEG) taken through a recording of 5 minutes with eyes open and 5 minutes with eyes closed.

All participants then completed 30 putts in the first baseline condition and took up to a maximum two-minute break between the three blocks of 10 putts. The self-based, task-based and other-based achievement goal conditions were then completed in a counterbalanced order. On completion of each condition, participants were asked to complete the 3 x 2 achievement goal questionnaire (Elliot, et al., 2011) which was adapted for sport specificity, in order to check the achievement goal that they were involved in during performance in that condition (see Appendix G). Participants' immediate feedback of a self-referenced grade out of ten, during the task-based goal condition provided additional validation of engagement with this achievement goal. For example, if the task relevant criteria were smoothness of stroke, a grade of 10 would represent feedback of the smoothest stroke and 1 would reflect experience of the least smooth stroke. Participants were reminded after each putting block (x10) to work towards the goal of the condition even if this was not part of their normal performance assessment/evaluation criteria. EEG was recorded continuously during performance and resting periods, however only 5 second epochs that captured cortical activity 4 seconds prior to and 1 second after impact were selected for analysis.

7.3.8 Data analysis.

The effects of achievement goal involvement on golf putting performance (Research Question 1) were examined through repeated measures ANOVA. Specifically five separate repeated measures ANOVA were carried out on the golf putting performance data that assessed putting success, accuracy, consistency, putting (score) and performance ellipse.

To examine the effects of achievement goal involvement on cortical efficiency (Research Question 2) a total of twelve repeated measures ANOVA were conducted on

high and low alpha and beta relative power estimates of the Fz and T3 regions and on T3-Fz pairings. Pairwise comparisons were calculated between baseline, task-based, self-based and other-based achievement goal conditions.

To explore the effects of cortical efficiency on golf putting performance (Research Question 3) and how achievement goals and cortical efficiency interact to effect golf putting performance (Research Question 4) data was first separated into successful (holed) and unsuccessful (missed) putts. Differences in the mean relative power of alpha1, alpha2, beta1 and beta2 T3-Fz coherence and alpha1 and alpha2 T4-Fz coherence between putts successfully holed and putts missed were analysed through six paired t tests. A total of 24 repeated measures ANOVA were carried out on relative power at T3 and Fz and on T3-Fz pairs at both low and high alpha bandwidths. This enabled the assessment of cortical activity differences between the two performance outcomes across achievement goal conditions.

Study 3 recruited a purposive sample of elite golfers with self-reported 'choking' experience in the skill of putting. Such specific parameters lead to an expected small sample size that would inevitably impact the power of analyses and the ability to reach statistical significance. As a consequence there is emphasis in the reporting of results on the effect sizes observed. Durlak (2009) highlights that research often requires small samples (e.g. paediatric research) and that the addition of a single subject to a study with a small sample size can shift a p level above .05 to one below .05 without any change in the effect size. Conversely preferred large samples that increase confidence in findings also increase the likelihood of finding a statistically significant difference although may not yield a large effect. There is support for the position that researchers should strive for comprehensive data description and careful interpretation of estimated effect measures rather than purely mechanical significance testing (e.g. Durlak, 2009; Stang, Poole & Kuss, 2010).

Cohen (1990) further argues that single studies that result in a yes / no decision at the $p < .05$ level will unlikely impact theory or practice and instead the primary purpose of research should be to measure effect sizes. Effect sizes achieve an important purpose in the present study because they help to assess the overall contribution of the research to understanding achievement motivation effects on attention and performance in a specific sport population. As Thomas, Salazar and Landers (1991) support, correlational

analyses such as those employed in Study 2 contain estimates of strength of the relationship as well as statistical significance and therefore, studies using ANOVA analyses should follow a similar pattern. Finally the importance of effect size is emphasised by the American Psychological Association in their publication manual when stating “For the reader to fully understand the importance of your findings, it is almost always necessary to include some index of effect size or strength of relationship in your Results section” (The fifth edition of the APA Publication Manual, 2001, p. 25).

7.4 Results

7.4.1 Descriptive statistics and reliability analysis.

The experimental conditions were validated by mean scores (see Figure 7.4) for achievement goal involvement in the task-based goal condition (task; $M = 5.23$, $SD = 1.21$, self; $M = 4.12$, $SD = 0.98$, other; $M = 3.12$, $SD = 0.72$) the self-based goal condition (self; $M = 4.73$, $SD = 1.23$, task: $M = 3.98$, $SD =$ other; $M = 3.17$, $SD = 0.65$) and the other-based goal condition (other; $M = 5.28$, $SD = 0.65$, self; $M = 4.47$, $SD = 1.18$, task; $M = 4.25$, $SD = 1.13$).

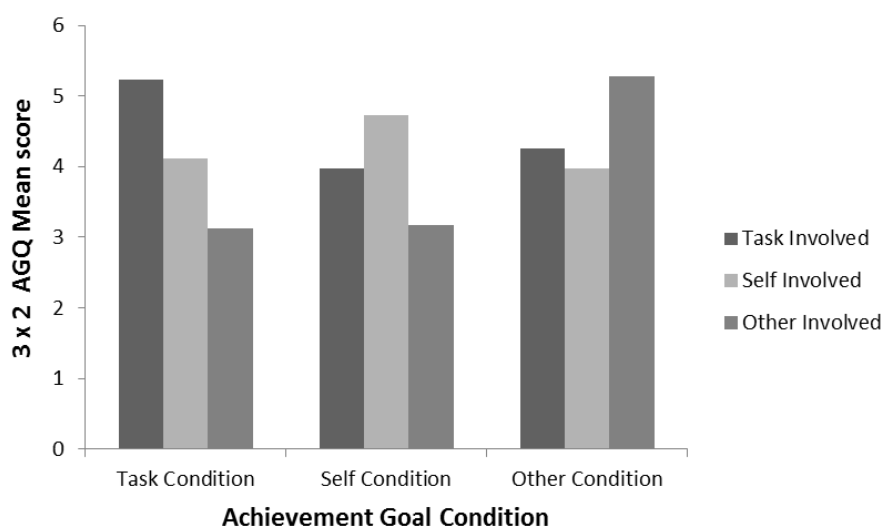


Figure 7.4 Mean 3 x 2 AGQ scores taken after self, task and other-based achievement goal conditions.

The achievement goal conditions were positively valenced and this was reflected in higher reporting of approach goals across achievement goal conditions (see Table 7.1).

Table 7.1 Self-reported achievement goal valence scores after task, self and other-based achievement goal conditions

Condition	Approach		Avoidance	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Task	5.85	1.36	3.98	1.85
Self	5.43	1.57	4.03	1.97
Other	6.37	1.03	4.20	1.92

7.4.2 Research Question 1: Achievement goal involvement and performance.

Five separate repeated measures ANOVA were carried out on the golf putting performance data from each participant that assessed putting success, accuracy, consistency, putting ability (score) and performance ellipse. Assumptions of sphericity were met in all putting performance analyses.

Putting success, defined as the number of putts successfully holed out of thirty in each condition was first analysed. Findings from analysis show that there was not a significant effect of achievement goal condition on putting success $F(3, 24) = 1.80, p = .17, \eta_p^2 = .18$.

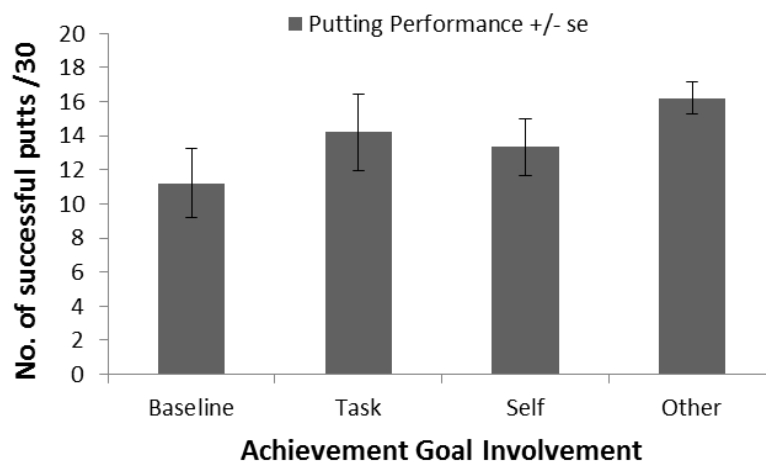


Figure 7.5 Total number of putts holed in each condition

Although the results suggest that the goal an elite golfer adopted during the task did not significantly affect performance outcome there was a difference and large effect size observed between the baseline and other-based goal condition with golfers holing more putts in the other-based achievement goal condition, mean difference = - 5, $d = -1.06$ (see Figure 7.5).

A significant main effect of achievement goal was also not evident on putting accuracy; $F(3, 24) = 2.54, p = .08, \eta^2 = .24$ or performance ellipse; $F(3, 24) = 2.61, p = .07, \eta_p^2 = .25$. However, there was again a difference and large effect size observed between the baseline and other-based goal condition in both measures of golf performance with golfers putting with greater accuracy; mean difference = .13m, $d = 1.14$ and producing a tighter performance ellipse; mean difference = .16m², $d = 1.16$ in the other-based achievement goal condition. A moderate-to-large effect was also found for the other-based goal condition on putting accuracy in comparison with the task-based goal condition, $d = .58$ (see Figures 7.6 and 7.7).

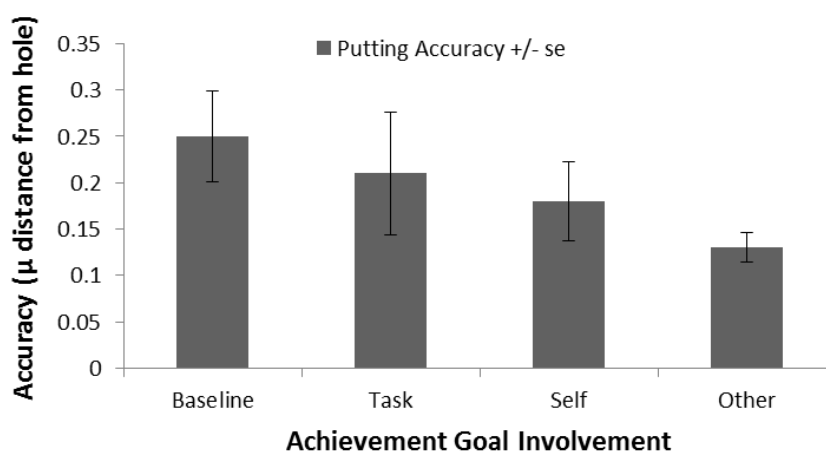


Figure 7.6 Differences in putting accuracy across achievement goal conditions

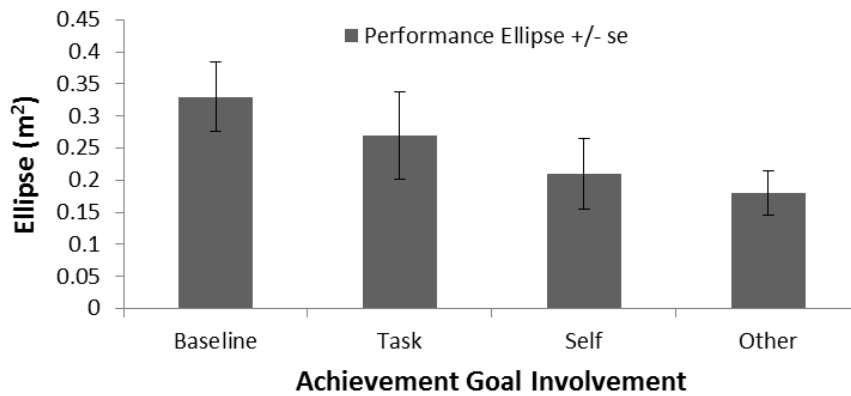


Figure 7.7 Differences in performance ellipse across achievement goal conditions

A repeated-measures ANOVA was carried out on the putting consistency data. Mauchly's test indicated that the assumption of sphericity had not been violated, $\chi^2(5) = 2.62, p = .76$ and results showed that putting consistency was significantly affected by achievement goal involvement $F(3,24) = 3.59, p = .03$. An overall effect size, $\eta_p^2 = .31$ showed that 31% of the variance in consistency can be accounted for by achievement goal involvement. Pairwise comparisons showed that there was a significant difference in elite golfers' putting consistency between the other-based goal and baseline conditions, mean difference = .06m, $p = .04$, CI (.004 - .116), $d = 1.16$ with other-based goal involvement yielding greater consistency (see Figure 7.8).

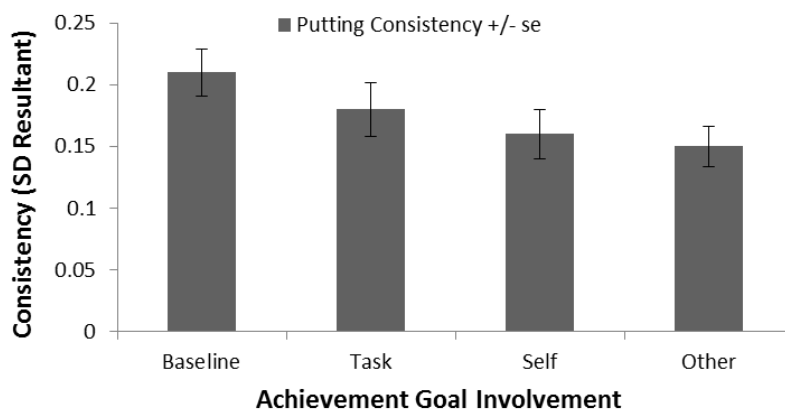


Figure 7.8 Differences in putting consistency across achievement goal conditions

A final repeated measures ANOVA analysed player putting ability (accuracy/consistency composite score). Mauchly's test indicated that the assumption of sphericity was assumed, $\chi^2(5) = 5.12, p = .41$ and results showed that putting ability was significantly affected by achievement goal involvement $F(3,24) = 3.29, p = .04$. An overall effect size, $\eta_p^2 = .29$ showed that 29% of the variance in putting ability can be accounted for by achievement goal involvement. Pairwise comparisons showed that there was a significant difference in elite golfers' putting ability (score) between the other-based goal and baseline conditions, mean difference = .15m, $p = .03$, CI (.034 - .259), $d = 1.27$ with other-based goal involvement resulting in improved putting ability as a function of greater consistency and accuracy (see Figure 7.9).

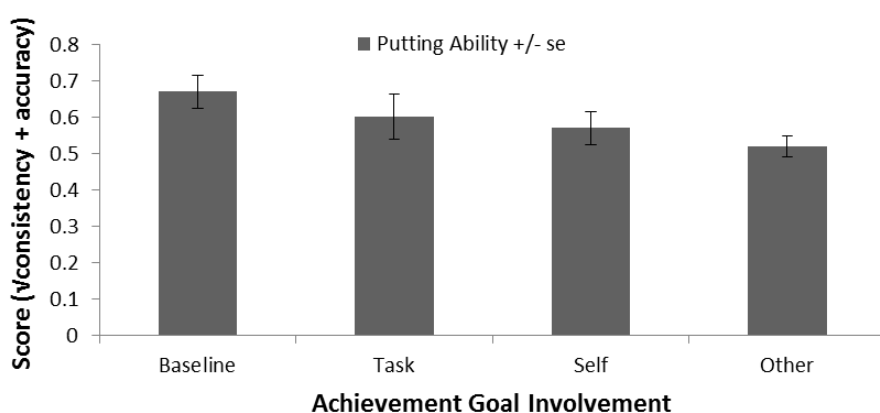


Figure 7.9 Differences in putting ability (score) across achievement goal conditions

7.4.3 Research Question 2: Achievement goal involvement and cortical efficiency.

EEG performance (EEG PRPow) relative power estimates were computed for the T3 and Fz channels in alpha1 (8 – 10 Hz), alpha2 (10 – 12 Hz), beta1 (15 – 18 Hz) and beta2 (18 – 25Hz) frequency bandwidths during golf putting. These were subjected to repeated measures ANOVAs. Assumptions of sphericity were met in all significant EEG analyses. EEG PRPow shows significant differences between achievement goal conditions in low alpha (alpha1), low beta (Beta1) and high beta (beta2) at frontal Fz and Temporal T3 (see Tables 7.2 and 7.3).

Beta1 PRPow was significantly affected by achievement goal condition at frontal Fz; $F(3, 24) = 4.08, p = .02$. An overall effect size, $\eta_p^2 = .34$ showed that 34% of the variance in PRPow in beta1 at Fz can be accounted for by achievement goal involvement. Pairwise comparisons show significant higher percentage of beta1 power in elite golfers at baseline compared with the task-based goal condition, mean difference = .644, $p = .02$, CI (.088 - 1.20), with a small effect size observed $d = 0.3$. Beta2 PRPow was significantly affected by achievement goal condition at frontal Fz; $F(3, 24) = 4.80, p = .009$. An overall effect size, $\eta_p^2 = .38$ showed that 38% of the variance in PRPow in beta2 at Fz can be accounted for by achievement goal involvement. Pairwise comparisons show significant higher percentage values of beta2 power in elite golfers at baseline compared with the other-based goal condition, mean difference = .939, $p = .01$, CI (.197 - 1.68), with a medium effect size observed $d = 0.7$. Although not significant, higher values were also observed in beta2 power at baseline compared with self-based goal involvement, mean difference = .809, $p = .06$, with a medium effect size observed $d = 0.5$.

Table 7.2 PRPow means (M) and standard deviations (SD) at Frontal Fz channel across alpha and beta frequency bandwidths

Fz (% power)	Baseline		Task		Self		Other	
	M	SD	M	SD	M	SD	M	SD
alpha1 (8-10 Hz)	6.89	4.24	5.76	1.99	6.45	3.54	6.41	3.44
alpha2 (10-12 Hz)	4.50	1.94	4.09	1.95	4.76	2.15	4.14	2.18
beta1 (15-18 Hz)	3.82	2.64	3.17	2.35	3.65	1.91	3.74	2.47
beta2 (18-25 Hz)	5.57	1.59	5.05	1.57	4.76	1.64	4.63	1.20

Alpha1 PRPow was significantly affected by achievement goal condition at the temporal T3 region; $F(3, 24) = 3.90, p = .02$. An overall effect size, $\eta_p^2 = .33$ showed that 33% of the variance in PRPow in alpha1 at T3 can be accounted for by achievement goal involvement. Significant differences were not found between achievement goal conditions and baseline, however, pairwise comparisons show significantly higher values of alpha1 PRPow in the self-based compared with task-based goal condition, mean difference = 2.13, $p = .02$, CI (.387 – 3.88), with a medium effect size observed $d = 0.7$. Although a significant effect of condition was not observed at T3

in alpha2 PRPow, $F(3, 24) = 2.43$, $p = .09$ a medium effect size was again observed between task-based and self-based achievement goal involvement, $d = 0.5$.

Table 7.3 PRPow means (M) and standard deviations (SD) at Temporal T3 channel across alpha and beta frequency bandwidths

T3 (% power)	Baseline		Task		Self		Other	
	M	SD	M	SD	M	SD	M	SD
alpha1 (8-10 Hz)	5.40	3.40	3.92	2.56	6.06	3.57	5.56	3.69
alpha2 (10-12 Hz)	5.66	3.46	4.82	3.45	6.90	4.76	6.31	5.60
beta1 (15-18 Hz)	3.81	2.02	3.44	1.46	3.65	2.11	3.37	1.74
beta2 (18-25 Hz)	7.29	3.93	7.48	3.54	7.02	3.72	6.65	3.79

EEG coherence estimates were computed for the T3-Fz pairs in alpha1 (8 – 10 Hz), alpha2 (10 – 12 Hz), beta1 (15 – 18 Hz) and beta2 (18 – 25Hz) frequency bandwidths during golf putting. These were subjected to repeated measures ANOVAs. Assumptions of sphericity were met in all significant EEG analyses. There were no significant main effects of achievement goal involvement on coherence, however small effect sizes were observed in alpha1 T3-Fz coherence, between baseline and self-based goal conditions, $d = 0.2$; alpha2 T3-Fz coherence between baseline and other-based goal conditions, $d = 0.3$ and beta2 T3-Fz coherence between baseline and self-based goal conditions, $d = 0.3$ (see Figures 7.10, 7.11 and 7.12).

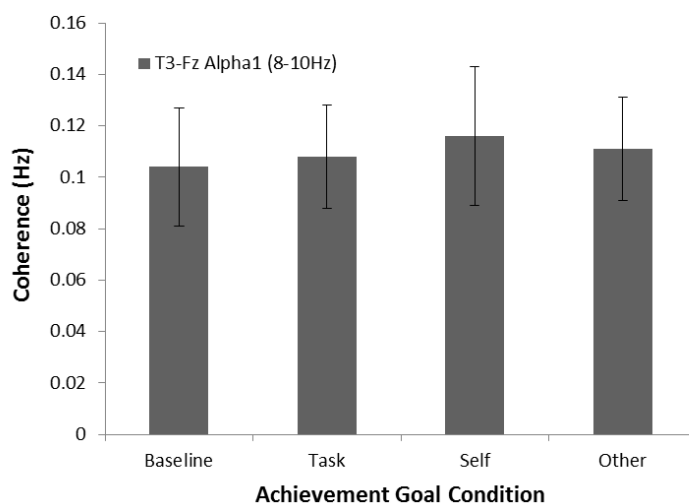


Figure 7.10 EEG T3-Fz coherence for the alpha1 frequency bandwidth during achievement goal conditions

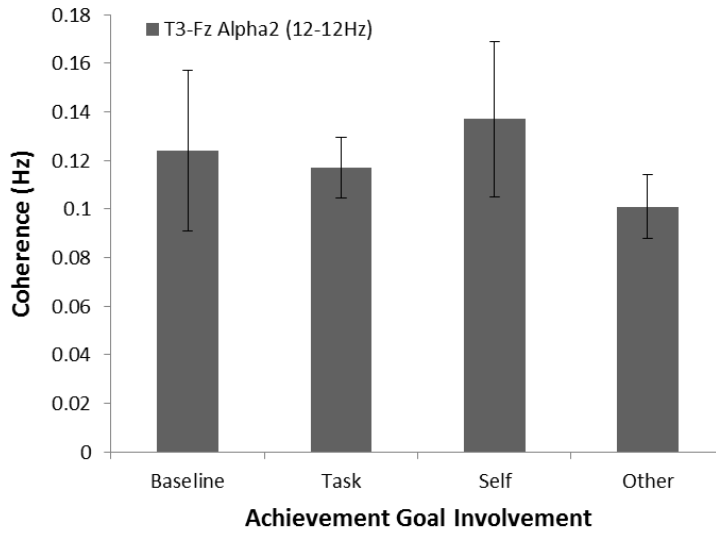


Figure 7.11 EEG T3-Fz coherence for the alpha2 frequency bandwidth during achievement goal conditions

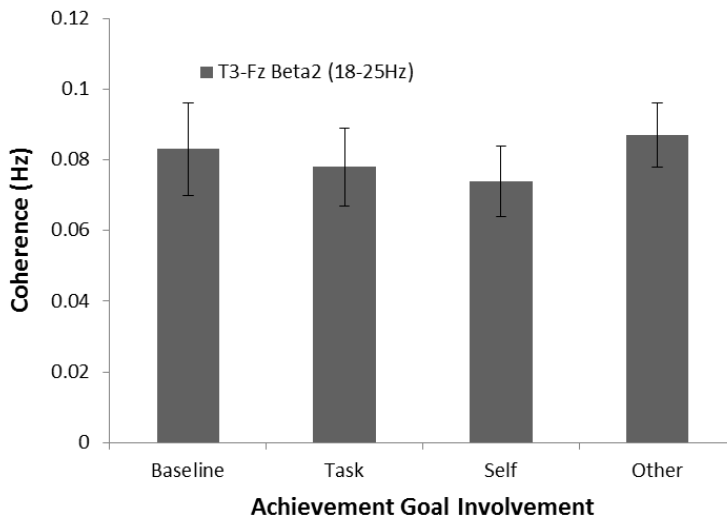


Figure 7.12 EEG T3-Fz coherence for the beta2 frequency bandwidth during achievement goal conditions

7.4.4 Research Question 3: Cortical efficiency and golf putting performance.

Repeated measures ANOVA were carried out on relative power estimates at Fz, T3 and T4 channels and across alpha 1, alpha2, beta1 and beta2 frequency bandwidths after the data had been separated into successful and unsuccessful putts in order to assess cortical activity differences between these two performance outcomes.

For putts that were successfully holed, a main effect of achievement goal condition was evident on the relative power values at Fz beta2, $F(3, 24) = 4.72, p = .01, \eta_p^2 = .37$ and T3 alpha1, $F(3, 24) = 6.73, p = .002, \eta_p^2 = .46$ and alpha2, $F(3, 24) = 3.56, p = .02, \eta_p^2 = .31$.

Large effect sizes were found for differences between baseline and self-based goal involvement at Fz, Beta2 with a mean difference = 1.43, $p = .03, CI (0.117 - 2.745), d = 0.9$, and between task-based and self-based goal involvement at T3, alpha1 with a mean difference = -3.17, $p = .009, CI (-5.522 - -0.815), d = 0.9$. A medium effect size observed for differences between baseline and task-based goal involvement at T3, alpha2, with a mean difference = 1.75, $p = .03, CI (0.155 - 3.345), d = 0.5$.

For putts that were unsuccessful a main effect of achievement goal condition was only evident on the relative power values at T3 alpha1, $F(3, 24) = 3.00, p = .05, \eta_p^2 = .27$. Pairwise comparisons were unable to detect a difference between conditions because of low statistical power, however a small effect size was observed for the increase in values in the other-based achievement goal condition compared with baseline, $d = 0.3$.

EEG data were first separated into putts that were successfully holed (hits) and those that were unsuccessful (misses). Paired sample t-tests indicated that averaged T4-Fz alpha1 coherence did not differ for putts holed ($M = 0.20, SD = 0.05$) compared with putts missed ($M = 0.17, SD = 0.04$) or for alpha2 coherence between putts holed ($M = 0.19, SD = 0.08$) compared with putts missed ($M = 0.19, SD = 0.08$) (see Figure 7.13).

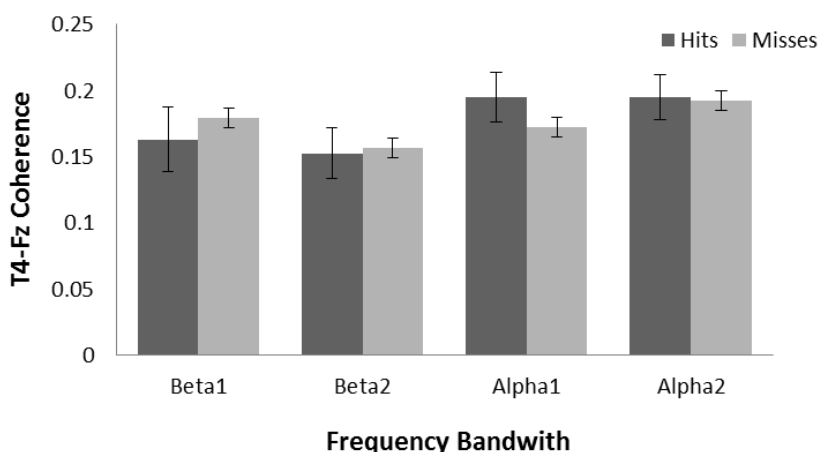


Figure 7.13 EEG T4-Fz coherence differences between successful and unsuccessful putts across alpha and beta frequency bandwidths

Four separate paired samples t-tests revealed no significant differences between successful and unsuccessful putts for T3-Fz alpha1, alpha2, beta1 and beta2 coherence. A small effect was observed in alpha2 coherence (mean difference = 0.01, $d = -0.13$) and medium effect in beta2 coherence (mean difference = 0.01, $d = -0.36$). Increase in alpha 2 and beta2 T3-Fz coherence was associated with unsuccessful putts (see Figure 7.14).

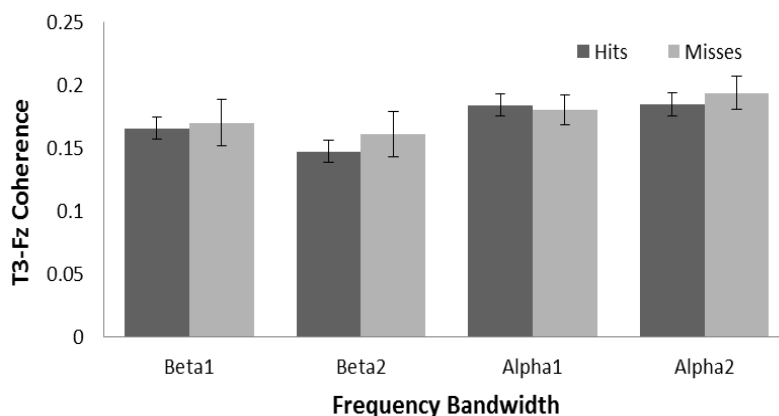


Figure 7.14 EEG T3-Fz coherence differences between successful and unsuccessful putts across alpha and beta frequency bandwidths

7.4.5 Research Question 4: The influence of achievement goals and markers of psychomotor efficiency on performance.

Repeated measures ANOVA were carried out on T3-Fz pairs in alpha1 (8 – 10 Hz), alpha2 (10 – 12 Hz), beta1 (15 – 18 Hz) and beta2 (18 – 25Hz) frequency bandwidths after the data had been separated into successful and unsuccessful putts in order to assess cortical activity differences across achievement goal conditions, between these two performance outcomes (see Figures 7.15, 7.16, 7.17 and 7.18).

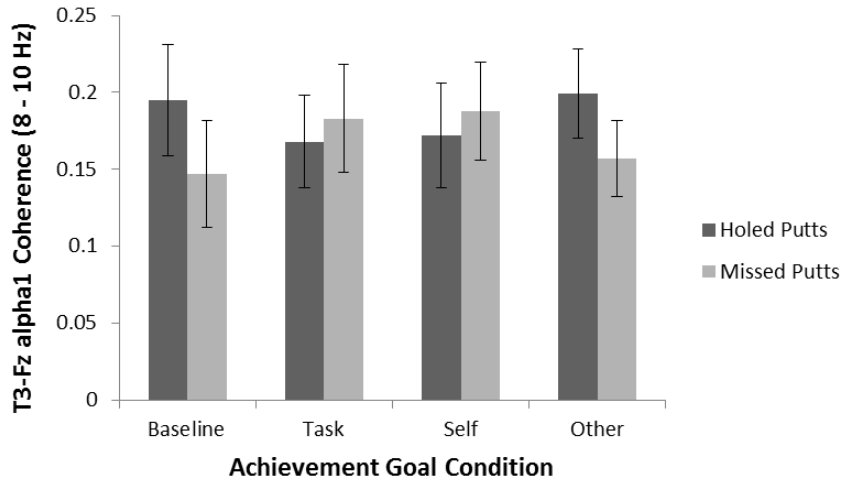


Figure 7.15 EEG T3-Fz coherence differences between successful and unsuccessful putts across achievement goal conditions for the alpha1 frequency bandwidth

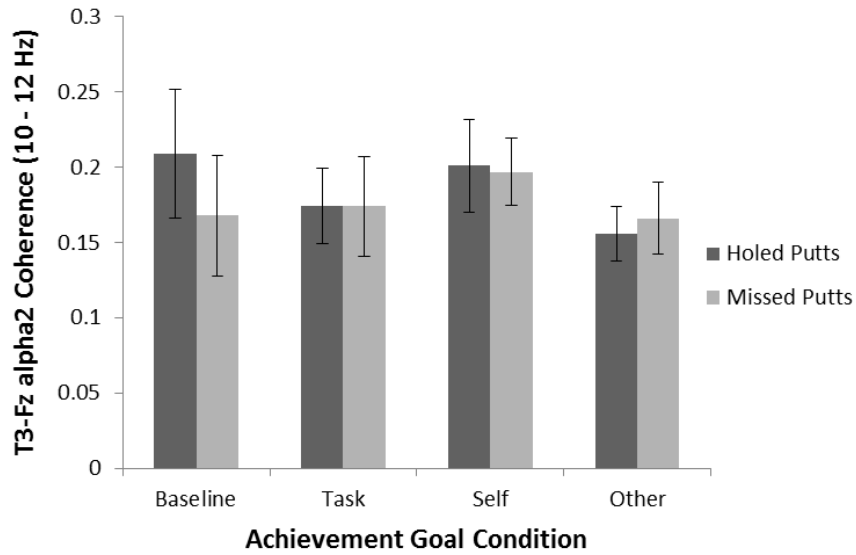


Figure 7.16 EEG T3-Fz coherence differences between successful and unsuccessful putts across achievement goal conditions for the alpha2 frequency bandwidth

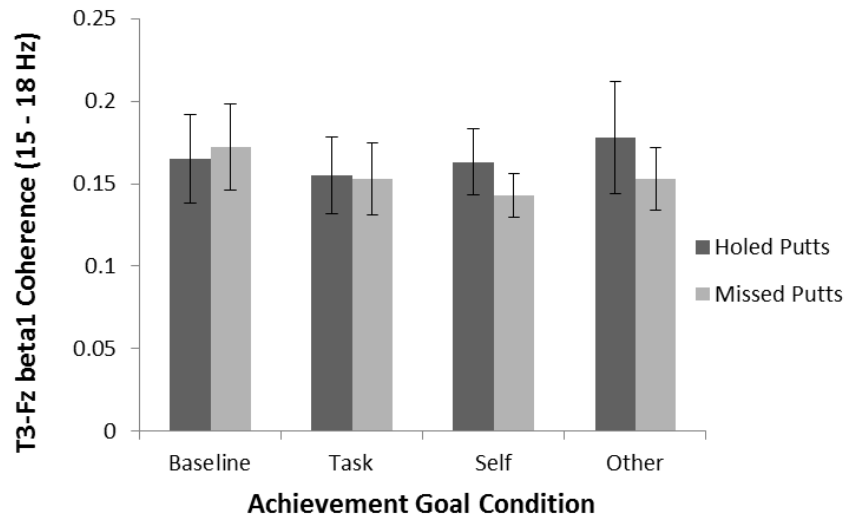


Figure 7.17 EEG T3-Fz coherence differences between successful and unsuccessful putts across achievement goal conditions for the beta1 frequency bandwidth

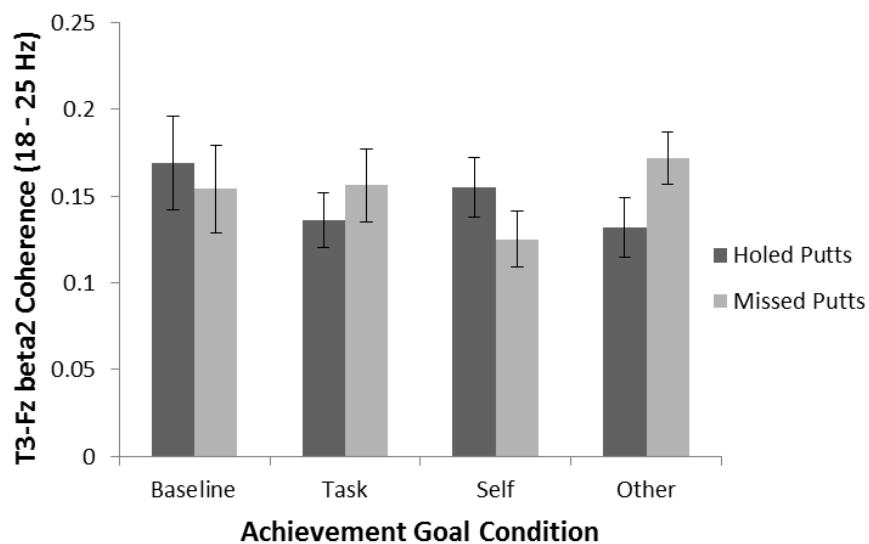


Figure 7.18 EEG T3-Fz coherence differences between successful and unsuccessful putts across achievement goal conditions for the beta2 frequency bandwidth

There were no significant main effects of achievement goal involvement on coherence after considering performance outcomes, however small effect sizes were observed for successful putts; in T3-Fz alpha1 coherence between baseline and task-based goal condition, $d = 0.3$. Medium effect sizes were evident for successful putts in T3-Fz

alpha2, $d = 0.5$ and T3-Fz beta2, $d = 0.5$ between baseline and other-based goal condition.

The other-based achievement goal condition yielded a reduction in T3-Fz alpha2 and beta2 coherence compared with baseline.

For putts that were unsuccessful; a small effect size was observed in T3-Fz alpha1 coherence, $d = 0.4$ between baseline and self-based goal conditions and medium effect sizes ($d = 0.5$) were observed in T3-Fz alpha2, T3-Fz beta1, and T3-Fz beta2 coherence between baseline and self-based achievement goal conditions.

The self-based achievement goal condition lead to an increase in T3-Fz alpha2 coherence compared with baseline and a reduction in T3-Fz beta1 and beta2 coherence compared with baseline.

7.5 Discussion of findings from Study 3

Study 3 sought to determine whether achievement goal involvement at the situational level would affect putting performance in elite golfers who had experienced sustained performance decrement in this area. There is currently debate regarding the utility of performance or other-based goal adoption on performance outcomes as a result of different findings from the academic and sport domains. In Study 2, elite performers who reported a high ego orientation and those that also reported a high propensity to reinvest appeared to perform better when increased performance goals were adopted. There was therefore, an expectation that the other-based goal condition, that makes reference to interpersonal standards, would result in improved putting performance compared with the self and task-based achievement goal conditions for elite participants that self-reported high dispositional reinvestment.

Support was found for predicted achievement goal involvement effects on putting performance with significant differences found between baseline and other-based goal conditions for putting consistency and ability score (a function of consistency and accuracy measures). Although significant differences were not found for all putting performance measures, the utility of other-based goal involvement appeared consistent across the five putting outcome assessments of accuracy, ellipse, consistency, ability

score and success, with most putts holed in the other-based goal condition. The baseline condition yielded the lowest average number of putts holed, however, it is likely that an increase in putts holed in the three other conditions were a consequence of baseline practice effects. These practice effects were minimised across achievement goal conditions with counterbalancing. The self-based goal condition resulted in the fewest amount of putts holed, however the task-based goal condition was observed to have a more detrimental impact on performance when assessed through measures of consistency and accuracy.

Findings in Study 3 provide support from the sporting domain consistent with those in educational contexts (e.g. Harackiewicz, et al., 1998; Hulleman, et al., 2010; Senko et al., 2011) and add to the limited sport specific literature that has found adaptive consequences associated with performance goal involvement (e.g. Stoeber et al., 2009; Stoeber & Crombie, 2010). Elite golfers in the present study, who had experienced sustained inferior putting performance in their careers, demonstrated greater consistency and holed more putts when attempting to outperform others than when competence was determined by intrapersonal or absolute measures. As Elliot and Moller (2003) note, the previous negative associations with performance goals may be explained by the avoidance valence. Although an avoidance climate condition was not specifically included in the current study, participants did report higher approach goal adoption in the manipulation check, and it is reasonable to propose positively valenced other-based goals as being beneficial to putting performance in this study. These findings also challenge the promotion of task-based goals by Elliot et al. (2011) in the academic domain and as they suggest, these goals may not be appropriate for more complex tasks and in this case, skill execution under pressure.

An additional research question was to understand how achievement goals influenced attentional focus selection when performing a putting task under pressure. Specifically, the research sought to assess whether achievement motives would have differing influences on cortical efficiency and previously established indicators of reinvestment (e.g. Deeny et al., 2003; Masters & Maxwell, 2008; Zhu, et al., 2011). The extant literature suggests self-focused attention as being the best explanation of ‘choking’ under pressure in elite athletes (e.g. Hill et al., 2010b; Hill et al., 2013) and The Theory of Reinvestment (Masters & Maxwell, 2008) describes how conscious control of movement can be evoked through conscious motor processing and movement self-

consciousness. Studies 1 and 2 explored the relationship between achievement goals and these mechanisms of conscious control of movement and observed relationships between task orientation and mastery goal involvement and the conscious motor processing subscale of the movement specific reinvestment scale. Study 3 defined achievement goals in line with the revised 3 x 2 achievement goal framework (Elliot et al., 2011) which bifurcated the mastery construct into self and task definitions of competence striving. These revisions together with Study 2 findings provided the rationale for continued exploration of how goal involvement affects attention and performance under pressure in this elite sample.

There was a tentative expectation that the task-based goal condition that defines competence through the attainment of skill relevant criteria would elicit increased activity in verbal analytical brain regions. Specifically, a decrease in alpha relative power and increase in beta relative power at T3 and also increased T3-Fz alpha and beta coherence was expected when elite golfers putted in the task-based achievement goal condition. The task-based goal condition was not found to have the predicted effect on alpha or beta activity at the Fz region and instead the baseline condition was found to elicit a greater percentage of beta1 activity than the task-based goal condition and greater beta2 activity than the other-based goal condition. There was a medium-sized effect observed for increased percentage alpha1 and alpha2 activity in the self-based compared task-based goal condition at the T3 region and although not significant, these effects suggest potential differences between the two mastery goals in their ability to influence psychomotor efficiency associated with expert performance.

Small effects were observed in increased alpha1 coherence in the self-based condition compared with baseline and decreased alpha2 coherence in the other-based goal condition compared with baseline. Elite golfers putting under pressure in the self-based goal condition displayed greater T3-Fz alpha coherence, which has been identified as neuropsychological evidence of reinvestment, than when putting in the task-based condition. In addition, this indicator of reinvestment was observed to reduce when golfers were striving for competence defined by comparison with others in the other-based condition. This suggests that normatively referenced achievement goals may promote attentional processes more associated with expert levels of skill execution (Masters & Maxwell, 2008).

Although not statistically significant, these findings did yield small-to-medium sized effects that warrant further exploration and model testing. Caution needs to be taken in the interpretation of increased alpha activity in localised brain regions compared with increased alpha coherence. Whereas the latter represents co-cortical communication that has been consistently found to be detrimental to performance (e.g. Crews & Landers, 1993; Hung, et al., 2005, Zhu et al., 2011) the former is encouraged as a marker of a more relaxed state, and is inversely related to activation (e.g. Hillman et al.; 2000). The self-based achievement goal condition resulted in a greater percentage increase in both, high and low alpha, than the task-based goal condition, which could be indicative of a beneficial quality of self over task-based goals.

The apparent maladaptive consequences of striving for competence in absolute task demands was further supported when participants' cortical activity was assessed for differences between successful and unsuccessful putts. Successful putts in the self-based and baseline conditions were characterised by increased alpha1 and alpha2 activation, respectively, in the verbal analytical region compared with the task-based goal condition. The most putts were holed, however, in the task and other-based goal conditions, suggesting that an increase in localised alpha is not the most important factor.

The relative activation of alpha cannot be considered independent of beta activation, and the relationship between temporal alpha and performance may not be linear as Hillman et al., (2000) caution. Whereas heightened EEG alpha power is associated with a relaxed state this may only be beneficial to a point, after which excessive relaxation can lead to self-regulation failures and inadequate attention to the task. Previous research has found inferior performance to be related to significant increases in temporal alpha (e.g. Landers et al., 1994; Hillman, et al., 2000); therefore, as Thompson et al. (2008) propose, the beta bandwidth may be of greater relevance to understanding relationships with cognition and focused attention in the sporting world. The self-based achievement goal condition in Study 3, when considered in these terms, resulted in the most consistent cortical and co-cortical activation associated with reinvestment, whereas, these indicators were less evident in the other-based achievement goal condition.

The applicability of EEG to determine reinvestment during performance under pressure has been suggested as being evidenced by distinctive activity observed in the verbal analytical and motor planning regions rather than global changes in activation (Deeny et al., 2003; Masters & Maxell, 2008). As such, previous research has established that increased coherence between the T4 region, responsible for mediating visuospatial processes and the motor planning region (Fz) has not been detrimental to performance in skills that place demands on visual aiming. The task of putting in the present study was thought to elicit similar demands and increased coherence between T4-Fz pairings was indeed not found to be an influence on putting performance determined by putts successfully or unsuccessfully holed. Whilst a significant difference between putts holed and putts missed was also not observed for T3-Fz coherence across alpha and beta bandwidths, there appeared to be an increase in communication between the two regions for missed putts compared with putts holed with small and medium effects observed in alpha2 and beta1 respectively.

It was predicted that unsuccessful putting performance would be associated with increased T3-Fz coherence that would be activated to a greater extent by the task-based goal condition that was posited to increase attention to explicit skill based knowledge. This prediction was not supported and, in fact, greater T3-Fz alpha2 coherence was observed in the self-based goal condition compared with baseline for unsuccessful putts. There was however, some support for the benefits of other-based goal involvement as successful putts were represented by a decrease in alpha2 and beta2 coherence compared with baseline.

The elite golfers in Study 3 had self-reported experiences of ‘choking’ under pressure specifically within the skill of putting and scored high on the conscious motor processing subscale of the movement specific reinvestment scale (Masters, Eves & Maxwell, 2005). For this purposive sample, the adoption of other-based achievement goals resulted in a greater number of putts holed, greater accuracy and consistency than alternative achievement goals as defined by the 3 x 2 achievement goal framework (Elliot et al., 2011) and the baseline condition. It should be noted that positive performance outcomes determined as putts holed do not necessarily relate to successful skill execution as cumulative deficiencies (e.g. incorrect aim together with technically deficient putting stroke) can result in positive outcomes. The current research, therefore, makes an important contribution to the assessment of achievement goals on

performance and future research into the mechanisms of performance decrement should incorporate wider measures of performance including kinematic indicators to enable understanding of more stable measures of successful skill execution.

Studies 1 and 2 had contributed to the prediction that mastery goals would elicit self-focused attention as a result of the self-referenced nature of achievement striving. The development of the 3 x 2 framework lead to the tentative expectation that task-based goals would further encourage this attentional focus as a consequence of their emphasis on absolute skill based criteria in defining competence. When golfers adopted self-based goals they holed less putts than when engaged in all other achievement goal striving, however task-based goals resulted in inferior consistency and accuracy. Additional research is, therefore, required to ascertain whether relationships exist between achievement goals within the revised 3 x 2 framework and the subscales of the Movement Specific Reinvestment Scale. Other-based goal involvement was not only associated with improved outcome measures of performance but also the reduction of neuropsychological markers of reinvestment and greater psychomotor efficiency. Self-based goals in comparison generated increased communication between the motor planning and verbal analytical regions during skill execution.

The EEG T3-Fz activity and coherence data add to Theory of Reinvestment that achievement goals potentially increase verbal analytical interference in motor performance, however further research is required to better understand the interaction between goal adoption, attentional focus and performance outcomes. It is important that research establishes whether increased coherence is an indicator of reinvestment of explicit declarative knowledge, separate from whether this is detrimental to performance. The elite group in Study 3 reported in this chapter, would be expected to experience detrimental performance as a consequence of verbal analytical interference (e.g. Hung et al., 2005), however, there are challenges to definitions of elite performer in both the present study and the extant literature. Golf ability, as in all sports, is determined by the cumulative abilities within a number of subdomains. The golfers in Study 3 were defined as elite because of the standards they have maintained in absolute terms (i.e. scores) however, this does not ensure that players within that elite sample have a similar ability profile across the skills of for example driving, long iron play, mid iron play, short game, sand play and putting. It is possible for participants to have obtained elite status without achieving elite levels across all subdomains. Such

distinctions are important in order to accurately determine the most likely mechanisms underpinning performance decrement in these groups.

If elite levels of proficiency have been demonstrated in the past in putting then self-focused attention or reinvestment of declarative knowledge would remain a plausible explanation of skill breakdown in elite players, however if this has always been an inferior skill then the player may be at an earlier stage of learning. If automaticity had never been achieved then there may be a requirement for explicit monitoring for self-regulatory gains (Bauer & Baumeister, 2011; Vohs & Baumeister, 2011) and performance decrement may be better understood through distraction for this particular skill. In this regard future neuropsychological research should establish whether differences exist in EEG activity of participants that reinvest through conscious motor processing or movement self-consciousness, specifically whether regions other than those associated with verbal analytical processes may better explain performance decrement in this population. Despite advances in EEG methodology the reduction of movement artifact during data collection remains of priority of study design. As such laboratory conditions provide an opportunity to enhance quality of EEG recording; however, potential limitations are recognised as a consequence of challenges to ecological validity. The use of a synthetic putting surface, wearing a EEG cap connected to a computer all represent threats to validity, although research into lab-field comparisons across sports suggest that important aspects remain (e.g. Di Michele, Di Renzo, Ammazalorso & Merni, 2009; Meyer, Welter, Scharhag & Kindermann, 2003; Riley et al. 2008). Previous research in golf and putting specifically, has sought understanding of comparisons between laboratory and field based measurement of cortical activity relevant to Study 3 and reported comparable, although not equivalent, findings particular with regard to working memory load (Reinecke et al. 2011).

Whilst careful consideration was given in study design to create the appropriate performance under pressure and motivational climates it is acknowledged that further manipulation checks are necessary to increase confidence in understanding the posited achievement goal effects on cortical efficiency and performance. With regard to the manipulation of achievement goals through alternative motivational climates, many of the findings reported in this chapter make comparison with the baseline condition and greater understanding of participant's competence striving during these trials is needed. It was not expected that participants would be putting without defining any competence

criteria, however, specific instruction or direction to assessment was not provided prior to performing in this condition. Clarity in this area could have been gained through additional measurement of achievement goal orientation and goal involvement. This would have enabled understanding of how dispositional achievement motivation may influence goal striving in the absence of salient environmental cues, the effectiveness of these cues in altering more stable competence motives and importantly supported interpretation of the findings reported in this study.

As DeCaro et al. (2011) note the pressure environment is multifaceted with process and outcome elements evident at the same. Pressure was created in line with previous research (e.g. Masters, 1992; Otten, 2009) that had looked to induce monitoring and outcome pressure so as to encourage cues that have been found to elicit attention to skill relevant criteria. In this way the impact of achievement goals on resisting this attentional selection could be observed. Participants were informed that their performances were to be observed and analysed and emphasis was placed on the outcome across all conditions. It is possible, however, that each achievement goal condition heightened participants awareness of different pressure cues in response to their definitions of competence striving. The most heightened perceptions of pressure, therefore, may be a combination of situational cues and golfers' fundamental achievement motives. For the golfer that defines competence through self-referenced measures, a putt to win a tournament will be perceived differently from that of a player who places greater emphasis on competence striving in absolute terms or through normative comparison. Future research needs to explore the performers' unique 'performance under pressure profile' to enable the most appropriate temporal achievement goal intervention.

7.6 Chapter summary

The final study in this thesis answered four specific research questions with which to address the thesis aim, research question and objectives. Findings reported in Study 3 established the positive effects of other-based achievement goal adoption on golf putting performance determined by measures of outcome, consistency and accuracy. In addition there was evidence to suggest that goal striving under the other-based goal condition elicited greater psychomotor efficiency and a reduction in the

neuropsychological indicators of reinvestment. The findings from Study 3 make an important contribution to the Achievement Goal Theory, Theory of Reinvestment and applied literature by incorporating the most recent conceptualisation of competence striving (Elliot et al., 2011) and by proposing the utility of achievement goals in resisting the extent to which verbal analytical processing of motor output is used to control performance. Enhanced understanding of the positive qualities of achievement goals for disparate skill levels, in different achievement contexts and multifaceted pressure environments, could be of great benefit to golfers. This knowledge would enhance the development of bespoke pre-performance routines for professional and amateur golfers and would inform caddies in the elite game of ways in which to create the most adaptive motivational climates.

The final chapter of this thesis (Chapter 8) is a general discussion that draws together the findings from all three studies and relates them to the overarching thesis aim, research question and objectives.

8. GENERAL DISCUSSION

“What do you want me to say? I should have played it differently? I believe that, you know, with what I do and the way that I do it, day in, day out ... that I played it correctly.”

"Maybe it was asking too much for me... Maybe I should have laid up. The ball was lying so well. ... Next time, I hit a wedge, and you all forgive me?" (Jean van de Velde explaining how he was unable to win the Open Championship, despite having a 3 shot lead on the last hole. Castonguay, July 2014).

8.1 Chapter overview

The purpose of this final chapter is to evaluate the main findings of the three studies reported in this thesis, making explicit their contribution to the primary aim, research question and objectives as well as the current achievement motivation, attention and performance under pressure in sport literature. The objectives of the thesis were first, to gain greater understanding of the cognitive experiences of golfers performing in perceived pressure situations. This was achieved in Study 1 (Chapter 5) by obtaining access to golfers' verbalisations of thoughts during a competitive performance and subsequent semi-structured interviews that explored, in greater depth, key performance incidents observed within the round. These think aloud methods together with the collection of psychometric data prior to performance in Study 2 (Chapter 6) and EEG data captured during putting performance under pressure in Study 3 (Chapter 7), addressed the second objective to get as close to the performance under pressure experience as possible. The Goal Evaluation and Performance Perceptions themes in particular, in Study 1 contributed to the third objective of enhancing current operational definitions of performance under pressure in sport. Suggestion is made, in this general discussion, of how future research may build on this analysis. All three studies were designed to address objective four and provide knowledge of the role that achievement goals play in directing attentional processes posited to contribute to performance decrement under pressure. Whilst investigation of achievement goal relationships with attention permeated all studies in this thesis, Study 3 specifically addressed the final objective of proposing developmentally apposite interventions and strategies that encourage adaptive attentional focus, through the manipulation of achievement goal involvement in experimental design.

In the remainder of this chapter, an overview of the findings from the three studies in this thesis that addressed eight specific study research questions (see Chapter 1.1 and Figure 4.1) are first presented together with suggestion for future research directions that emanate from analyses. Limitations of the studies reported in this thesis are then considered prior to highlighting the implication of these findings to the golfing sample of interest. Conclusions are made and a final reflective account offers insight into how this research has impacted my understanding and beliefs of the competitive performance experience.

8.2 Summary of main findings

A full discussion of individual study findings relating to specific research questions can be found in each of the study chapters (Chapters, 5, 6 and 7). The findings are synthesised here for their utility in addressing the main thesis research question which asked: How does achievement motivation influence attention during performance under pressure? I will specifically focus on how the main findings from across the three studies contribute to: (1) the orthogonality of achievement goals at the situational level (goal involvement), (2) the relationship between achievement goals and golf performance under pressure and (3) the relationship between achievement goals and self-focused attention in golfers performing under pressure. A final discussion considers how analysis of golfers' verbal reports in Study 1 may inform future research into definitions of performance outcomes under pressure.

8.2.1 The orthogonality of achievement goal intentions.

The three achievement goal perspectives of goal orientation, motivational climate and achievement goal involvement can be considered as an individual's propensity to define competence in achievement situations, perceptions of the environmental influence on definitions of competence and the actual goal striving that individuals are engaged in whilst performing a task. At the level of goal orientation there is support for the independence or orthogonal nature of achievement goals (e.g. Harwood & Hardy, 2001; Harwood & Swain, 2001; Nicholls, 1984) meaning that a performer can have an achievement goal profile consisting of combinations of high and low task and ego

orientation. At the situational level of achievement goal involvement there has been debate as to whether an individual can be engaged in more than one form of competence striving simultaneously (e.g. Harwood, Hardy & Swain, 2000; Treasure, Duda, Hall, Roberts, Ames & Maehr, 2001). Whilst Duda suggested that “a suitable assessment of goal states would seem to consist of dependent dimensions that can be measured dynamically throughout a sporting event” (2001, p. 134) she further acknowledged the need to measure goal involvement closer to the achievement situation. All studies in this thesis achieved that objective and in doing so Study 1 provided support for the orthogonality of achievement goals at a proposed new level of practicality; that of achievement goal intention.

The Goal Evaluation theme reported in Study 1 is proposed to reveal golfers’ underlying achievement motives that initiate skill execution and in that regard would support the position that achievement goal involvement during a task is non-orthogonal or that the definitions of mastery (task or self) and performance (other) are mutually dependent. In preparation for performance, however, golfers were observed to consider multiple goal intentions. These intentions consisted of different combinations of goals with regard to definition and valence, with golfers making reference to their awareness of self-referenced and normative striving as well as a reporting an aim to achieve competence or avoid incompetence in this domain. An important finding from Study 1 in relation to the purposive sample of golfers, who had experienced ‘choking’, was the dominant reporting of avoidance goals. The only time in fact that approach goals were revealed prior to skill execution was towards self-regulation rather than towards performance outcomes.

Despite the conceptual debate over the orthogonality of achievement goals, Barron and Harackiewicz, (2001) have reported findings from the education domain, suggesting that goals can combine in four ways; through an additive, interactive, specialised or selective goal pattern. Support was not found for the additive effects of achievement goals in Study 2, failing to replicate what has been found in education (Elliot & Moller, 2003; Harackiewicz, et al., 2002; Porath & Bateman, 2006; Van Yperen, 2006). However, findings from Study 1 suggest that future research should focus on how the consideration of multiple goals interact to influence underlying competence striving. There is some support, therefore, from Study 1 that both interactive and selective

achievement goal patterns may better explain performance outcomes, specifically with regard to goal intentions. Perceptions of the performance climate and pressure environment would influence a selective goal pattern in which goals are considered for their relevance at that specific moment in time. Golfers in Study 1 also revealed that, at a valence level particularly, avoidance goals often initiated approach goals and vice versa and as such represent an interactive goal pattern in line with the Barron and Harackiewicz position or an alternative 'sequential' goal pattern in which recognition of one goal initiates a new goal that ultimately energises skill execution. The interaction is important to the extent that the consideration of both goals appears, from golfers verbal reports, to provide greater explanation of attentional focus than of one goal alone.

Studies in this thesis represent the closest assessment to date of competence striving in golfers' performing under pressure and as such propose goal evaluations as revealing the strongest held achievement motives with which players evaluate performance and establish feelings of competence. Goal intention profiles are suggested to provide the most useful understanding of a performers' potential attention field, and achievement goal involvement assessment, during a task may, as Keegan et al. (2010) note, only be inferred through behavioural indices such as attention. These attention choices will serve to reveal underlying motives. For example, self-focused attention, reinvestment or internal attentional focus would suggest competence striving through mastery whereas attention to external stimuli and distraction from task focused attention would infer performance or 'other' defined competence striving in line with the current 3 x 2 achievement goal frameworks (Elliot, Muruyama & Pekrun, 2011).

Current measurement of goal involvement through situation specific questionnaires (e.g. Achievement Goal Questionnaire for sport, Conroy, Elliot & Hofer, 2003; 3 x 2 AGQ, Elliot et al., 2011), and inferences from either goal orientation measures or perceptions of the motivational climate have been found in this thesis to be potentially misleading for the following reasons. First Study 2 revealed that participants reported a greater task than ego orientation and golfers of all abilities reported a greater use of mastery approach goals than any other goal. When the verbal reports of Study 1 were considered, multiple goal intentions suggested that this over reporting may be a result of increased awareness by sports people of the correct goals to adopt for performance enhancement. Golfers' thoughts aloud, therefore, that considered the often reported adaptive mastery and approach goals may in fact reflect golfers use of a mental skills

strategy or intervention, rather than revealing a valued measure of competence. Therefore, the combination or interaction of multiple goals, the subsequent goal evaluation and the potential discrepancy between reported intention and evaluation need to be considered.

It was also evident that there were an absence of normative cues in the performance environment of particularly recreational competitive golfers and as a consequence there was less reporting of goal intentions and evaluations defined in this way. For professionals there were external cues such as leader boards to make these goals salient, however, for the recreational golfer of greater relevance to feelings of competence were consideration of performance in absolute terms, for example performing to standards expected of their ability level for each skill. As such, the findings from Study 1 and golfers' reference to 'correct' measures provide support for the absolute task construct in the 3 x 2 achievement goal framework and for the continued exploration of goal complexes (Elliot et al., 2011) that consider the interaction of reason and aim in goal striving.

8.2.2 Achievement goal relationships with performance under pressure.

Previous research into the relationship between achievement goals as defined by the 2 x 2 framework (Elliot & McGregor, 2001) and performance have found all but mastery approach goals to be consistently associated with maladaptive outcomes such as test anxiety, negative affect and self-handicapping (e.g. Adie et al., 2008; Ommundsen, 2004; Smith et al., 2002) and has led to the general promotion of mastery over performance goals and more recently the promotion of task over self-based goals (Elliot et al., 2011). Benefits of adopting performance goals have been found in the education domain including increased effort, persistence and achievement and it was therefore an objective of the studies in this thesis to contribute to the limited research in sport that has found similar adaptive consequences of performance goals (e.g. Stoeber et al., 2009; Stoeber & Crombie, 2010).

Findings from Study 2 did not show support for the adoption of performance goals and golf score at the level of goal involvement in golfers of a wide range of skill levels however; there was a significant relationship between ego orientation and superior

performance within the sample. In addition goal profiles that included high ego and high task orientation were associated with golfers who performed significantly better than both the Lower-ego/Lower-task and Lower-ego/Moderate-task groups, supporting previous research that propose these as the most adaptive profiles (Fox et al., 1994; Harwood, Cumming & Fletcher, 2004; Hodge & Petlitchkoff, 2000; Smith, Balaguer & Duda, 2006). These performance differences were not evident, however, after controlling for playing ability.

In Study 3 the positive influence of performance (other-based) goal adoption were clear in elite golfers with a propensity to experience skill failure under pressure. When golfers completed the putting task whilst striving to outperform others they were observed to hole more putts and demonstrated greater accuracy and consistency than when involved in task or self-based goals. Not only do these findings add to those from educational literature (e.g. Harackiewicz, et al., 1998; Hulleman, et al., 2010; Senko et al., 2011) but also provide initial feedback of differences between education and sport in the utility of goals in 3 x 2 achievement goal framework. Where Elliot et al. (2011) proposed task-based goals to be more adaptive than self or other-based goals in education, task goals were found to be least beneficial to putting performance under pressure when success was defined as number of putts holed. As Elliot et al. suggest this may be a consequence of the complexity of the task and so further research is required to see if different effects are evident across different skills.

There appears to be strong support from this research therefore, for the adoption of performance (other-based) goals for elite golfers who have experienced 'choking' under pressure and who reported high dispositional reinvestment in Study 3. Manipulation checks revealed that goal striving was conducted in approach terms and further supports the opinion of Elliot and Moller (2003) who suggest that negative effects originally attributed to performance goals are uniquely associated with performance avoidance goals. This adaptive relationship between performance goal involvement and golf performance was not found in Study 2 for golfers of similar profiles and this may be for reasons associated with measurement of both achievement goals and of golf performance. Where Study 2 assessed achievement goals prior to golfers competing in a tournament and determined performance as gross score, Study 3 manipulated the motivational climate to infer goal involvement and defined performance in terms of success in a putting task, which represents one skill that contributes to gross score.

I propose that there can be greater confidence in the goal that participants adopted in Study 3 due to the proximity of assessment, corresponding manipulation checks and previously stated suitability of this design when assessing performance outcomes (see Duda, 2005 and Roberts, 2012). The reported goals in Study 2 may more closely resemble the construct of goal intentions proposed in Study 1. In contrast, to Study 1 achievement goals reported prior to a performance do not reflect the dynamic nature of competence striving in sport performance and do not consider participants competence in a range of skills (i.e. putting, chipping, iron play, driving) that contribute to a final gross score.

8.2.3 Achievement goals and attention.

The principle question to be addressed in this thesis was how achievement motivation influences attention during performance under pressure. Self-focus and distraction mechanisms have been posited as the best explanation of performance decrement in elite and novice golfers respectively (e.g. Beilock & Carr, 2001; Hill et al., 2010; Masters & Maxwell, 2008), however, it has been further suggested that the negative effects on movement execution can both be explained through distraction principles (e.g. Nieuwenhuys & Oudejans, 2012). Self-focus theories and specifically the Conscious Motor Processing Hypothesis (Masters, 1992) and the Theory of Reinvestment were central to the designs of studies 2 and 3. This decision was taken as the majority of research supports these explanations of skill breakdown in sensori-motor tasks as they are automated via access to proceduralised motor programmes (e.g. Beilock et al., 2004).

Study 1 provided partial support for the association between attention to explicit rule based knowledge and inferior performance in golfers of all abilities. The purposive sample of golfers that had experienced ‘choking’ were characterised by their attention to technical and explicit information to initiate skill execution, a focus away from the immediate challenge and a priority for self-regulation of thoughts and emotions over performance outcomes. Verbal reports provided insight into the circumstances in which attention to technical and explicit information were heightened and demonstrated this was greatest when the player was presented with challenges they felt unable to meet and when they were indecisive in their tactical intentions. Less technically explicit

information was a consistent feature of players' thoughts aloud, however this was in the absence of perceived pressure and when they reported greater self-efficacy in the specific task. These findings support those of previous qualitative research in demonstrating that during performance and perceptions of pressure there is not exclusive attention to either movement execution or distracting thoughts, instead the competitive environment naturally promotes these in combination (e.g. Gucciardi et al., 2010; Wilson & Smith, 2007).

Recreational golfers were less able to recall attention to explicit information in post round interviews than the professionals in the study which highlighted a discrepancy between recall and attention processes captured in the verbal reports. This finding raises concerns over the reliability of accounts provided by participants after task completion in previous research (e.g. Englert & Oudejans, 2014) as it would appear to not reflect accurately the focus of attention prior to and during skill execution. Regardless of the attention content of thoughts aloud prior to skill execution, all players evaluated outcomes in technical terms. For recreational golfers this was reported as assisting the learning and understanding process and for professionals this was to guide subsequent skill execution.

The orthogonality of achievement goal intentions posited earlier (8.2.1) and the analysis of players' cognitive processes prior to skill execution provide some support for research that has challenged the dichotomous nature of attention established in experimental approaches (e.g. Bernier, Codron, Thienot & Fournier's, 2011). It appears that multiple goal intentions that are combinations of task, self or other-based competence striving will energise action (attention) toward a range of possible attention choices. This supports Bernier et al. reported findings that golfers used sequences of attentional foci, moved from one to another as they prepared, executed and evaluated their shots. Bernier et al. suggested that an understanding of what may influence these attentional shifts as an important area of research and findings in this thesis propose achievement motivation as one possible explanation.

A strong rationale for the research in this thesis was the apparent correspondence between achievement goal definitions and the underlying processes of movement specific reinvestment. The self and normative aspects of goal striving shared components of conscious motor processing and movement self-consciousness

respectively because of their emphasis on the perspectives of the individual and important 'others'. There was evidence from Study 2 of a relationship between achievement goals and the different processes by which individuals are proposed to reinvest and consciously control movement. Task orientation was related to conscious motor processing and ego orientation to movement self-consciousness, with increased movement self-consciousness not related to mastery approach goal involvement. Within the 2 x 2 achievement goal framework, mastery avoidance goals have received comparatively little research attention in the sport domain and so findings from Study 2 contribute to the literature in demonstrating a negative pattern of associations between mastery avoidance goals and dispositional reinvestment (Moller & Elliot, 2006; van Yperen, Elliot & Anseel, 2009). Mastery avoidance goals were related to both conscious motor processing and movement self-consciousness and conscious motor processing made a unique contribution to the explanation of mastery avoidance goal adoption.

Achievement goal orientations were, therefore, found to have the predicted relationship with dispositional reinvestment suggesting that how a performer typically defines competence is associated with how they direct attention. The relationship between a players' propensity to reinvest and their goal striving during a task appears a little more complex. A main finding from Study 2 was that contrary to the tentative prediction that elite performers, who were posited to experience performance decrement through reinvestment, would do so from an increase adoption of mastery goals as a consequence of their task based content. However, performance was found to improve with mastery goal adoption and mastery approach goals in particular. Initial interpretation would suggest that this provides support for the adaptive qualities of mastery goals, however, the development of the 3 x 2 framework and the separation of self and task based goals means that it is not clear whether intrapersonal or absolute competence striving resists a player's tendency to reinvest under pressure and contributes to enhanced performance.

Findings from Study 3 looked specifically at elite golfers in order to assess the utility of achievement goal involvement in managing their propensity to reinvest and to maintain performance standards. Self-based goal involvement was found to increase T3-Fz alpha coherence which has been identified as neuropsychological evidence of reinvestment, to a greater extent than when putting in the task condition. This indicator of reinvestment was observed to reduce when golfers were striving for competence defined by

comparison with others in the other-based achievement goal condition. This suggests that normatively referenced achievement goals may promote attentional processes more associated with expert levels of skill execution (Masters & Maxwell, 2008).

One explanation of the differences observed in achievement goal relationships with performance in studies 2 and 3 could be the way in which performance was defined. In Study 2 gross score was used and encompasses golfers' cumulative ability in a number of golf skills. In Study 3 performance in a putting task alone was assessed. Achievement goal involvement was determined in Study 2 by golfer self-reports prior to a tournament and as such are only representative of their goal intentions. It is therefore not possible to determine the goal that they were involved in during performance or immediately prior to skill execution which would have been influenced by their changing perceptions of the performance environment and pressure.

Although the small sample size in Study 3 contributed to the challenge to statistical power and establishing significant differences between conditions, there was support for previous research that has found increased T3-Fz coherence to be related to inferior performance. Unsuccessful putts were associated with increased T3-Fz coherence in the self-based goal condition. There was again partial support for the benefits of interpersonal competence striving when adopting other-based goals as successful putts were represented by a decrease in alpha2 and beta2 coherence in that condition. There is therefore, evidence from the three studies to suggest that achievement goals add to the Theory of Reinvestment the potential to increase verbal analytical interference in motor performance or to resist the detrimental effects of attending to explicit components of movement.

8.2.4 Future directions.

An exploratory research question guided the design of the first study in this thesis in order to gain a greater understanding of the performance under pressure experience. The third objective of Study 1 was to enhance operational definitions of performance under pressure and whilst it is acknowledged that the data did not fully support alternative conceptualisation, analysis and discussion of findings have raised some important considerations for future research in this area.

Thoughts have long been acknowledged to be an important variable contributing to performance outcomes with individuals' subjective interpretation of the social situation initiating action (Weiner, 1972). Duda positions motivation at the centre of these interpretations, stating "in essence achievement goals are held to be the interpretive lens influencing how we think, feel and act when engaging in achievement endeavours" (2005, p. 319). Mesagno and Hill have further suggested that the 'choke' in performance is considered to differ from underperformance as a function of underlying cognitive and emotional processes and behavioural outcomes (2013a; 2013b) and the specific aim of Study 1 was to gain greater understanding of these cognitive differences.

There is debate with regard to universal definitions of performance outcomes and an emphasis in the literature on negative outcomes such as 'choking' (Buszard et al., 2013; Hill et al., 2010a; Jackson, 2013; Mesagno & Hill, 2013a and 2013b). The main points of contention in this debate were detailed in Chapter 1, however, Study 1 sought to follow recommendations by these authors to get closer to the performance experience and investigate purposive samples that had reported experience of 'choking' under pressure. There have been calls to clarify factors that have contributed to 'choking' and performance decrement definitions including anxiety, perceptions of pressure, success normally attainable and critical deterioration (e.g. Mesagno & Mullane-Grant, 2010). The current research posits the addition of 'performance' to that list so that the impact of process and outcome successes and failures can be understood independently. In doing so it was hoped that this experiential knowledge would enhance the current definitions of performance outcomes and particularly 'choking' posited by Mesagno and Hill, (2013a) to be:

'an acute and considerable decrease in skill execution and performance when self-expected standards are normally achievable, which is the result of increased anxiety under perceived pressure' (p.9).

Hill et al. (2009) argued that the 'choke' can only occur during task execution or during the moment that the task should have been executed and so Mesagno and Hill (2013a) sought to include more observable elements in this most recent definition. Discussion of findings from the three studies reported in this thesis, suggest, however, that these objectives are not attainable within one conceptualisation of performance decrement

and that the identification of performance levels is separated by self-perceptions and the perceptions of others. Verbal reports in Study 1 have raised questions as to whether assessment of principal intrapersonal components of performance standards are only accessible to the individual (e.g. thoughts and feelings), whereas more absolute measures are observable to others. The suggestion is therefore, that for ‘clutch’ and ‘choke’ performances to be established, self-regulation or self-regulation failure would have to be acknowledged, supporting Hibbs (2010) assertion that this intrinsic experience is a central component. Moreover, ‘choking’ and ‘clutch’ performance cannot be observed by others but only experienced in accordance with personal achievement motives. For performance decrement to be ultimately established it is essential that the aims of action (achievement motives) are known and this is information that is only accessible to the performer.

The conceptual cognitive model of competitive performance (Figures 5.2) proposes how goal discrepancy contributes to self-regulation failure and self-perceptions of underperformance and that this goal evaluation and self-regulatory component are not a requirement of others’ underperformance perceptions. Instead absolute decrement is all that has to be observed for this classification. Conversely, absolute decrement can be perceived by the player as standard performance, when self-regulation and goal correspondence is present. Finally others in the model have been proposed to perceive absolute ‘success’ as opposed to the absolute ‘competence’ experienced by the individual players as this relates to the motivational distinction between aim and reason that characterise the difference between contemporary definitions of achievement goals (e.g. Elliot & McGregor, 2001; Elliot et al., 2011; Nicholls, 1994). Discussions of findings in Study 1, therefore, propose that characterisation of performance levels should be separated by those that can be determined by others and by those that are uniquely experienced by the performer. As a consequence an important prediction is put forward for continued research that posits that ‘choking’ can only be experienced by the performer, through self-regulation failure in addition to absolute performance decrement, whereas others can only objectively determine underperformance.

The cognitive experiences of golfers who were susceptible to ‘choking’ revealed achievement goals as playing an important role in making salient potential ‘choking’ situations, energising attention toward skill relevant and irrelevant information and in

determining self-perceptions of performance that can lead to isolated performance decrement or longer term deficits. The important role of goal evaluation in this process promotes striving for success/competence from a secondary indicator in Hill et al.'s (2009) conceptualisation to a more integral mechanism by which to understand performance decrement. Definitions that seek to include observable elements remain relevant but should preclude intrapersonal factors that are not identifiable through player behaviour. In addition, a wider 'performance' definition is warranted to include self-regulation failure as well as absolute measures of performance.

Central to the 'choking' debate (Buszard et al., 2013, Jackson, 2013; Mesagno & Hill, 2013) has been an aim to establish the amount of performance decrement that is required to characterise different levels of performance, however, it is proposed that this may not be the fundamental element of the phenomenon. Instead any behavioural, cognitive or affective response to a competitive situation, that differs from that normally experienced in the absence of competition, has been elicited by individuals' achievement motives; they are responding to the personal meaning of the situation rather than the demands of the task/challenge ahead. It is proposed that refinement of definition should enable the performer to identify both 'choking' situations and performances, as this will better inform appropriate intervention. The level by which others define underperformance is of less relevance to enhancing knowledge to assist performance under pressure; however, if more appropriate commentary is provided on player performance then it will serve to alter perception of external pressures that initiate goal intentions.

The dynamic nature of competitive performance can be evaluated in moments. Perceptions of performance are made in response to an achievement situation and these will be defined in relation to shot-by-shot aims and to the performance as a whole. Consistent with these ideals, and those of Jackson (2013) to separate definition from explanation and underlying causes and in consideration of all themes reported in Study 1, but particularly, Goal Evaluation and Performance Perceptions, two separate definitions of negative performance outcomes are proposed for future research:

Underperformance is an atypical (behavioural or emotional) response to an identified achievement situation that will lead to **any** deficits in absolute performance **or** self-regulation.

Choking is an atypical (behavioural, emotional or cognitive) response to an identified achievement situation that will lead to **any** deficit in absolute performance **and** self-regulation.

The working definitions proposed, represent a move to position the performer more central to the identification of performance standards as this will promote the development of more appropriate intervention. These definitions share the opinions of Mesagno and Hill (2013a) in positioning ‘choking’ as qualitatively different from alternative performance failures, however they propose that the magnitude of decrement is not a determining factor but that it is instead the competence striving and achievement motive of the performer. The definitions attempt to increase identification of performance decrement with the inclusion of behavioural, emotional and cognitive responses and observable deficits in absolute performance or self-regulation. This appreciation of the temporal aspects of the ‘choking’ experience supports research by Gucciardi, Longbottom, Jackson and Dimmock (2010) and the requirement of a greater holistic approach to understanding the phenomenon of ‘choking’.

An important distinction here is that where underperformance can be identified by both the performer and observer, ‘choking’ which requires intrapersonal evaluation, can only be determined by the performer. This delineation supports the research by Otten (2009) into ‘clutch’ performances in suggesting that the performer’s appraisal of the competitive situation is integral to accurate definition. I suggest that whilst it may seem appealing to pursue a definition that encapsulates observable elements of a ‘choke’ so that others are able to accurately apply the label, failure to consider the performer’s aims, objectives and intentions when in achievement settings will result in it being impossible to consistently determine this specific performance decrement. Definitions that do not include these motive appraisals will not, as a consequence, be useful to research investigating underlying mechanisms of underperformance and ‘choking’, or applied research that looks to assess the efficacy of interventions designed to maintain optimum performance.

Previous attempts at defining ‘choking’ do consider performance motives, goals and expectations; for example ‘inferior performance despite striving’ (Baumeister & Showers, 1986, p.361), ‘performing worse than expected’(Beilock & Carr, 2001; Beilock & Gray, 2007) and in the case of Gucciardi et al. the emphasis on expectation and incentive is repeated on three occasions ‘where incentives for optimal performance

are at a maximum lead to acute or chronic forms of sub-optimal performance or performing more poorly than expected given one's skill level and self-set performance expectations' (2010, p.79). The most comprehensive consideration of achievement striving was contained within the secondary indicators of 'choking' posited by Hill et al. (2009, p.209) that identified 'choking' as 'a critical moment determined as a situation deemed important to the athlete in which they are striving for success'. Therefore, the findings from this thesis propose that these factors are promoted above quantitative indicators (i.e. catastrophic drop in performance from expected normal standards) in order to determine the 'choke'.

Golfers' cognitive experiences and reflections did not reveal anxiety to be a necessary component of either underperformance or 'choking'. The proposed omission of anxiety, therefore, satisfies the requirement to separate definition from underlying cause but challenges the suggestion by Mesagno and Hill (2013b) that the exclusion of anxiety and performance decrease would inhibit the accurate development of a 'choking' definition. In addition, the absence of quantifiable terminology, such as 'chronic forms of sub-optimal performance', 'critical deterioration' or 'a considerable, extreme and dramatic failure' (e.g. Jordet, 2009) allow for underperformance and 'choking' to be attributed to single and discrete events. This partially supports the view of Jackson (2013) who suggested that this is possible when sufficient athlete information is obtained, however, I propose that 'normal' levels of performance does not represent sufficient information, but instead intrapersonal criteria including goal striving and self-regulation is of greater utility.

Finally, underperformance and 'choking' conceptualised in line with the discussion of findings from Study 1, would position appraisal of the achievement situation as of paramount importance. As such it would support the view that similar underlying processes are evident in each (e.g. Buszard et al., 2013), the important difference in definition, however, relates to cognition. Whereas cognitive deficits are not posited as essential mechanisms of underperformance they are an important component of 'choking' in terms of response to achievement situations or self-regulation failure.

The findings from Study 1 further suggest that achievement goal research would benefit from investigation of goal intentions prior to skill execution, encompassing the dynamic achievement contexts that contribute to performance under pressure experiences. Such

an approach will lead to a greater understanding of the behavioural, cognitive (including attentional focus) and emotional responses to competence striving. Specifically goal intention profiles defined by the 3 x 2 framework (Elliot et al., 2011; Mascret et al., 2015) may provide insight to the perceptual information that is promoted to guide skill execution and the range in which attention has the potential to shift (Bernier et al., 2011). Based on the proposed orthogonality of achievement goal intentions, further study is needed to establish how initial pressure appraisals elicit primary goal intentions in response to perception of threat or opportunity and then how secondary intentions emerge as a possible cognitive strategy to meet achievement demands. Research in this domain would also inform debate as to whether achievement goals combine at the situational level (Barron, Finney, Davis & Owens, 2003) and clarify whether the verbal reports provided in Study 1 that reveal players' consideration of multiple goals are representative of an interaction between goal intentions or an alternative sequential effect. In addition it is proposed that goal evaluations provide better assessment of goal involvement than self-report measures that report the adoption of achievement goals prior to an event and without consideration of the dynamic nature of the performance environment and fluctuating salient achievement goal cues. These together with assessment of the correspondence and discrepancy between goal intention and evaluation warrant further research to provide understanding of how they influence intrapersonal and absolute performance perceptions.

8.3 Limitations of research

The limitations of the research in this thesis have been acknowledged in each of the study chapters. The broader limitations of the research are now discussed in relation to the main objectives of the thesis and the ability to address study research questions. In line with these considerations future directions are discussed that will enhance our understanding of the mechanisms underpinning successful and unsuccessful performance under pressure.

This thesis focused on motivation and attention relationships during performance under pressure and was not able to plan data capture specifically relating to inferior or superior performance. It was not possible within the study designs to predict specific

instances of optimal performance, underperformance and ‘choking’ and this was not central to addressing each of the research questions. Instead the cognitive representations of motivation and attention in golfers that reported experience of performance decrement and ‘choking’ were assessed and so it remains important that future research analyses the performance incidents of interest.

Participant recruitment across all three studies was purposive in the extent to which it sought the inclusion of golfers that had experienced performance decrement under pressure. Whilst that was achieved, the ages of golfers, their time participating in the sport, and their proficiency in discrete golf skills covered a broad range and as a consequence possible important related individual difference variables such as self-regulatory strength (Baumeister, Heatherton & Tice, 1994; Baumeister & Vohs, 2007; Muraven & Baumeister, 2000) were not considered. A greater understanding of the duration of participants’ positive or negative performance experiences is therefore needed to ascertain the opportunities that golfers have had to test various strategies to maintain or enhance performance under pressure.

It is also imperative that future research gains a more comprehensive profile of participant skill levels in relation to the wide range of competencies required to determine elite status. As Beilock et al. (2004) highlight, the characteristics of skill demands are fundamental to understanding how attention control contributes to skill failure. When determining performance outcomes in Study 2 through gross score, skills that place different demands on working memory, as a result of the skill level of the participant and the challenge of the task would have contributed. The performance under pressure literature therefore needs to continue to separate the contributions that knowledge of skill breakdown make to those of absolute performance decrement as the former do not always lead to the latter and assessment in absolute terms do not reveal individual incidents of skill breakdown under pressure.

In line with the thesis objective all studies attempted to get closer to the performance under pressure experience. Although the use of think aloud techniques to capture performance under pressure experiences eliminates errors associated with retrospective recall and memory decay, there are limitations to this method that need to be considered. Efforts were made to minimise the influence that data collection from such close proximity would have on cognitive and behavioural performance through the use

of protocols proposed by Ericsson and Simon (1993). It is, however, possible that instruction to think aloud in Study 1 altered the ‘normal’ sequence of players’ thoughts as a consequence of the request to verbalise thoughts relating to performance. Previous research using think aloud techniques has cautioned at the possible exclusion of other significant influences on pressure outside of the performance domain that may not be included in these verbal reports (e.g. Nicholls & Polman, 2008).

It is also possible that behavioural and self-regulation strategies, (e.g. pre and post shot routines, relaxation techniques) were altered and as such impacted the performance experience however, these were not specific to data collection. The most noticeable observable instances were recorded however, and discussed in the post round semi-structured interviews. Future research may benefit from utilising video replay methods in addition to think aloud, such as those employed by Smith and Harwood (2001) in order to validate verbal reports and that explore underlying achievement motives that may only be accessible upon reflection. Whilst a useful method for gaining understanding of performance under pressure in golf, there are limitations to accessing verbal reports in other sport settings that are more physically demanding such as tennis or swimming. In order to gain understanding of similarities of performance under pressure experiences across sports more feasible methods that gain access to real time cognitive processes need to be explored.

Research into performance under pressure has been criticised for failure to represent ecological validity (e.g. DeCaro et al., 2011; Englert & Oudejans, 2014) and the studies in this thesis require similar scrutiny. Where studies 1 and 2 captured data before during and after competitive performances, Study 3 was conducted on an indoor synthetic putting surface whilst participants were wearing an electroencephalographic cap. External factors could have influenced results in studies 1 and 2 as the golf courses that players competed on presented different challenges in terms of course design and weather conditions. Where internal validity may have been compromised by external stimuli in studies 1 and 2 the external validity was higher than that obtained in the laboratory setting of Study 3. There is however support for the fact that brain activity obtained under laboratory conditions are comparable, if not equivalent, to those obtained under field conditions (Reniecke et al. 2011). Future research into achievement goal influences on cortical efficiency and performance should make use of EEG recordings in the field to assess how changes in the perception of pressure and the

dynamic nature of achievement goal involvement initiate activation in verbal analytical and motor planning brain regions.

The pressure manipulation itself was designed to encourage a monitoring pressure (DeCaro et al., 2011) in order to promote a performance environment that would elicit self-focused attention that has been posited as explaining skill breakdown in the purposive elite sample. A manipulation check is needed to determine the effectiveness of the pressure environment and to ascertain the presence and/or level of somatic and cognitive anxiety. In this way the role of anxiety can be established separate from threats to competence striving and greater understanding can be achieved of the effects of reinvestment under perceptions of low and high anxiety and pressure. Malhotra et al. (2014; 2015a; 2015b) have found, for example, that a propensity to reinvest is not always detrimental to performance in these low anxiety / pressure situations and so coherence estimates in Study 3 need to be interpreted with regard to perceptions of pressure in order to more accurately predict effects on performance outcomes. Golfers who typically define competence in normative terms may have perceived the pressure environment in a way that increased movement self-consciousness rather conscious motor processing and so as with previous research (Wong, Masters, Maxwell & Abernethy, 2009) the mechanisms responsible for performance decrement could not be determined from the findings in Study 3. Future research should explore whether the two sub-dimensions of reinvestment can be differentiated by unique psychomotor activity so that EEG analysis can determine whether conscious control of movement has been elicited through movement self-consciousness or conscious motor processing.

With regard to the manipulation and measurement of achievement goals in the three studies in this thesis, there have been assumptions in the extant literature that goal involvement can be inferred through individuals' goal orientation and/or their perceptions of the motivational climate (see Roberts, 2012 for review). Studies 1 and 2 revealed that there was some stability in the avoidance valence adopted by golfers who reported higher propensity to reinvest and also by those of lesser ability; however, verbal reports in Study 1 suggested that goal intention and evaluations were made following interpretation of the performance environment. Goal involvement measured in Study 2 therefore, does not reflect golfers competence striving in response to the dynamic nature of performance and the relationships established with goal orientation may mean that measurement in this way provides no more insight than dispositional

measures. Study 3 did get closer to assessing goal involvement during performance through the manipulation of the motivational climate; however, experimental conditions meant that all possible cues from the multifaceted performance and pressure environment could not be included. The achievement goal conditions in Study 3 were all designed with a positive valence and whilst manipulation checks supported participants' goal striving future research should explore the influence of all possible climates within the 3 x 2 achievement goal framework to gain greater understanding of the under investigated self-referenced avoidance goals.

A final limitation relates to the baseline condition in Study 3. This condition was not intended to be a 'no goal' condition; however, assessment is needed of how participants defined competence whilst performing the putting task under this condition. With an additional measure of goal orientation it would have been beneficial to see if goal involvement was related, as has been consistently established in the literature and in Study 2, and thereafter the extent to which the motivational climate conditions altered dispositional competence striving. Interpretation of the cortical efficiency across achievement goal conditions when compared to the baseline trials could then be clarified.

Despite these limitations, the studies presented in this thesis do contribute to existing research on achievement motivation, attentional focus and performance under pressure. The current research also provides some potentially useful insights into the influence of the motivational climate. It also offers some practical advice for the application and development of future research in this area, which will now be discussed.

8.4 Implications of research

This research has highlighted a number of important factors with regard to the relationship between achievement motivation and attentional focus that have contributed to theory and applied practice. First, definition is offered to the performance under pressure literature that proposes that efforts are diverted away from quantifying performance decrement. Instead it is suggested that definitions that consider the qualitative differences and an individuals' competence striving will inform appropriate research into underlying intrapersonal mechanisms associated with, for example, the

‘choke’ and ‘clutch’ performances. As a consequence these will inform appropriate intervention.

Second, this research has contributed to the Achievement Goal Theory literature in proposing the orthogonality of achievement goal intentions and that goal evaluations would provide greater understanding of the most valued goals that energise skill execution. In addition discrepancies in findings between goal involvement and performance suggest that self-report measures prior to performance may provide no greater utility than measures of orientation. Future research should therefore continue to focus on the dynamic nature of competence striving when performing under pressure.

Third, research has contributed to the attention theory literature and supported previous empirical study that has suggested that the multifaceted nature of the performance under pressure environment will place similar multi-attentional demands. Future research should explore how goal intention profiles contribute to attention parameters that are made salient and in which focus has the potential to shift to initiate skill execution. Whilst greater understanding is needed of proximal goal states, achievement goals are posited as both contributing to performance decrement and maintenance under pressure and therefore, have the potential to maximise absolute and self-regulatory performance in these situations. Definitions of ‘elite’ and ‘skilled’ performers also require classification. When assessing the influence of variables on absolute measures of performance, such as, gross score in golf, a more accurate profile of abilities is needed in order to predict whether self-focus or distraction will impact skill breakdown in micro-domains (e.g. driving, chipping, and putting) that subsequently will impact outcomes.

With continued understanding of achievement goal relationships with attention and the proficiency that a golfer has across skill domains, apposite interventions can be developed to assist players, coaches and golf caddies in particular. For players, appraisal of current skill level could inform self-talk strategies that include appropriate achievement motivation content (definition and valence) during a pre shot routine and corresponding evaluation with which to assess performance during post shot routines. The training environment for player and coach does not often provide the multifaceted pressure cues associated with competitive performance for amateur or professional

golfers. A greater understanding of a players' achievement motivation may help create more optimal training environments that elicit pressure perceptions and in turn inform adaptive coach feedback protocols. For the elite competitive golfer, the caddie is uniquely positioned to shape the motivational climate through verbal and nonverbal communication. Enhanced caddie-player relationships and understanding of their players' skill strengths and weaknesses will inform appropriate communication and setting of goal intentions to promote appropriate attentional focus.

8.5 Conclusion

Findings from this thesis have made an original contribution to the performance under pressure, Achievement Goal Theory and Theory of Reinvestment literatures, demonstrating that the nature of golfers' competence striving has an influence on attentional focus and perceptions of performance under pressure. The research addressed calls in the extant literatures to study purposive samples that had experienced performance decrement, to prioritise distinct definitions of performance decrement and to obtain achievement goal and attentional focus data closer to the performance under pressure experience. To enable this, the research adopted a mixed methods approach and utilised innovative methods with which to access golfers' motivational and attentional cognitive processes.

The studies reported in this thesis, provide evidence that elite and recreational competitive golfers attend to both skill relevant and irrelevant stimuli and proposes that a golfer's achievement motivation has different effects that modify the allocation of attention to skill execution. This supports the premise that different attentional explanations of performance are appropriate to different skill domains (e.g. Beilock & Carr, 2001; Beilock et al., 2004; Buszard, Farrow & Masters, 2013; Malhotra, 2015a and 2015b; Nieuwenhuys & Oudejans, 2012). Masters and Maxwell (2008) suggested that psychological pressure is a dominant antecedent of reinvestment. Findings reported in this thesis suggest competence striving and achievement motivation to be fundamental to understanding both.

8.6 Epilogue

My playing and coaching experiences as a golf professional of twenty years influenced the aims, objectives and research questions that I sought to address within this thesis. Whilst endeavouring to provide psychological understanding of performance and performance decrement I was aware that I could bring a number of assumptions and biases particularly to qualitative analysis in Study 1 (Chapter 5) and so made these known from the outset (Chapter 4.3.1). Each stage of research has afforded time for reflection to determine any impact this previous experience had on the research process and how data, findings and potential new knowledge were providing renewed understanding and developing my skills as a researcher.

Review of the performance under pressure, attention and motivation literature provided an initial challenge to the epistemological and ontological assumptions that I had brought to research, however, this consequently provided a key foundation from which to design the three studies in this thesis. I had previously viewed these research paradigms as dichotomous; considering it necessary to take either a positivist or constructivist position. Whilst it was appealing to pursue ‘objective truths’ about performance under pressure to enable findings to be generalised to relevant populations, I also believed that multiple constructed realities existed and that specific research questions could not separate individual’s experiences from what could be observed. As a result of engaging with the mixed methods literature, I was able to understand my intentions through a ‘pragmatic lens’ and consequently feel that research is an iterative process that incorporates both qualitative and quantitative methodologies. Phenomena first require description before hypotheses can be generated and tested. Competitive performance together with understanding of the achievement motivation and attention relationship, I believe, warranted this exploratory start point.

The motivation to train and compete dominates my recollections of success and enjoyment as performer and coach. This research has highlighted the dynamic nature of achievement goal adoption and how feelings of competence may be defined in response to perceptions of task difficulty and challenge. As such, the three studies reported in this thesis have heightened my awareness of both the complexity of achievement striving and the superficial nature with which I engaged with planning, goal setting and analysis of performance in these previous roles. I found practise to be an isolated experience

with an absence of consistent coach and peer feedback that is more readily available in other sports (e.g. football, tennis, and athletics) and raises opportunities for important intervention for caddies, particularly at the elite level. Without this support appropriate goals may not be set to meet the demands of the task and outcomes may not be evaluated in line with these intentions to ensure that competence is acknowledged and success perceived.

My own measures of success and competence were more susceptible to those elicited by the environment and that were made salient by transitions through the developmental phase. Absolute measures of competence, a theme of Study 1 and a component of contemporary achievement goal theories, were a dominant feature of my own achievement goal profile. Frames of reference were taken from standards that I believe 'should' have been attained at different stages rather than recognising personal progression across a number of skills. These unique individual motives I have no doubt, subsequently directed my attention, in training, towards technical information and time spent on the driving range in an attempt to perfect movements. In contrast, skill irrelevant factors such as cognitive/somatic anxiety and concern about others contributed to diminishing enjoyment and wellbeing during competition and ultimately led to transition out of my sport.

Studies two and three have emphasised the need to more appropriately define performance outcomes and to more clearly establish levels of expertise and I feel that this is of paramount importance before attention explanations of my own 'elite' performance experience can be made. The label of 'professional' does not seem adequate to define expertise or provide understanding of skill levels across sub disciplines and competencies (i.e. long game, chipping and putting). Deficiencies in one skill may be compensated for by strengths in another, thus reducing the efficacy of strict novice/elite working memory explanations of performance. This research, therefore, has alerted me to the potential utility of achievement goal intentions, the importance of feedback, and the necessity of establishing skill/competency profiles in order to determine appropriate focus of attention and the commensurate achievement goal intention that may elicit that adaptive cognitive process.

Completing this thesis has undoubtedly had cathartic benefit in understanding and normalising my own experiences; however despite energising and directing me toward

research, this positive personal outcome has been very much a bi-product, rather than a principal aim. What at times felt a solitary endeavour toward a distal goal, I have come to realise has cultivated a greater self-determination for future research in this area. Isolation promoted greater autonomy, collaboration and discussion with peers and experts in the field, developed feelings of relatedness, and reflection on how I was applying new knowledge to the research process enhanced feelings of competence along the way.

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APPENDICES

Appendix A - Concurrent report instructions

I will start by familiarizing you with the procedure for giving verbal reports. We are interested in knowing your thoughts as you come up with the answers to the problems in this experiment. In order to do this, I am going to ask you to think aloud as you work on the answers to some practice questions. What I mean by think aloud is that I want you to say your thoughts out loud from the moment you finish hearing a practice question until you say the final answer. I would like you to talk aloud as much as you comfortably can during that time. Don't try to plan or explain what you say. Just act as if you are alone and speaking to yourself. Keep talking while you are coming up with the answer to each question. If you are silent for a long time, I'll remind you to think aloud. Do you understand what I would like you to do? We will begin with a practice question. First, listen to the question, then answer it as soon as you can. Are you ready?

Please name five animals that live in the zoo.

Good. Did you have any other thoughts as you came up with the answer to this question? I want you to think those thoughts out loud as they occur to you. **Don't explain your thoughts to someone else!** Just say what you are thinking--even if it doesn't always seem grammatical or you're afraid that it won't make sense! Listen to the next question and try to think of the answer as soon as you can! Are you ready?

What is the sixth letter after B?

Thank you. Chances are that the letter "H" didn't immediately occur to you after hearing the question. You probably had to go through several steps to find the answer. Had you summarized your thinking during the last question rather than reporting the sequence of actual thoughts aloud, you might have said that you found the letter H by counting through the

alphabet. But, when people solve this problem out loud, they usually say a sequence of individual letters, such as B, then C, D, E, F, and G, before the answer H. Because we are interested in knowing the thoughts you had as you answered the question, we wish to have the most accurate, detailed report of thoughts as possible, instead of a summary of those thoughts.

One more point about reporting sequences of thoughts: If I asked you "Which is the third letter following A," you might try to think of something and come up with D. You might remember thinking of A and then D, but feel unsure of whether some thought occurred in between. In that case, you'd only report A and D. Only if you are confident of a thought should you report it. Don't report unclear thoughts or thoughts you think that you *should* have while answering this kind of question--even if you didn't.

Let's do another question. Think aloud while you generate the answer. Are you ready? I'm going to show you a dot grid and ask you to tell me how many dots in the grid.

(Experimenter--Present the 27-dot grid and ask "How many dots are there"?)

Thank you. Can you recall any other thoughts? Any questions? (**Experimenter:** If the subject doesn't clearly verbalize their computational steps while making the report, show the grid again and ask them to restate their think aloud report as an actual account of their thoughts while answering the question.)

Thank you. Here is the last/another practice problem before we begin the main experiment. (**Experimenter:** At this point decide whether or not to use extra practice problems. Ask for questions following the final practice problem.) Please remember to think aloud as you answer it.

How many months begin with the letter J?

Thank you. We will now begin the main experiment/do another practice problem.

EXTRA PRACTICE TRIALS

1. What is the *fifth* letter before M?

Control conditions:

Now you know how to give verbal reports. Verbal reports are an important source of data in psychological research, but because you are in a control condition, you will not be asked to report your thoughts during this experiment. We will now discuss the actual experiment.

Appendix B – Semi-structured interview schedule

Research question: What are golfer's experiences of performing under pressure?

Structure and notes

- Introduce myself and the purpose and structure of the interview
- Begin with general easy questions to make player feel at ease
- Follow the timeline of the round
- Explore incidents of note from the round
- Make use of clarification and elaboration probes

Introduction

Thanks for taking part in the first part of the study it is much appreciated. I just want to explore in more detail your thoughts and feelings during that round and gain a full understanding of the competitive experience for you. Is that ok?

Section 1 – Reflections on today

Overall what were your thoughts on how today went from a playing perspective?

How did you find giving verbal accounts of your thoughts during the round?

Antecedents of choking under pressure

What did you hope to achieve from today's event?

What did it mean to you to perform well today?

Can you talk me through your round today?

EP: What else if anything could you have done?

I notice that you have a preshot routine can you tell me what you are trying to do there?

EP: How do you feel that benefits your performance?

Mechanisms of choking under pressure

Can you describe your thoughts and feelings as you walked from the practice ground to the first tee?

EP: Can you recall your thoughts and feelings as you prepared to take that shot?

EP: What about immediately after?

We focused on thoughts before and after swinging what do you think happens during the swing?

EP: Can you recall any thoughts that you had during the swing?

Repeat for key instances during the round

Consequences of poor performance

What were your thoughts and feelings immediately after that happened?

In what ways did that affect your performance afterwards?

Can you recall some of the thoughts that you had in between shots?

EP: What did you say to yourself?

How did your objectives for the rest of the round change?

How do you feel about your next tournament?

Influences on performance

Why do you feel that your performance improved/deteriorated after that point in the round?

What did you do to try and overcome those thoughts/feelings?

Strategies

How were you able to deal with that situation?

EP: What do you think that you need to be able to deal with that situation better in the future?

Section 2 – General competitive performance experiences

Can you recall a time when you did not perform well under pressure?

What was different about that event?

Can you tell me about your thoughts and feelings leading up to that event?

What about the round itself, and your thoughts and feelings at the time?

CP: Before and after any particular shots of interest.

What influenced those thoughts and feelings do you think?

Why was your performance affected at that time?

Repeat for key instances in that round or others

Consequences

What effect do you feel it had on your training and subsequent performances?

How did that experience alter your thoughts and feelings towards the next competitive round?

What do you think that you learned from that experience?

Influences

Why do you feel that you were unable to deal with that situation, at that time?

Strategies

Tell me about the strategies that you used to deal with the strategies of that performance

Thank you again very much for your time today is there anything that you want to ask me or discuss about your participation?

Appendix C – Example ‘think aloud’ and semi-structured interview transcript

Professional Male 1 – (PM1)

Before Hole (BH)

1st Hole

Pre shot (Pr) Tee

Going to change down to a 3 wood not windy today

Just want to get this one away. Anywhere up the left half, got a bail out, but not really worried about the bail out just straight at those pines. Right! Nice swing.

Mark for commitment

Wind off the left

Slightly anxious, let's get nice rotation through the ball get those hips working.

Post Shot (Po)

Little bit left.

In between shots (IB)

God it's cold and wet

2nd shot (Pr)

Pleased with that drive, that was good got through it nicely position A. Not too far from the green it's alright... it's alright. Middle of the green; just get off to steady start get through the first three holes.

Oh it's cold.

Come on.

Don't have a pin sheet or... (asks) is it red front, white middle yellow back?

That would have been good thing to check! I'll play middle.

198, solid 5 iron. Little bit of breeze of the left. God the ball's running nowhere.

(Breath)

Right! Ignore what he has just done! OK let's put it on a nice lie... a good lie. Right sit in that right hip. Keep your hips moving. OK nice tempo.

Po

Stay there... that's a pretty good swing... a touch right. Fuck it's a touch short. Ball's going nowhere.

IB

Think its red front white middle.

Hit it a little bit healy not quite through it but its ok.

It's a strong opening hole. A nice one.

I'm already thinking about my chip already.

Want to get good contact on chip. Good contact on the ball and get into that dustbin lid. What are we still 150 yards away from the green?

Still feeling a bit nervous!

Cold adds to the nerves. Can't tell with my hands shaking whether it is cold or nerves.

Hopefully it's on the fairway. If its not... if it's not on the fairway I will concentrate on strike. I think we are on fairway I will wait for John to play shot.

3rd shot Pr

Red is front.

We're not in any rush but I will just clean ball. It's going to be wet so will land soft. Depends how it's going to land really. Anywhere within 6 ft really give me a putt for par. Get me started. Don't speed up too much. Get a strike on it

Po

Good shot. Sit, sit. Ran on a bit more thought. A lot further...still.

1st Putt Pr

Try and work out the line.

Po

That was not a good putt at all.

2nd Putt Pr

Just take your time concentrate on the hole.

Po

Well done. Disappointed that I didn't make par there. Chip reacted different to how I thought it would.

Score 5 (+1)

BH

Another strong hole.

2nd Hole

Tee shot Pr

4 iron, slightly downhill down breeze. Think I will feel happier hitting a 4 than a 3. But I think 3 is it... let's hit a 3. Feel I can get 3 over the bunker. Hit 3 down the left half.

Oh it's on the front. Should I go 4? 195 front...4 would be better. Get it High. OK#

Just get nicely through it.

Po

Little heavy little right. Didn't quite feel I was focusing.

2nd Shot Pr

Let's work out how to play this. Do you want to go aerial...which is probably the case. Higher risk or go low, less risk but more difficult. Loads of green to play with. Pitch just over half way and let it run out. Again get it in that 6 ft range and give decent chance of a 3. Again 4 is not a disaster on this hole.

Probably same sort of length as the last hole. Maybe a touch longer. Focus on the strike. Good swing. STRIKE.

Po

Oh Pete that's a miserable zero. Fuck it! Get down! Come back down... a bit lucky.

3rd Shot Pr

That's crap.

Ok interesting one. Get up and down from here.

Po

Leaves a stinky little one!

1st Putt Pr

Try and switch off.

Po

Good up and down. Try and get some quiet time turn the brain off.

Score 4 (+1)

3rd Hole**Tee shot Pr**

Slightly distracted by the dog walkers. Wait for them. OK hips through it nicely. Good nice line.

Po

Stay there. Hmm not a bad swing won't worry about that too much.

IB

Slightly concerned can't see my ball.

Just turned slightly in the wind

2nd shot Pr

That's a result (G.U.R)

167

Drop in line with the flag, going to be just here.

I've started bogey, bogey that's not too bad the way I've hit the ball, slightly frustrating the way I've hit the ball...one bad swing, one bad chip but that's it.

One club more than you think it normally is. It's really cold. 172 middle, 6 iron. Really cold. It's going to move slightly right to left on the wind. Nice swing, straight at the flag.

Po

Stay there. Too much. Another green missed, fucking hell. Buggar

IB

Just too quick. Tempo too quick. Just not settling into it, another typical round. Long way to go tough holes. Due an up and down anyway so...

3rd shot Pr

So again need to work out what to do. Distracted by John's chat...he talks a lot.

Right we're going to play a different approach to this...bump and run it. It's going to break left to right. Again try and get a nice strike... get that pitching working properly. get this nice...putt chip. Over that 3rd boy there let it release out.

Po

Again not a great result. Can't play it right. Thought that I played it right but skidded a bit, I chucked it too far. Still nerves show in the short game a bit. Getting a bit twitchy so I've just got to calm it down. Ok start. Hole this putt...plenty of birdie opportunities long way to go...plenty of birdie opportunities. It would just be nice if the rain resisted slightly.

Lots of thoughts going through fairly quickly all on the lines of sharpening the short game. I'll get my rhythm with long game, just need to sharpen up a bit.

Next hole is a par 5 down wind.

1st putt Pr

Going slightly right to left. Outside that mark get it to roll nice and positive, don't shy away from it. slightly uphill...slightly uphill.

Po

No element of surprise there!

Much more positive putt through the ball

Score 4 (LvL)

4th Hole

Tee shot Pr

Don't know whether to hit driver or 3 wood. 3 wood is safe but drive gives me a good chance of getting home in 2. Let's keep it steady let's make a few pars now. Opportunities will come you don't need to push. Start getting a bit of rhythm. A good opportunity.

Right. Very similar to John's really. Let's go rhythmical.

Po

Oh Pete that's where you get right over the top of it. Wanker. Ok that's a reload. Fuck.

Reload Pr

C'mon. Better rhythm. Nice rhythmical.

Po

Aagh.

IB

Didn't turn into the backswing at all. Just didn't commit to it. Just wanted to hit a fairway. second one was a much better swing, thought I got through the ball. Ah Pete Do things the hard way all the time. hope it's not too thick over there but it looks pretty fucking bushy. Oh well. Still getting through the tough start it gets easier. Right get lucky...if you can't be good be lucky.

Oh hello...got it. Sat like a peach.

2nd shot Pr

Now caught between consolidation, which is probably going to win over, and actually having a go.

266 that's way too far. Just hit a 7 iron down there and leave a...a 9 iron or something. At least my provisional ball was a good one.

Right. This one go for good commitment down the line of those bunkers. Nice and smooth but good commitment.

Po

Get up. It's alright...it's alright. Just snagged on the way back and hurried me a little bit.

IB

Shame, the second one was fucking genius. Much, much better swing much better strike it's what we should be doing every time...30 or 40 yards past him. Might have been hitting 3 or 5 wood.

Didn't give a mark did we. That's the thing, find ourselves too caught up in everything else we don't do what we set out to achieve and give ourselves that mark out of 10. But we are alive...got rid of a bad swing as long as it is sitting alright.

3rd shot Pr

Less nervous now... but still feel that things are moving a bit quick. Just getting a bit jumpy. Got time now to get a bit more rhythmical. Time to have a proper practice swing.

Sitting nicely. Right they are only on the tee in front so there is no rush. Find out yardage to the front, play one club more. Take our time...so its 150 to the front... that's a 9. It's down breeze but very cold. Coming out of a roughish lie, just get this within...15 ft give myself a chance at birdie.

Nice rehearsal swing. Pretty good over the shot, pretty confident of aiming at that little fir at the back.

Sit in that right knee.

Po

Hit a much better commitment. Nice swing Pete, get close!... get close! Yep lovely.

1st putt Pr

Let's just concentrate on our thing now.

Bit of a wobbly putt... bit of a wobbly one.

I'm not afraid of a 3 putt. Try and get it in. Just outside the right. It's going to straighten up at the end. Get a good roll...

Po

Nice roll...nice roll. That's quite a relief. Well played Pete.

Score 5 (LvL)

BH

Right another good hole.

Right well played Pete. One hole at a time be patient, all the old clichés but today is one of those days

5th Hole

Tee shot Pr

Right same as last time...commitment. Bit solid in the ground here. Right! Down the middle.

Po

Streaky but Ok. Again pretty filthy! Actually it's in quite good shape.

IB

8 Iron range again... hit it close, hole the putt.

2nd shot Pr

Expected it to be wet but actually the lie is pretty good. Its exactly the same 8 iron shot as before. Little bit of wind into and of the right... Jesus! Distracted by dogs...into wind. Feel confident.

Po

So streaky and unbalanced! Get over that bunker...don't be in that fucking bunker. Oh it's short anyway, that's horrible Pete. Wrong club, wrong swing...horrible! Just didn't get through that one at all. Very disappointing. Now that's left a tricky one as well.

IB

Stock 8 iron! Got stuck on my left side. Interesting round so far.

See if you can get up and down; just want to leave it below the hole.

3rd shot Pr

Have a look at the green. It's going to be straight uphill from here. Land it about here...the thing is the tighter we play it to the bunker the shorter we go...the more trouble we are in. Bunker isn't even there doesn't even matter...straight up fringe of the green...

Po

Oh Sit! Oh that's jumped out of there...flown...the strike was good, just too clean. Gonna need a good putt. you had the shot...play it to this part of the green.

1st putt Pr

Crafty little pin. Should have chipped to the low part of the green and left myself an uphill putt. Try and work out where to putt it. Bit of a smelly one...the putt to miss is just past the hole...need par here.

Po

Turn, turn, turn, turn, aargh!...good putt.

Score 5 (+1)

BH

I'm pleased with that putt it went quite nicely up the hill. Thought it was going to really turn in...oh well. Don't feel I quite deserved a 4 there after bad second bad chip.

6th Hole

Tee shot Pr

Little bit of an anxious tee shot 'cos the winds of the left... don't really like the wind off the left. Take it at that silver birch. Nice and positive.

Po

Safe. Very boring. Always my bail out that area...very boring.

2nd shot Pr

All on the front the pins today. Red flags mean back nine not front! Feeling a touch anxious...that's not a good shot at all (partner). Try and knock one in there controlled.

Po

Be the right sti...(ck). That's more like it Pete.

IB

Can smile a little bit chance here...putted well.

1st putt Pr

Yep happy with that shot. Pleasing strike. Again thinking about getting to 1 under... holing the putt getting to the next tee. Slow the heartbeat down...heart's beating a little strongly. Have a wander round and watch. Watch John's shot. Stunning golf course, amazing. What am I going to score today...what are the membership going to think...about playing Hankley Common...what my number is. Little bit anxious about that.

Focus back on now. Line up this putt.

Try and get back in focus...take your time. You're not behind (time).

Left lip...slightly affected by (partner) hitting it past. Better off being on the positive side. Pick your spot...

Po

Tentative. Disappointed by that. Wasn't the best stroke.

Score 4 (LvL)*10th Hole***Tee shot Pr**

Still feel unsure about my swing so I think this is the time for judging commitment. Commit at those...think commitment. Not speed; commitment.

Po

Yep. Definitely committed.

2nd Shot Pr

135. Knock down a little 8 iron. Let's think about what we're doing. Bunker down the right...rhythmical that's what I need. Gonna have to hit down...push down into that...

Po

Come on wind. Oh I don't believe it!

Didn't quite mirror what I think I did.

IB

Definitely need to achieve something out of this round. Shame I hit a good shot there, it was the right club.

3rd shot Pr

I would rather play it from the bunker than out here...better out of bunkers.

This is all or nothing... stay down on it.

1st Putt Pr

Again straight in middle of hole

Score 4 (LvL)

11th Hole

Tee shot Pr

Control it with the arms turning through...

Po

Don't be long...don't be long...don't be short! What the hell...

IB

Bit muddy

1st Putt Pr

Right concentrate on this putt. Right this is all uphill. Green goes that way...its pretty straight.

Lets give it a decent rap.

Po

Get up, get up. It's a long way from down there.

I'm thinking about 4 being a good score already thinking about a 3 putt which isn't a good thing.

That's a bit heavy (partner)

2nd Putt Pr

This could be my chance to pick up a shot. What are the differences in our scores?

Again you know the line its just dead straight up there isn't it. Its pretty straight...just right edge.

Po

Aagh. New the line there just...disappointing. That was disappointing.

Score 4 (+1)

12th Hole

Tee Shot Pr

Good chance here. Very good chance actually.

Again thinking about final score...not a good thing. Just strike it up there middle of the fairway.

Po

That's a better swing

2nd Shot Pr

Control needed on this one I think. A bit windy and flag up the back of the green on a step. Dubious about what to play because I have got to land it back there but not spin it so gotta to try and punch it in. Got loads of room right to try and draw it in. Should be quite a comfortable shot...should be. If I can get it anywhere on that back level, gives me a flat putt for birdie...be happy with that. a little bit tentative about going over the back so...not a lot I can do there. The wind is with; my pitching wedge will only ever get to the back of the green.

That's short isn't it? (partner)

Right fuzz it in low. Clip it off the top and fuzz it in low.

Po

Be right. Be good, be good! Oh you're fucking kidding! Aagh that was such a good shot. Just not playing quite...margins really isn't it just so tight. Oh fuck. Don't know how I could have played that shot any differently that's the problem...aah bollocks.

3rd Shot Pr

(whistles) That's pretty... Leave this on the top layer. Don't want to go bogey, bogey. Again just feel like I'm rushing...slow...bump it onto that fringe, let it run through the fringe. This could go in.

Po

(laughs) You buggar... went straight right

1st Putt Pr

Feeling tense just want it to go in. Need to slow it down a bit

Po

Stayed there

Score 4 (LvL)

BH

Thinking about performance and result. Looking forward to getting home...seeing girlfriend.

13th Hole

Tee Shot Pr

Short this hole. Rhythmical get it up in the air an it will fly

Po

Go!

IB

God he doesn't stop Jesus (Partner) he's giving me headache. I hit good shot into that last hole, frustrated that I didn't have a birdie putt at it...one of those days. I've hit a few iffy's but nothing where I've thought wow that was a really bad swing! Good up and down though with mud on it... frustration levels high...what am I +7 haven't hit it much worse than (partner) but what is there 5 or 6 shots between us? Whether its an illusion or disillusion that I'm not hitting the ball so well...maybe I'm not hitting the ball so well but..I don't feel like, other than a few swings that I have hit it any worse than him. Bit of rust around the short game...still nice golf course. As long as (friend) isn't doing better than me...gutted.

Got Chris Moyles show song in my head now!

2nd Shot Pr

Good chance of putting one into 6 or so feet here give proper chance at birdie. Slopes off a bit, there's a flat spot...can pitch it into this little ridge here...should check up nicely. Short of the hole is going to better putt isn't it. Come on little ball make a crafty 2 here that will be fucking eh!

Come on switch on switch off. Down wind. Arm swing. 40 yards. Get it going up there... little bit of control on it.

Po

Sit down sit. Too clean. Lost a bit of control

1st Putt Pr

C'mon chance for birdie...bit closer than I thought. Winds getting up a bit. Trying to think of the name of the super worm?? Get back to the task in hand. Left edge.

Po

Bloody hell

Score 4 (LvL)

14th Hole

Tee Shot Pr

Strong wind off the left. Not my favourite wind. Right forget about Earthworm Jim! Make a solid swing.

Po

Oh Pete! Bollocks. Fuck it...rushed it.

Reload

Right lets take my time...same swing.

Po

Ah!

2nd Shot Pr

This weather is horrible. Think it's me to go. Pin's right at the back wind straight off the left makes for tough reading. Its 179 to the back...6 iron all day long.

Ok just pump this one up the left.

Po

Oh fuck! That's come out of there so bad. Bollocks!

IB

Is he going airborne? (Partner) That's pretty ambitious. This could go anywhere!

3rd Shot Pr

Try and make a par Pete.

Again an arms and body shot. Just get a nice strike...crisp up to the back of the green.

Po

Get up! Oh so good in the air again. Right 2 putt 5. 5, 6, 7, (counting score).

1st Putt Pr

Slightly to the left

Po

Oh just died through that puddle. Didn't see that there at all. C'mon. Feel rushed because of people behind...

Score 5 (+1)

Hole 15

Tee Shot Pr

Total commitment.

Po

Oh Peter don't... Spin get down, down, down, down...

IB

Definitely hit a branch. Not the best of drives.

Only big clump of heather and it must be where I've hit my fucking ball. Really frustrating now. Didn't think it was in any danger other than being a bit scruffy.

2nd Shot Pr

I don't know how I'm going to play it!

Po

Come on wind. You've got to be kidding me. Rushed it again!! This is just a chop now, fuck. Nearly home.

3rd Shot Pr

Pin's quite far back. Right lets take some time now, the others are a long way away. The lies alright, can get your club to the back of the ball, Try and hit a nice soft cut. Little bit off the left.

Po

Oh in the bunker. Fuck it. Raised the frustration levels. Loss of tempo there. C'mon get this up and down.

4th Bunker Shot Pr

Nothing to stop you holing this play it like a put from half way. Pretty confident here.

Po

Average result

1st Putt Pr

Dead straight at the hole same as last time.

Po

Again good putt felt confident then.

Score 5 (+1)

Hole 16

Tee Shot Pr

181 to the ridge. Make sure you get through it.

Po

Come on wind. Oh god. Just trying to cut it and pull it. Fuck.

2nd Shot Pr

Lots of grass behind the ball. Just get up to half way. These shots can go in as well. Pop it up. Nice and confident...underneath it.

Po

Part one done.

1st Putt Pr

Right then. This will be a great up and down! Right edge. You're rolling it well.

Po

That was fun!

Hole 17

Tee Shot Pr

Smooth swing.

Po

Come on wind.

2nd Shot Pr

C'mon chance to finish birdie, birdie. That will be satisfying. Right nice drive Pete, pleased with that. Well in range lets try and get up nice and close. Nothing to stop you going eagle, birdie! 219...hybrid. Feel happier hitting a hybrid and not quite getting there than cruising a 3 wood through and reloading. 219 middle...yeah hybrid's the club. Its going to hang off the right. There is a bunker short right...basically at that silver birch tree and let the wind just drift it. I can see the shot pretty clearly. Keep the tempo...silver birch.

Po

That's the shot Pete that's the one you were looking for. Get up, get up.

3rd Shot Pr

Got distracted. Take our time. C'mon. Pretty straight little bit off the left lets bin this.

Po

Quite good weight

1st Putt Pr

Stop thinking of (partners) score

C'mon right edge up and in.

Po

(Laughs) Putt off by leaf going past. Ohh Bollocks...nightmare. Another chance missed.

Score 5 (LvL)

Hole 18

Tee Shot Pr

Not a long hole. Want to finish strongly. 2 good bats. 2 solid swings. Straight at that bunker...2 solid swings.

Po

Oh sit down a bit. Fine.

2nd Shot Pr

Good chance to knock this one close and make a birdie. Good chance. Same swing, PW, full commitment.

Po

Oh that's fat as fuck. Fly! Came out really heavy, really slappy...really slappy.

3rd Shot Pr

It would be a shame to finish badly. Managed to get it back fairly well; just made a few errors. Needs to go a little bit left then its going to fall to the right need send it just short of that slope.

Po

Fuck sake. Just the worst way to finish a round of golf. Didn't execute that like I said. Finish with a fucking good putt Pete.

1st Putt Pr

C'mon lets make a streaky little 4. It's gone now. Feel I have to grind. This is uphill right to left. Give it a ram you don't want to leave it short.

Po

What a day. Same old day.

Finish

PM1 Interview

K – So how do you think that went generally today?

P – Generally same old, same old! I think I summed it up in my Jerry Springer final word...I come of the golf course a lot feeling somewhat despondent erm..and slightly disappointed which is a general feeling which even if I've...if I've turned a good round into an average round or an average round into a bad round like today, score-wise it doesn't matter so much but I always come off with roughly the same feeling.

K – Can you tell me a bit more about that feeling?

P – It's more like I have given away too much...erm...that I've not taken the chances where I've had them ... erm.. and just generally I I ... you know...my feeling was finishing that 9th hole where that 10th tee was next I wanted to go and start again. Just to say you know look I can do much better than that...and just go and do it again. And that was my feeling on the 9th.

K – The actual 18th hole?

P – The actual 18th hole our 9th hole yeah. I don't know I just feel that I should be achieving more than I am. As I say cores have never worried me so much but its the giving away of shots that annoys me more than anything.

K – And what had you hoped to achieve from today, aside from what we were doing?

P – A little more of the understanding as to why...why do I rush when I get overexcited about something..you know why do I feel...hard to sum up really...

K – Ok before we get to that then, what about what you wanted to get out of the tournament itself?

P – Today I had sort of an open or a blank slate really as I feel I can achieve more in the long run by making the most out of it for you than I can of just playing another round of golf and I don't think that it affected me adversely at all I think that really...you know generally the thought processes and results were very similar to normal really. It was a fairly decent cross section of my game [laughs].

K – Did you have any expectations from your play today? What would they have been?

P – Of my own game?

K – Yes

P – I guess I hadn't set any individual goals as to a score or hitting fairways or... but generally to come out and if anything to get my tempo right. Because when I get my tempo right I get through the ball well and generally I strike the ball and that's when I get into a bit of a groove...and I guess again it's to get an understanding of where that groove comes from. You know how do I generate...not to force a grove...but to just generally feel...I don't know whether it's a routine thing, because of my lack of routine that I don't tend to recreate the shots. But I know I've got the shots out there. Like I was saying, sometimes the shot just feels right and you know I feel I cant really miss it. How do I not make that every...[laughs]...you know why

shouldn't I, because I have hit thousands of drives, millions of pitch shots and...so why can't I make it, you know, sort of 14 good drives, 4 good iron shots and then the rest is all...

K – So given that tempo was something that you were hoping to focus on while you were out here...

P – Well it was a thought...it has been a general thought for the last sort of month, you know to not get too quick.

K – What did you do to encourage that out there?

P – Yeah you see again, probably not enough not a huge amount erm... you know I find that everything speeds up its like doing a driving test or whatever, everything tends to speed up and before you know it you are finished and I find that that's a similar sort of thing in the golfing round. You know I really want to get started and then once a get started... you know... if I get off to a fast start then normally it tends to follow through but I don't know really...

K – Can you tell me a little more about that feeling of going too quickly, do you mean individual shots, the whole round? What is it?

P – No it's just the whole round. I feel that it's gone by without giving it my full attention. Just feels like everything happens quite quickly and suddenly I can be 9 holes in and +4 and kind of written myself out of it before...rather than... I guess if I could get the feeling, like I had today of finishing the 9th hole and then rolled [back] onto the 1st I think I would have made a better hash of those first 4 holes because I would be...I don't know...continuing on a bit of tempo, rhythm . It's very difficult, I find, for those first 4 holes to get that rhythm and I make a few nervy shots. Again I didn't feel too nervous but nervous enough on those first few holes, just to be a little bit...particularly over the shorter shots, a little bit twitchy, a little bit quick.

K –And your preparation for today, golf-wise?

P – Golf-wise the norm but...

K – Which is what?

P – Which is ... well I would have liked possibly a little longer, but hit a few balls, few chips and a few putts and those no real structure to it, it's all just literally rock up and see what happens.

K – Because...?

P – Well I don't know I've kind of ... not shunned the idea of structure but...because I feel it relaxes me more and I don't, you know...I don't know... I have never really...

K – That's interesting...it relaxes you more. What would it mean to you to have a more structured routine? What do you think that would do?

P – A routine...a pre shot routine or a routine for the whole event?

K – Everything.

P – If I turned up to an event and I had to hit say 15 pitch shots then I would automatically judging how good those 15 pitch shots were and then I would be sort of... a little bit as to

oh...and if I say hit 14 bad pitch shots or 10 bad pitch shots, when I go out on the course I kinda feel like it would be in the back of my head. Like the old Tiger 50 2ft putts... if I spend my time trying to get 50 2ft putts in and never completed it, when I get out on the course that would make me more nervous than doing the practice in the sort of... so my practice is literally to drop a couple of balls and just give it a roll because when I work at home on the putting green at [club]I just take one ball out and play the 18 hole loop. Which I feel is much more...I feel that my putting has improved because of it than just going out with 3 balls and hitting 3 balls from 4ft constantly.

K – So if I am understanding you correctly, it is almost better not to give yourself the opportunity of experiencing lots of bad outcomes, in case that happens because that is not what you want to take out onto the golf course.

P – Yeah, yeah. It's like, you know, trying to picture the first shot that you are going to hit. If I stood there and tried to picture the first shot that I was going to hit and hit a 4 iron and piped 2 or whatever, then I am knocking myself back for on the first tee...and I know that is complete poppycock ...

K – So say that gain for me if you were on the practice ground and the first tee shot was a 4 iron...

P – Yeah and I was on the practice ground thinking about how I was going to recreate that... and I got a bit quick and spun out of them and hit 4 or 5 right then those thoughts of that shot would come into my head on the first tee. Rather than just hit a few 7 irons and not particularly take...think more about the flight and the strike as opposed to the end result erm... just helps me to not have any... I guess to have a blank head going onto the first tee. So there is no sort of emotions from before.

K – How do you feel about that, saying it out loud? Do you believe that that is a strategy that works for you?

P – Well yeah I think I need to start trying but again I don't really play enough events to put in the structure to find out whether it makes a real difference. Because I will play in a couple of weeks and then I might not play in anything until March and then really it is difficult to go out and play competitive rounds and to put myself under the pressure. I think as I said earlier I feel a lot more comfortable about rocking up to a venue now on a competition day and you know relaxing into the protocol of it all. It has de-cluttered my head, so whether a practice routine would de-clutter my head or whether I set aside exactly 45 minutes to do a certain routine and then I get stuck in traffic, it will muck up my whole round, whereas now if I got stuck in traffic and I had a 10 minutes to hit a couple of chips and a couple of putts I don't think that it would bother me too much. I don't know whether that makes any sense but...but I have never really... again you get taught all the stuff by the PGA, so I have in my head what I should do... but it's whether it is laziness or habit that causes me to just do my own thing... so my habit is probably a pre shot routine but it is not a structured one. I don't know whether breaking that down or putting a structure in would improve it ... or what I have got is structured?

K – So thinking back to first thing this morning and your golf, can you recall your thoughts as you walked from the putting green to the first tee?

P – Funnily enough my thoughts were about the microphone [laughs] ... we saw one of the guys on the putting green from [club] and I remember thinking it was lucky that we didn't get drawn with him...

K – That was lucky because?

P – Just talking to him on the putting green for 30 seconds was weird just didn't want 4 and a half hours with him!

K – Can you recall your more immediate thoughts relating to the golf ahead? When did they first come?

P – Probably on the tee, not before the tee...because I changed my mind from hitting driver to hitting 3 wood because there wasn't any wind from when I played before...

K – Yeah you did, that was a strategic thing?

P – Yeah it wasn't avoiding the driver it was more I didn't need to hit it. I don't need to hit driver here it will bring in more trouble than necessary and so it was just go to my stock go to shot and it worked... went a little bit left of where I was aiming but it was fine and got me away.

K – And immediately after you hit the shot what were your thoughts then?

P – Erm...only that I had tugged it slightly erm...again through just being a little bit nervous... just not quite getting a full shoulder turn.

K – And those nerves what are they about?

P – Erm... they are just sort of get under way butterflies, not racked with nerves, just c'mon get started. I mean I have always had sort of first tee thoughts and I don't know it's a kind of lottery kind of shot... 'well hopefully this will be a good one!' [laughs]. So there is not a huge amount of trust that I am going to hit a good first tee shot and yet the last 4 tee shots that I have hit in competitions have been the best that I have probably hit all round! That 3 wood I hit today was fine; I nearly drove the green on the last one that I played at... you know... it's a bit silly.

K – What are the worst 1st tee thoughts?

P – I guess the worst conditions that I could have is a left to right wind on the first tee, because then that brings in... because if I block it I know that I am going further right and so if that's there then I start thinking about the bad shots as opposed to the best result.

K – Ok can you recall any thoughts that you had during the swing?

P – During that first tee shot?

K – Yes

P – I think that it was either commitment or tempo because they tend to be my 2 ones...that really my game...if I commit to the shot and I make a decent rhythmical swing...because I am quite flat and quite shallow so generally I don't have the clubface...I set it and then I just rotate through it and so my bad one is when I don't quite get fully turned, come over the top of it and snag it left, like on the par 5 or I sit back on it and I poke it right. I don't tend to hit snap hooks

or really nasty shots, it's just where I don't quite commit to a swing and execute it properly but...

K – So thinking back over the round, I have got a couple of occasions that have stuck in my mind that I wanted to ask you about, are there any specific shots that come to mind for you that you felt I didn't perform well there because of the situation?

P – Because of the scenario we were in?

K – Yeah... if I offer you one first?

P – Yeah

K – Second hole second shot, the chip shot.

P – Second hole...our second hole...oh yeah, yeah, yeah! The thinned chip shot.

K – Par 3...so can you recall your thoughts and feelings prior to that shot?

P – Yeah as I was walking up to the ball it was about making my mind up about what sort of shot that I wanted to execute and sort of going through almost like a tick box of well, how will that shot react on the green, do I want to bump it up the bank? Actually the margin for error means it is probably going to be easier to fly it $\frac{3}{4}$ of the way and try and stop it. Erm...so I chose the shot and then again...probably can't remember sort of the execution of it but again that's a normal, occasional duff sort of chip shot within the first 5 holes and being a bit tweaky and not quite getting through it.

K – So were there any other instances like that that come to mind?

P – What where there was some sort of distraction?

K – Yeah maybe a situation where you would define a pressure to perform.

P – Yeah, yeah, I guess this hole here [points] par 4 where I leaked that one right up into the wind. Again I find the pressure comes up on me when I have a left to right wind. Because I know that I can hit the ball straight through the wind and it shouldn't make any difference but as soon as I have a left to right wind I think that 'if I hit a bad shot, that shot will become worse'. Then having [partner] hit my typical bad shot [laughs] and poking it why right, then put that thought in my mind and I felt that after hitting that first one I just needed to take 30 seconds out to re-gather my thoughts and to completely commit to that shot. I guess that was my...that was my worse scenario, for a right to left hole with a left to right wind. Then he hit the shot that I pictured as being my worse shot...and then Earthworm Jim got in the way! Then it all went...[laughs] you know I just got on the tee and hit the ball way too quick. I didn't have enough time to sort myself out and think well actually, if I want a safe shot where...you know... I could have aimed it on the left fir and let it slide on the wind but...

K – Can you recall how that affected your performance afterwards if it all?

P – Erm...Again it's a sort of general, off the tee 'Oh I've hit that shot!' Because it is my stock bad one. Very rarely to a pull it left and it's that one and I just think how have I not done...how have I not hit that straight? How have I just not got through it? Because I used to hit this big

right to left ball so I don't know whether it's my safety of you know I don't want to hit that snap hook, so I just lean back on it and I just poke it right.

K – So that particular shot, was that a thought beforehand?

P – Of snap hooking it?

K – Yes

P – No, no the thought beforehand was just trying to slide it off that left bunker and just trying to avoid the shot that I hit really, the sort of reverse and leave my weight on the back foot, just pop it up into the wind and let it hang off to the right. You know I don't know how I... as I say it is the worst scenario for me is that shape hole; right to left, left to right wind. I struggle to get my head around, thinking about, well... when I used to play better I used to think about shaping shots, I used to be able to draw the ball when I wanted to but equally I had a hook in it. I worked hard to get rid of that hook but equally now I can't draw the ball quite so well. So I tend to hit a cut everywhere, it tends to work when it's not windy but then often when it gets windy I get a bit quick and that cut gets accentuated and if I've got a cross wind, equally the same thing. I almost think about it too much and then it goes.

K – So then if we look at the biggest dip in performance during the round in terms of score that would be the 9th could you tell me a bit about that?

P – Yeah you see I didn't think I hit a bad shot down the 9th [laughs]. I thought about that for a couple of holes afterwards and particularly that walk from the green to the next tee past the clubhouse. I thought that the first was only a little bit left but it was only just slightly left of the marker post and then hit the wind. Then the second one again, I thought that I had actually swung the club quite well, started off where I wanted to and I didn't know it was...you know the second one was probably the silly one because I didn't think...I guess I thought there was more space down there. But having walked down there and walked back again...'cos when I played it in my practice round I went right and then erm...so I should have known that there was lots of space right. But in my head I thought well there is quite a lot of space left and yeah I don't think that I hit a bad shot really on the 9th, that's the funny thing. That 6 iron was a little bit quick, so it ballooned a bit and again a good putt and tapped in for my 8.

K – How were you able to deal with that situation and the fact that you had lost 2 balls?

P – Yeah I think that when I walked back to the tee it was one of those...you know it was one of those 'well let's make a good seven'. You know let's make this a ... I don't know, I think the walk back would have been better...If I had found my ball, my second ball, in some bushes, I probably would have made a worse score than going back to the tee. Because walking back to the tee I had a bit of time to chill and wait for it and start thinking again. Be conscious of the fact that I was wearing a microphone so it made me think a little clearer if that makes sense? So I wasn't changing what I would say but I was just... there was a little more clarity there. You know, let's try and make a good swing here and try and make the best score you can. As opposed to just standing up and letting rip another one. Frustrating walking back to the tee.

K – The outcome of that hole, did it change your objectives for the round?

P – Yeah big time. It was then to make the best out of the round. Rather than, where I was before that, a couple over, you know, I could have turned it into a reasonable round...erm...if I

had made a couple of birdies somewhere it changes it. I kinda felt I was still in for getting something out of it, and then when I made that hole I thought well let's make the best out of what we've done, so scrap that. Especially being the 9th hole, you think well there's a whole other 9. So its quite nice in a way, it just cuts it up. But yeah it was pretty frustrating, especially when I thought that I'd hit a good third drive as well and that was in the right rough [laughs]. I thought that I hit that really well, it just didn't hit the wind!

K – So taking the performance as a whole how does that influence your next tournament? What does it do for that?

P – Well it highlights the fact that I want to work a little bit more on my short game. Because whilst I made a few up and downs to day it was largely down to my putting as opposed to my chipping. I started hitting a few better chips in the end. Erm...but I feel that that's an area of my game that...you know when you look at top tour pros, some of them only hit 11 or 12 greens a round in regulation and yet they are still shooting 67 / 68 because they will maybe chip in once every couple of rounds and they will get up and down most times. That way every step you take, you're taking forward as opposed to back. I make so many bogies from not getting the ball up and down, you know, from relatively easy positions. I am constantly doing that and trying to nibble back in as opposed to trying to nibble forward.

K – So if you think back to any of the shots that you feel that you just frittered or through away, including the ones that we have spoken about, can you just summarise why they happen? Just some of the influences.

P – Yeah, yeah. I don't know really.....There were some shots that I felt I wasn't rewarded for, that I hit good shots and they didn't quite come out as good. But as for my drop shots...what was the question again?

K – Just broadly why do you think that performances deteriorated at some points and why was it superior at other points? You mentioned to me that some of the shots that you hit well, you could just see it.

P – Yeah I mean the 8 iron up the first par 5 and then the hybrid, I just felt I knew the shot. Whether it was something that I had it well before or whatever I just knew the shot erm... where probably my... and this is why I think I walk off the golf course frustrated, I fritter away shots with the odd bad swing that really cost me or lots of little errors. You know, not getting the ball up and down from the fringe of the green on the par to make birdie.

K – Can you think of one that comes to mind out there today that seems like you just through it away?

P – Yeah the 18th... it was a total throw away.

K – Ok talk me through that, why did that happen?

P – Well yeah, that was the one where...bit of an iffy lie in the rough, I didn't hit a particularly bad 3 wood, a little bit slappy, but then I had a shot that I felt I couldn't get too overly aggressive on because it was slightly down wind and I didn't want to fly the back of the green and whether I slightly decelerated on it, I don't know, I felt I had the shot and I don't think I... I think I picked the shot right I just didn't execute it properly. Then my mindset went from lets finish this well to something like 'well that was a stupid mistake to make'. Erm...and now we

are struggling to get it up and down. Then again I made a mistake in not looking at the green properly and seeing that it all sloped away and hitting what I thought was an alright enough chip shot that went a little bit long and then ran on even further. So it was really just, just bad decisions. Just a string of, just innocuous mistakes, that were small but they add up to making a bogey instead of a par or birdie.

K – At the risk of being really annoying [laughs] why do you think that you make those bad decisions?

P – [Laughs] well this is it. I kind of half think that well take the easy route out and it's just that I don't take enough time over it to really...I don't...I guess I don't really nail home in my head what thoughts I have or what the shot should be and really get the self belief of yeah that really is the only shot I can hit here and that is THE shot to hit. I don't know whether it's that and I'm a little bit wishy washy about...that will do, that will work as opposed to being well that is the one I want to hit that is the real key.

K – Is that a thought that sometimes...

P – Yeah again it's a self belief thing. You know I've not been playing this game particularly long. Before a rugby game if my fitness was good, I would have no doubt in my mind that I would go out and put in a good performance. Whereas in golf, even if I have been playing well leading up to it, I will still be conscious of what I am doing and stuff going on around me, you know, rather than if I am totally blinkered like in a rugby game, I wouldn't really think of anything before a game it would be such a sort of shut off from everything else. It wouldn't matter what happened I was going out on that pitch to do one job and that was it, whereas it would be nice if I could get that on the golf course.

K – You say 'stuff that is going on around you' can you just elaborate a little bit more?

P – Yeah well in a rugby game if we are in the changing rooms beforehand and heading out to the pitch or whatever, I wouldn't ever see family or friends on the sidelines, I wouldn't see any of that, it would be just waiting for the first...again where that stems on to golf is the excitement of getting started. You know for me it was all about the first whistle I just wanted to get going. I couldn't stand being in the changing rooms beforehand so I would just shut myself away and just this sort of chilled out nothing. Then as soon as the first whistle went that was my go time.

K – So what are 'the other things going on around you' in golf?

P – Well I suppose there are lots of distractions because you've got... although you are playing against the guy next to you, you are not playing against him if that makes sense? You're all playing against the golf course and you are just doing it in different ways and I guess I just get distracted by how they are doing it compared with how I'm doing it. There's no such right or wrong but...

K – Tell me a bit more about that.

P – Erm...I don't know really.

K – Can you give me an example from today?

P – Yeah its not a massive thing that I am aware of it. Its just knowing that...I don't know, I don't know. It's just sort of, I'm trying to work out how to word it...just knowing that there's

more ways to do it than the way that you're doing it or the guy next to you is doing it. That you don't have to hit it 300 yards, you don't have to hit the ball rifle straight, you don't have to draw everything.

K – So is it a comparison or is it just being aware of something?

P – I guess it's a bit of both. It's being aware of you know how to...whether it's my brain trying to learn from other people that I play with or whether it is part of my brain comparing my game to the person next to me, I don't know but ... I think that you always learn from the people that you play with how to get the ball around the golf course. Often I will come off the course thinking well you know I actually struck it better than that person but they have scored better than me, how is that so? I've never felt I have scored as well as I should do but again that's a private thing; I wouldn't ever go up to someone and say I struck the ball better than you... well I did once...when a guy was just horrendous and he scored better than me, I mean he was just awful [laughs] I said 'I don't know how you did that!' [Laughs].

K – So thinking more generally now can you think of a time that was far more pressurised than today, where you maybe didn't perform well?

P – Yeah [laughs]. Funnily enough the worst feeling I have ever had on a golf course was playing a ladies match with the new lady captain this year. We play a foursomes match against 2 challengers and we walk out the shop and we have to walk on the first tee and it is normally a long iron or a hybrid erm and then you hit your second into the 2nd which is normally a 3 wood and until the 7th you don't hit anything less than sort of a 3 iron. And the first hole, I was wearing glasses and I take my glasses off in the shop, get my bag on and straight out to the tee. I could barely see the ball, nearly hit it through my legs and into the bushes [laughs], the lady captain's hacked it out and then I have shanked one and nearly killed the other player [laughs] and I felt so... I didn't feel confident about what I was seeing, I didn't feel confident about my swing and I felt fuck...this is awful! When you play 18 holes on your own, you can make up for a bad shot; you're the one who has got to play out of the holly bush it doesn't matter. When you are playing with the lady captain, she is putting you in all sorts of different positions that you haven't been in before and you're putting her in positions that she has never been in before and er the psychology of that is weird for me because it's not my game. I can never get a rhythm. I am a very bad foursomes player unless I play with someone who is exactly like me.

K – So were you wary of it before you started?

P – Yeah, yeah. Big time. And I guess it's almost because of their expectations, or what you perceive their expectations to be of you, that you should, you know, retail like Marks & Spencer's, teach like David Leadbetter and play like Tiger Woods or whatever and I guess that in my head you want to rip a 3 iron off the first tee to 6ft on a 230 yard par 3 and it's all happy days.

K – What about in an individual event?

P – The most pressurised shot I played was I got to a shoot out in [tournament] where there were three of us playing for two places and there was a nearest the pin. I felt really pumped up and the problem was I hit the same club that I hit in regulation and I hit it straight over the flag just off the back of the green. Then the other 2 hit the green miles away and they went through, but that was definitely the most pressurised I felt over a shot.

K – And what did that feel like you said ‘pumped up’?

P – Yeah, I don’t know, again I felt that I had the shot, I wanted to draw because you had to draw straws, I wanted to hit first, I didn’t care what the others were doing, I was going to put it close and I made a good swing. Nothing really went wrong apart from hitting it too far, you know and that’s just not being in that position before to know to hit just one club less. But that was certainly...very, very excited. Erm... I guess almost getting ahead because if you got through that...so that was definitely the most I felt.

K – So what would define a pressurised situation for you?

P – Yeah well my probably most pressurised situation is what other people would think of me. like for example if I’m giving a lesson and suddenly the person turns round and says ‘oh you hit a shot’ you know for me that’s quite...you know, I haven’t had any warm up, I haven’t seen the ball fly, I haven’t hit anything and that to me is pretty pressurised.

K – What does that mean? If you hit a bad shot what does that mean?

P – Well exactly, nothing! It doesn’t...I mean you get it into your head that if your teaching it you should be able to play it. So if I’m teaching a bunker shot and suddenly someone says you have a go at it and I am trying to hit a 30 yard bunker shot and I haven’t hit a ball all day and it would be very difficult for me to hit the right shot anyway... I mean it would be pretty impressive if I stuck it to 2 ft. But I’ve got everything to lose or in my head I’ve got everything to lose. You know, then if I go and pipe one or fat it or don’t get out the bunker, then all those other thoughts are fuzzing about rather than ‘ you know how to hit the shot, you’ve hit it a thousand times, just go and do it’.

K – So finally just summarising what do you feel that you do to meet the demands of the game?

P – I’m trying to play more... in events, to try and put myself in situations so that I know how to deal with it. You know, I’m not afraid, afraid of it, I just want to learn how to deal with the feelings. So it’s not that I don’t like the feeling of nerves because I quite like it but I want to learn how to...how to...hold it and deal with the feelings of what’s going on.

K – Any other strategies that used particularly today?

P – I guess self talk is my big thing especially with chip shots. Funnily enough I found it more today with talking out loud. Every chip there was no reason why it couldn’t go in and that was my biggest thing, if I’m hitting a chip shot why can’t I put it in the hole so rather than focusing on getting it close it was well let’s hole it. I used to be really bad with negative self talk; I used to talk myself down all the time. I think that I have got rid of a lot of the negative stuff and turned a lot of positive stuff...I guess it’s not quite to the point of get into the hole...’there’s no reason why I can’t...which I guess is still not definitive lets do it but you know you can do it so let’s...there’s no reason why you can’t replicate that shot here.

End

Appendix D – Thematic analysis

SOURCE OF PRESSURE 19	}	<p><i>Context pressures</i></p> <p>7</p>	}	<p>Factors that add to shot difficulty</p> <p>Perception of challenge</p> <p>Preoccupation with score</p> <p>Thoughts that increase effort</p> <p>Opportunity to achieve</p> <p>Stage of round</p> <p>Winning or losing salient</p>
		<p><i>External pressures</i></p> <p>4</p>		<p>Pressure created by others</p> <p>Pressure from the perception of others</p> <p>Pressure associated with expectation</p> <p>Letting others down</p>
		<p><i>Personal pressures</i></p> <p>8</p>		<p>Demands upon weakest part of game</p> <p>Previous experience influencing current thoughts</p> <p>Increased importance or meaning</p> <p>Need to achieve</p> <p>Maintaining personal standards</p> <p>Perfectionism and unrealistic goals</p> <p>Beliefs about game and ability</p> <p>Influence of confidence and expectations</p>
GOAL INTENTION 32	}	<p><i>The role of others</i></p> <p>6</p>	}	<p>Wanting to demonstrate ability to others</p> <p>Self-presentation concerns</p> <p>Motivated to beat others</p> <p>Motivation from external reward</p> <p>Using information from playing partners</p> <p>Affected by others behaviour</p>
		<p><i>Self-referenced goals</i></p> <p>8</p>		<p>Personal goals and individual targets</p> <p>Indication of personal acceptance levels</p> <p>Motivation for self-improvement</p> <p>Motivation to meet challenge</p> <p>Motivation to be in control</p> <p>Motivation to feel comfortable</p> <p>Motivation to play to potential or maintain standard</p> <p>Intention to focus on mastery</p>
		<p><i>Towards success and enjoyment</i></p> <p>6</p>		<p>Approach goals</p> <p>Outcome goal</p> <p>Performance goal</p> <p>Goals related to score</p> <p>Attempts to do everything to ensure a positive outcome</p> <p>Desire to keep it simple</p>

GOAL INTENTION

Averting failure and disappointment

9

- Goal to avoid poor shots and 'worst' outcomes
- Decision making influenced by knowledge of undesirable outcome
- Avoid repeating previous mistakes
- Avoidance goals for mental state
- Technical avoidance
- Motivation to play safe
- Motivation to avoid loss
- Effort to block out visual hazard
- Wanting to withdraw from challenge

Multiple goal intention

3

- Approach influencing avoidance goals
- Avoidance influencing approach
- Process influencing performance

GOAL EVALUATION

21

Motivation hierarchy

5

- Setting success criteria
- Comparison with others
- Outcome priority
- Score not main motivation
- Enjoyment goals dependent on minimum performance success

Reference to 'correct' measures

5

- Motivation to make up for errors
- Efforts to get everything correct
- Attempt to redefine goals for round
- Use of new strategy to turn things around
- Attempt to correct technique during round

Maintenance of achievement perceptions

11

- Positive acknowledgement of situation and outcome
- Process and outcome success differences
- Premature assessment of consequences
- Negative assessment of previous shot
- Self-depreciation and failure to acknowledge success
- Frustration at poor performance
- Confirmation of not being on target to achieve goal
- Acknowledging being on target to achieve goal
- Perceived missed opportunity
- Relief at outcome
- Impact of goal

INITIATING
SKILL
EXECUTION

34

Decision-making

8

The decision making process
Positive approach to decision making
Simple decision making
Decision based on uncertainty
Decision made to reduce risk
New information influencing decision
Process thoughts and the benefits of routine
No clear decision made

*Personal rules and
implicit information*

7

Thoughts during shot
Feelings about shot
Attention to key swing feelings
Use of golf knowledge rather than precise information
Instruction and feedback with personal meaning
Picture creating instruction
Labelling difficulty without justification

*Technical and explicit
information*

9

Importance of technique in preparation
Technical swing thoughts
Pre-shot key words
Mantra like reminder of what is needed to produce good shot
Technical alterations to meet specific demands
Attention to the step by step process
Attention to multiple swing thoughts and feelings
Technical assessment of outcome
Suggestion that technical focus is detrimental

*Focus away from
immediate challenge*

5

Prediction thinking
Wishful thinking
Panic thoughts
Hindsight thinking
External distraction

*Attention strategies
and influences*

5

Awareness of negative thoughts and feelings
Concentration thoughts
Identifying opportunity
Challenge prompting strategic thinking
External focus of attention

PERFORMANCE
PERCEPTIONS

6

Self Regulation

2

Intrapersonal
Affective

Absolute

4

Score
Position
Handicap reduction
Permanence/stability

Consent Form

Introduction - My name is Karl Steptoe (Email: k.j.steptoe@gre.ac.uk Tel: 0208 331 7560) and I am conducting this research as part of my MPhil/PhD in psychology. The aim of this study is to look at the goals golfers adopt when playing, how they define success during performances and the influence this has on how they execute golf swings. The present study is part of research being undertaken within the department of Psychology and Counseling, School of Health and Social Care at the University of Greenwich. The project has received ethical and risk assessment approval and is supervised by Professor Pam Maras (Email: p.f.maras@greenwich.ac.uk Tel: 0208 331 9627).

The Survey - After completing the personal details you will be asked to complete a survey containing multiple choice questions about your golf and performances. Please answer all questions as honestly as you can, reflecting your own experiences of playing golf. There are 6 sections in the survey with some to be answered before and some after your round of golf and it will take around 15 minutes to complete. Your responses will be combined with others to look at comparisons between elite and recreational golfers.

Confidentiality - All data obtained from participants will be kept confidential and will only be reported as combined results with individual results never reported. All questionnaires will be concealed, and no one other than the primary investigator listed below will have access to them. The data collected will be stored in the HIPPA-compliant, Qualtrics-secure database until it has been deleted by the primary investigator. Participation in this research study is completely voluntary and there are no expected risks of physical or mental harm associated. You have the right to withdraw at anytime or refuse to participate entirely. If you wish to withdraw, please just close your Internet browser, if you have completed and submitted your survey responses then you can withdraw your data up until November 1st 2012 by contacting me at: k.j.steptoe@gre.ac.uk

Please keep a copy of this information for your records and if you have any further comments or questions, please email me at the above address. My sincere thanks in advance for your participation, it is much appreciated.

I have read and understood the above consent form and wish to participate in this study.

- Yes
- No

Please enter a personal code that is meaningful to you. This will be your personal code and you can use this if you wish to withdraw your data from the research at a later date:

Please enter your email address

What is your gender?

- Male
- Female

What is your age?

How long have you been playing golf?

- Less than a year
- 1 - 3 years
- 3 - 5 years
- 5 - 7 years
- 7 - 9 years
- 10 - 15 years
- 15 - 20 years
- 20 years +

How regularly do you receive professional golf coaching?

- Never
- Less than once a month
- Once a Month
- 2-3 Times a Month
- Once a Week
- 2-3 Times a Week
- Daily

How often do you play 18 holes of golf?

- Never
- Less than Once a Month
- Once a Month
- 2-3 Times a Month
- Once a Week
- 2-3 Times a Week
- Daily

What is your playing status or handicap?

- | | |
|---|-----------------------------------|
| <input type="radio"/> European Tour | <input type="radio"/> 15 Handicap |
| <input type="radio"/> Challenge Tour | <input type="radio"/> 16 Handicap |
| <input type="radio"/> Other Professional Tour | <input type="radio"/> 17 Handicap |
| <input type="radio"/> +3 Handicap | <input type="radio"/> 18 Handicap |
| <input type="radio"/> +2 Handicap | <input type="radio"/> 19 Handicap |
| <input type="radio"/> +1 Handicap | <input type="radio"/> 20 Handicap |
| <input type="radio"/> 0 Handicap | <input type="radio"/> 21 Handicap |
| <input type="radio"/> 1 Handicap | <input type="radio"/> 22 Handicap |
| <input type="radio"/> 2 Handicap | <input type="radio"/> 23 Handicap |
| <input type="radio"/> 3 Handicap | <input type="radio"/> 24 Handicap |
| <input type="radio"/> 4 Handicap | <input type="radio"/> 25 Handicap |
| <input type="radio"/> 5 Handicap | <input type="radio"/> 26 Handicap |
| <input type="radio"/> 6 Handicap | <input type="radio"/> 27 Handicap |
| <input type="radio"/> 7 Handicap | <input type="radio"/> 28 Handicap |
| <input type="radio"/> 8 Handicap | <input type="radio"/> 29 Handicap |
| <input type="radio"/> 9 Handicap | <input type="radio"/> 30 Handicap |
| <input type="radio"/> 10 Handicap | <input type="radio"/> 31 Handicap |
| <input type="radio"/> 11 Handicap | <input type="radio"/> 32 Handicap |
| <input type="radio"/> 12 Handicap | <input type="radio"/> 33 Handicap |
| <input type="radio"/> 13 Handicap | <input type="radio"/> 34 Handicap |
| <input type="radio"/> 14 Handicap | <input type="radio"/> 35 Handicap |
| | <input type="radio"/> 36 Handicap |
| | <input type="radio"/> No Handicap |

WHAT DOES SUCCESS IN GOLF MEAN TO YOU? THERE ARE NO RIGHT OR WRONG ANSWERS. I WOULD LIKE YOU TO SELECT THE ANSWER THAT BEST INDICATES HOW YOU FEEL.

WHEN PLAYING GOLF I FEEL MOST SUCCESSFUL WHEN:

I beat other people

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

I am clearly superior

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

I am the best

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

I work hard

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

I show clear personal improvement

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

WHEN PLAYING GOLF I FEEL MOST SUCCESSFUL WHEN:

I outperform my opponents

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

I reach a goal

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

I overcome difficulties

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

I achieve personal goals

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

I win

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

I demonstrate to other people that I am the best

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree

- Agree
- Strongly Agree

WHEN PLAYING GOLF I FEEL MOST SUCCESSFUL WHEN:

I perform to the best of my ability

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

PLEASE READ EACH GOAL CAREFULLY

Only endorse the statements that truly represent the goals that YOU have when playing tournament golf

I am striving to understand how I can perform at my very best

- Not at all like me
- Not like me
- Not much like me
- Neutral
- Somewhat like me
- Like me
- Completely like me

I am striving to not miss the opportunity to learn about how I perform in competition

- Not at all like me
- Not like me
- Not much like me
- Neutral
- Somewhat like me
- Like me
- Completely like me

My goal is to play as well as I possibly can

- Not at all like me
- Not like me
- Not much like me
- Neutral
- Somewhat like me

- Like me
- Completely like me

Only endorse the statements that truly represent the goals that YOU have when playing tournament golf

My aim is to master all aspects of my game

- Not at all like me
- Not like me
- Not much like me
- Neutral
- Somewhat like me
- Like me
- Completely like me

My aim is to avoid playing as badly as I could

- Not at all like me
- Not like me
- Not much like me
- Neutral
- Somewhat like me
- Like me
- Completely like me

My aim is to avoid playing worse than other players

- Not at all like me
- Not like me
- Not much like me
- Neutral
- Somewhat like me
- Like me
- Completely like me

My goal is to avoid performances that are worse than I am capable of

- Not at all like me
- Not like me
- Not much like me
- Neutral
- Somewhat like me
- Like me
- Completely like me

Only endorse the statements that truly represent the goals that YOU have when playing tournament golf

I am striving to do well compared to other players

- Not at all like me
- Not like me
- Not much like me
- Neutral
- Somewhat like me
- Like me
- Completely like me

My aim is to perform well relative to other players

- Not at all like me
- Not like me
- Not much like me
- Neutral
- Somewhat like me
- Like me
- Completely like me

My goal is to avoid being one of the worst performers

- Not at all like me
- Not like me
- Not much like me
- Neutral
- Somewhat like me
- Like me
- Completely like me

My goal is to perform better than the other players

- Not at all like me
- Not like me
- Not much like me
- Neutral
- Somewhat like me
- Like me
- Completely like me

Only endorse the statements that truly represent the goals that YOU have when playing tournament golf

I am striving to avoid performing worse than other players

- Not at all like me
- Not like me
- Not much like me
- Neutral
- Somewhat like me
- Like me
- Completely like me

BELOW ARE A NUMBER OF STATEMENTS ABOUT YOUR GOLF SWING. THE POSSIBLE ANSWERS GO FROM STRONGLY DISAGREE TO STRONGLY AGREE.

There are no right or wrong answers so select the answer that best describes how you feel for each statement.

I rarely forget the times when my golf swing has failed me

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

I am always trying to figure out why my swing has failed

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

I reflect about my golf swing a lot

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree

- Agree
- Strongly Agree

Select the answer that best describes how you feel for each statement.

I am always trying to think about my movements when I am swinging

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

I am self conscious about the way that I look when I am swinging

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

I sometimes have the feeling that I am watching myself swing

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

I am aware of the way my body moves when I am swinging the club

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

I am concerned about my style of golf swing

- Strongly Disagree
- Disagree

- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

Select the answer that best describes how you feel for each statement.

If I see my reflection I will examine my golf swing

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

I am concerned about what people think about me when I am swinging

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

I expect to play well in this competition

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Neither Agree nor Disagree
- Somewhat Agree
- Agree
- Strongly Agree

I believe that I will shoot a good score in this competition

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Neither Agree nor Disagree
- Somewhat Agree
- Agree
- Strongly Agree

***Thank you very much for your time so far.
To complete this survey could you please answer 5 short questions
after your round?***

PLEASE ANSWER THE FOLLOWING QUESTIONS ABOUT THE COMPETITION YOU HAVE JUST PLAYED.

I think that I played very well in the competition

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Neither Agree nor Disagree
- Somewhat Agree
- Agree
- Strongly Agree

I think that I shot a good score in the competition

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Neither Agree nor Disagree
- Somewhat Agree
- Agree
- Strongly Agree

Where there any moments in the round today where you felt your performance dip below usual standards?

- Yes
- No

Did you use any particular golf knowledge when swinging the club during your game today? If so, please state below.

What was your gross score for the round?

- 61
- 62
- 63
- 64
- 65
- 66
- 67
- 68
- 69
- 70
- 71
- 72
- 73
- 74
- 75
- 76
- 77
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- 97
- 98
- 99
- 100
- 101
- 102
- 103
- 104
- 105
- 106
- 107
- 108

What was the par for the course that you played in the competition today?

- 65
- 66
- 67
- 68
- 69
- 70
- 71
- 72
- 73
- 74
- 75

Debrief

Title of Project: Are you thinking what they're thinking? Professional and recreational golfers' experiences of performance under pressure

Date of Ethics approval: March 2010

Identity and contact details of investigator(s): k.j.stepto@gre.ac.uk

Identity and contact details of supervisor(s):

Professor Pam Maras, School of Health and Social Care, Dept. Psychology & Counselling, University of Greenwich, Southwood Site, Avery Hill Road, Eltham, SE9 2UG. P.F.Maras@gre.ac.uk 0208 331 9627

Dr Rob Willson, School of health and Social Care, Dept. Psychology & Counselling, University of Greenwich, Southwood Site, Avery Hill Road, Eltham, SE9 2UG. R.Willson@gre.ac.uk 0208 331 9628

Description of research:

As a professional golf coach for 15 years I have been fascinated at how some golfers are able to meet the demands of performing under pressure where others succumb to the breakdown of skills to a standard far below their 'normal' level of ability. How golfers measure success and what they focus on during skill execution has been associated with this breakdown (Masters, 2008; Hill 2010) and this current research aims to explore the influences upon this self focus and in particular associations with the goal that the individual engages in when performing. Results: The study will be completed on 1st September 2011. If you would like to know more about the outcome of this study, you may request a copy of the report or the results from the investigator. Support services: If you feel that you have been affected by participating in this study, and would like further information on all aspects of coaching then please contact: The Professional Golfers' Association National Headquarters, Centenary House, The Belfry, Sutton Coldfield, West Midlands, B76 9PT 01675 470333 Sport Psychology Services Sion Thomas S.Thomas@gre.ac.uk We would like to reassure you that confidentiality will be practiced at all times and your identity will not be revealed.

Thank you very much for your participation

Appendix F – Preparation instructions for EEG study

Dear

Thank you for agreeing to take part in this research on:

Date: Friday 14th September 2012 at 9.00am

Your support is greatly appreciated. Below you will find directions to the University of Greenwich campus in Medway and information on preparation for the experiment. You will need to inform us as soon as possible of your car registration if you require a parking space on the day

If you have any other questions then please do not hesitate to contact me at any time on **07796865888** or at k.j.stepto@gre.ac.uk

The night before

Please get a good night sleep

Avoid consumption of excessive alcohol

Day of experiment

Wash hair normal shampoo with no conditioner or gel

Make a note of the time you last ate (There are no restrictions here just need record).

Avoid consumption of any caffeine based drinks

Inform research team of any medication that you are currently taking

After study

If you would like to bring a towel with you there are shower facilities. It is expected that you will want to wash hair afterwards to remove gel used in EEG cap.

Directions

Post Code: Central Avenue, Chatham Maritime, Kent ME4 4TB

The biomechanics lab is in GRENVILLE building at the MEDWAY campus of the University of Greenwich with directions to and around the campus accessible at this link:

<http://www2.gre.ac.uk/about/travel/medway>

Parking

Is available on campus and you need to collect pass on entry. We can only issue this if you let us know your registration so please do so as soon as you can.

We really look forward to seeing you and hope that you find the research interesting!

Karl

Participant Information

Name

Date of Birth

Exact Handicap or Playing Status

Medical History of Note

Have you had any head injuries?

At what time did you last eat?

At what time did you last have a caffeine based drink?

When putting how does your stroke feel when you know that you are putting well?

How does your putting stroke feel when you know you are not putting well?

What is the difference between your good and bad putting strokes?

Appendix G – 3 x 2 achievement goal questionnaire

Instructions: The following statements represent types of goals that you may or may not have for this class. Circle a number to indicate how true each statement is of you. All of your responses will be kept anonymous and confidential. There are no right or wrong responses, so please be open and honest.

1	2	3	4	5	6	7
not		slightly	moderately		very	extremely
true of me		true of me	true of me		true of me	true of me

Task-approach goal items

To get a lot of questions right on the exams in this class.
To know the right answers to the questions on the exams in this class.
To answer a lot of questions correctly on the exams in this class.

Task-avoidance goal items

To avoid incorrect answers on the exams in this class.
To avoid getting a lot of questions wrong on the exams in this class.
To avoid missing a lot of questions on the exams in this class.

Self-approach goal items

To perform better on the exams in this class than I have done in the past on these types of exams.
To do well on the exams in this class relative to how well I have done in the past on such exams.
To do better on the exams in this class than I typically do in this type of situation.

Self-avoidance goal items

To avoid doing worse on the exams in this class than I normally do on these types of exams.
To avoid performing poorly on the exams in this class compared to my typical level of performance.
To avoid doing worse on the exams in this class than I have done on prior exams of this type.

Other-approach goal items

To outperform other students on the exams in this class.
To do well compared to others in the class on the exams.
To do better than my classmates on the exams in this class.

Other-avoidance goal items

To avoid doing worse than other students on the exams in this class.
To avoid doing poorly in comparison to others on the exams in this class.
To avoid performing poorly relative to my fellow students on the exams in this class.
