What Do We Do With the Rest of the Day? Examining Non-Shot Making Activity in Competitive Golf

By

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Abstract

In completing this thesis I am attempting to answer the broad question of what golfers should do with their time on the course when they are not executing their shots. Surprisingly, and considering the amount of research within golf that has considered how performance can best be optimised, either by focusing on the development of technique, mental skills, physiological factors, or tactical considerations, this has remained an under-researched area with few authors considering the potential impact of these time periods.

In attempting to answer this broad question I present five, substantive chapters, one desktop study, one chapter which explains and justifies the chosen research philosophy and methodologies (Chapter 3), and three empirical studies. These are wrapped in introduction (Chapter 1) and conclusion (Chapter 7) chapters. Chapter 2 critically reviews the extant literature prior to the completion of this thesis. In addition to critiquing existing literature future avenues for research that would fill some of the identified gaps in knowledge are suggested. Adopting a pragmatic philosophical approach Chapter 4 explores the perceptions from golfers and support personnel of what golfers should do on the course when not executing their shots. Results point to the use of a number of novel processes specifically the use of pre[2]- and post-shot routines, in addition to the impact of caddies at the meso-level of performance. These impacts of these processes and inputs on both player attention and other psychological factors are discussed. Reflecting the suggestion from Chapter 4 of the importance of meso-level processes, Chapter 5 seeks to identify if, and how, high-level golfers use the meso-level processes identified in Chapter 4. The findings suggest that high-level golfers do use the processes identified in Chapter 4 but that the content and application of the processes varies depending upon shot outcome. In particular, post-shot routines need to be adaptive based upon shot outcome. Consequently, the need to develop meta-cognitive skills is also highlighted. In order to close the pragmatic loop and practically apply the

knowledge generated in the thesis to that point Chapter 6 takes five high-level golfers through a 10 week intervention. These interventions are aimed at developing the skills and processes discovered in the thesis and assesses both the perceived and performance benefits derived from the interventions. There were notable improvements in performance as a consequence of the interventions, although these were not statistically significant. However, participants did also positively note a number of perceived benefits derived from the interventions including the development of meso-level skills and associated general benefits and improvements. In concluding the thesis, and as per the pragmatic approach adopted, I offer practical suggestions to what golfers should do with the rest of the day and the impact that adopting these processes has on performance. Finally, and in order to provide practically useful findings to practitioners, a model for how to integrate the findings from the thesis is proposed.

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"Golf is deceptively simple and endlessly complicated; it satisfies the soul and frustrates the intellect. It is at the same time rewarding and maddening - and it is without doubt the greatest game mankind has ever invented" *Arnold Palmer*

Chapter 1- Introduction

1.1 OVERVIEW TO THE THESIS

This thesis is broadly interested in the question of what should golfers do with their time on the course when they are not executing their shots. Considering the amount of time that golfers spend on the course not actively involved in executing a shot, and the potential importance of this time, these time periods have received little attention in the literature. Instead, most research within golf has focused upon the biomechanical, psychological, and physiological aspects of successful swing execution. Whilst these are clearly important to successful golf performance, however, authors such as Hellström (2009) have called for further research on "the rest of the day". Furthermore, given the essential role that knowing what to focus on, and when, has on golf performance (Hellström, 2009) it is surprising that research up until this point has predominantly focused on attentional focus and control during pre-shot routines and shot execution phases (Cotterill, 2010; Wulf, 2007). Thus, more research is required on what, and how, players focus and control their attention in the broader time periods outside the pre-shot routine, and any impact this may subsequently have on performance. In addressing the need for further research in this area, the thesis had three overarching aims:

1) To explore perceptions of attentional focus 'best practice' from players, coaches and support staff and determine its' congruence with current sports psychology literature (i.e., what *should* players being thinking and doing outside of shot execution).
2) To analyse high-level golfers over time to determine any significant patterns in practice which relate to attentional focus 'best practice' (i.e., what do golfers actually *do*? And do they follow the best practice suggested?).

3) To apply an intervention based on models of best practice in order to train for the attentional demands of high-level golf (i.e., does following the best practice identified improve golf performance?).

In order to achieve these aims I have completed 5 chapters (Chapters 2 – 6). Of these, three have been published in academic journals (Chapters 2,4, and 5).

CHAPTER 2 OVERVIEW

Chapter 2 is a desktop study which sets the scene for the rest of the thesis. The goals of this chapter are to outline current understanding of macro-level (i.e. tournament preparation) and meso-level (i.e. shot preparation and response) planning in golf. Additionally, I also consider how these processes may be enhanced via the golfer's work with their support team. Specifically, because elite golfers are in the unique position of being able to receive real-time advice at the meso-level of performance, I focus on the player-caddie relationship. Secondly, based on the existing literature, I discuss the best advice available before completion of this thesis on the patterning of golfers' focus between shots and holes. Finally, I provide directions on how the gaps in knowledge which are identified may be effectively filled.

In addressing current understanding of macro-level preparation, I review research and anecdotal evidence within golf, in addition to literature from other sports which suggests a number of processes or considerations for these elements of preparation, including: use of imagery; technical change/refinement; and tactical planning. At the meso-level, based on the literature available I introduce the term pre-pre(pre^2)-shot routine to describe the decision making process before the pre-shot routine alongside reviewing the limited amount of literature on post-shot routines.

In relation to the role of the support team across both macro- and meso-level processes, I review the literature on Shared Mental Models (SMMs) and suggest how this

may apply to the work done by coaches, psychologists, and caddies before a tournament, and the caddie during a round. More specifically, the importance of team members and golfers holding common or overlapping task, team, and team member models is discussed.

Penultimately, a model of "best practice" for patterning of attention across a round is proposed, based on the existing literature. Whilst proposing this model I also critique existing guidance, including the *PAR* model (Kirschenbaum et al., 1998). Finally, and based upon these criticisms, I suggest that more knowledge is required around: how macro-planning effects attention at the meso-level; the make-up of effective pre[2]- and post-shot routines and how these processes affect shot planning and responses; and how SMMs between the player and support staff may affect shot planning and responses.

1.2 CHAPTER 3 OVERVIEW

Chapter 3 outlines and discusses the chosen research philosophy and methodology. I discuss how my background and the lack of current understanding around the area of this thesis influenced my choice of a pragmatic approach. Following this, I review the key elements of a pragmatic approach to research and how this aligns with the aims of the thesis. Having outlined my overall philosophical approach, I then outline methodological considerations for subsequent empirical chapters of the thesis. The issue of trustworthiness in both the data collection and analysis processes is then addressed. This primarily covers the use of semi-structured interviews, stimulated recall, inductive and deductive content analysis, and thematic analysis.

1.3 CHAPTER 4 OVERVIEW

Having outlined my overall research philosophy and methodological considerations Chapter 4 is the first empirical chapter which builds on and seeks to address the gaps in literature identified in Chapter 2. Specifically, I was interested in: what golfers and support practitioners considered effective macro-level planning and how that impacted golfers

attention at both macro- and meso-levels; what elite golfers are and potentially should be focusing their attention on at the meso-level of performance; and if, and how, SMMs between players and support team members influenced the golfers' thinking at macro- and meso-levels.

Against these aims, semi-structured interviews were carried out with four elite golfers, four caddies, four coaches, and four psychology support personnel; all of whom worked in elite level golf. Participants were questioned about: attentional focus over the course of a tournament (from pre-tournament through to pre-shot); strategies to effectively shift attention whilst playing; any influences on the variability of attentional focus; and training for shifts in attention.

Findings suggested a number of novel processes at both macro- and meso-levels which could impact both the focus and nature of player attention and other psychological factors. Importantly, at the meso-level of performance, models for a pre[2]- and post-shot routine are suggested alongside outlining the caddies' contribution to those processes. The chapter concludes by highlighting that, although a new model for "best practice" now exists given by experts in the field, there is a need to explore if golfers actually follow this best practice.

1.4 CHAPTER 5 OVERVIEW

Chapter 5 is an empirical chapter. The chapter is introduced by reviewing the key findings from Chapter 4 whilst also highlighting some of the potential shortcomings from the study's design such as the use of retrospective methods over real-time investigation. Furthermore, Chapter 4 did not clearly outline if the identified meso-level processes were specific to better performances. Thus the aims of this chapter were to explore what a sample of high-level golfers actually did and thought at the meso-level of performance, and identify

if any differences existed in the deployment of meso-level behaviours and thought processes before and after perceived good and bad shots.

In order to address these aims, data were collected from four competitive rounds from six high-level golfers. Data were captured on video and used to undertake stimulated recall interviews to elucidate what players were doing before and after both perceived good and bad shots.

Results suggest the high-level golfers in this sample were using the meso-level processes identified in Chapter 4 *but* that the content and use of these processes varied across good and bad shots, I discuss this variation in content and use in the context of literature on meta-cognition. Finally, I conclude by suggesting that in order to fully assess the impact of meso-level processes on performance interventions that up-skill and track high-level golfers in this area would be beneficial.

1.5 CHAPTER 6 OVERVIEW

Chapter 6 is an empirical chapter. Drawing on the findings from Chapters 4 and 5, I designed then applied bespoke interventions with five high-level golfers. In doing this, my aims were to assess any perceived impact from the interventions in addition to assessing if the interventions had any impact on players' scoring performance. Subsequently, each participant was taken through a 10-week bespoke intervention programme that aimed to improve selected meso-level skills. Pre- and post-intervention data were collected via interviews and following the stimulated recall protocol used in Chapter 5.

The results point to perceived impacts from the interventions, both in terms of developing specific meso-level skills and other associated benefits and improvements from the interventions. Whilst four of the golfers improved their scoring performance post-intervention, these improvements were not statistically significant. These findings are discussed in relation to findings from previous chapters and current literature. I conclude by

highlighting the importance of developing meso-level skills but also developing the meta-cognitive skills to know when and why to use those meso-level processes.

1.6 CHAPTER 7 OVERVIEW

To conclude the thesis I return to the three overarching aims of the thesis and aim to answer the broad question of what should golfers do with their time on the course when they are not executing their shots? In order to answer this I draw on the core conclusions of each chapter. In completing the thesis I assess the overall strengths and limitations of the thesis, and finally make recommendations for future research.

Chapter 2- So what do we do with the rest of the day? Going beyond the pre-shot routine in golf performance

2.1 OVERVIEW

The use of psychological skills has long been recognized as a significant differentiator between elite and non-elite sport performers (Durand-Bush, Salmela, & Green-Demers, 2001; Salmon, Hall, & Haslam, 1994; Stevenson, 1999; Weinberg, Burton, Yukelson, & Weigand, 1993). In the case of golf, McCaffrey and Orlick (1989) outlined a number of mechanistic factors associated with performance excellence, including: commitment, quality practice, goal setting, imagery, practice planning, pre-tournament planning, tournament focus planning, distraction control, and tournament evaluation. More recently, a body of work has also investigated and supported the efficacy of 'packaging' some of these skills to address specific phases of the game; most notably, through the use of pre-shot routines (for a comprehensive review see Cotterill, 2010). To date, however, little research has addressed the attributes required to successfully "fill the gap" between how (and which) psychological skills are applied in pre-tournament planning in comparison to those applied in shorter–term, pre-shot routines. In other words, there exists a significant knowledge gap on the optimal use of time between shots and holes which, chronometrically at least, represents the majority of "playing time" in any round.

Given its essential role in performance, the focus and nature of performers' attention has a substantial history in the sport literature (Garfield & Bennett, 1984; Loehr, 1984; Privette, 1981, 1982; Ravizza, 1977). Defined as "engagement in the perceptual, cognitive, and motor activities associated with performing skills" (Magill, 2003, p.141), attention has, however, developed into a highly fragmented construct. Specifically, several, often disparate categories are commonly applied in relation to attentional focus, including: internal and

external (Nideffer & Sagal, 1998; Wulf & Prinz, 2001); broad and narrow (Nideffer & Sagal, 1998); proximal and distal (Bell & Hardy, 2009, McNevin, Shea, & Wulf, 2003); associative and dissociative (Morgan & Pollack, 1977; Schomer, 1986); endogenous (voluntary) and exogenous (non-voluntary) (Jonides, 1981; Posner, 1980); and content and characteristics (Bernier, Codron, Thienot, & Fournier, 2011). Based on these studies, it can be inferred that high-level golfers could and indeed should utilize information from visual, kinesthetic, and auditory sources to attend to different attentional foci depending on the situation they face. However, the plethora of constructs on view may have served to obfuscate exactly how this should be accomplished!

In tandem, and perhaps due to the predominant micro (i.e., pre-shot) focus of the literature, work to date has also largely failed to address exactly what skilled golfers focus on before and after their swing, and during the considerable gap time which exists in between shots and holes. Moreover, by primarily considering performers' attention immediately preceding or during shot execution, this field of study has also overlooked how the intensity of a golfer's focus may change during an entire round (Hellström, 2009). Indeed, important tasks engaged beyond pre-shot and shot execution levels all require changes in the breadth and direction of attention. These include meso-level information processing before entering a pre-shot routine (e.g. course set-up, ball lie, pin position, wind speed/direction, technical changes made since last facing a similar shot or situation) and the return to meso-processing after shots (i.e., post-shot routine) (Hellström, 2009; Thomas, 2001). Taking this requirement against the lack of scholarly knowledge, work is needed which explores what attention should be focused on and how its intensity may change in the time preceding and proceeding shot execution.

Anecdotal evidence and research suggests a number of potential distractions that professional golfers may face, all of which will require effective meso-level attentional

patterning. These distractions will vary in both number and scope, depending upon factors such as: tournament size and importance (e.g. Majors/the Ryder Cup versus a smaller tour event); standing within the tournament (e.g. holding the lead versus chasing the leader); and any tournament specific demands (e.g. the challenging rough at the US Open or the challenging greens at the Masters). The importance of effective attentional patterning at a meso-level was also demonstrated within research by Cohn (1991), who found that peak golf performance was associated with staying in the present, not focusing on past or future events (such as shots that have been hit or a potential score), and having a narrow focus of attention . Anecdotal evidence from players also suggests that macro-planning can be used to cope with meso-level attentional demands, such as moving on from dropped shots. For example Ogilvy (2012) discussed that part of his preparation for the US Open was using imagery to rehearse how he would react and cope with making more bogies than in a regular tournament.

Given that knowing what to focus on and how is essential for peak performance in elite golf (Hellström, 2009), especially given the number and scale of possible distractions, the purpose of this chapter is threefold. First, I outline current understanding of macro-level (i.e. tournament preparation) and meso-level (i.e., shot preparation and response) planning in golf. Additionally, I also consider how both macro and meso processes may be enhanced via the golfer's work with their support team. Second, and based on existing literature, I discuss what the best advice available was prior to this thesis on the patterning of golfers' focus in-between shots and holes. Finally, these preceding considerations are integrated to provide directions on how knowledge gaps in this area may be effectively filled.

2.2 MACRO-, MESO-, AND MICRO-LEVEL PLANNING IN GOLF: CURRENT UNDERSTANDING

2.2.1 Macro (Pretournament) Planning

Research across a range of sports has considered the importance of pre-competition, macro-level planning from a number of perspectives including: physiological, psychological, technical, tactical, logistical, physical, and medical. Synthesising these varying perspectives and providing a holistic approach to pre-event preparation, Collins and Cruickshank (2015) suggested the P^7 approach as a framework to accomplish effective. The importance of pre-event preparation becomes evident when one considers that research across sports has shown that general performance strategies, prepared in advance, help performers feel more relaxed, prepared, and in control (Blumensein & Lidor, 2008; Collins & Cruickshank, 2015; Gould & Maynard, 2009). Importantly, these outcomes have also been linked to peak performance (Cohn, 1991).

Reflecting the importance of this holistic approach to preparation, but also acknowledging that approaches taken in other sports may not be directly applicable to golf, McCaffrey and Orlick (1989) outlined the importance of pre-tournament preparation in golf. Surprisingly, given the evidence that suggests how important pre-event preparation is this key performance feature has remained relatively under-researched in golf. Given that pre-tournament preparation for golf includes a mental plan for course management and shot making strategies, as well as a logistical plan for the management of event requirements and responsibilities (McCaffrey & Orlick, 1989), the comparative dearth of work on this topic within golf is surprising, especially when heeding anecdotal evidence from players (Diaz, 2008; Ogilvy, 2012). Additionally, research in other sports has repeatedly highlighted the importance of a structured integration of mental skills and preparative behaviours before competitive performance (Beauchamp, Bray, & Albinson, 2002; Judge, Bell, Bellar, &

Wanless, 2011; Malouff, McGee, Halford, & Rooke, 2008.). I now consider the type of skills and behaviours which research from golf and other sports suggests can (and should?) be applied in macro-level planning.

Pretournament Imagery

Work from Paivio (1985) has shown that athletes can use imagery to rehearse skills (cognitive-specific imagery) as well as strategies of play and routines (cognitive-general imagery) prior to competition. Additionally, pre-tournament imagery can also serve a specific and general motivational function (Paivio, 1985) where athletes image the achievement of goals (motivational specific: Callow & Hardy, 2001) and also physiological arousal and its effects (motivational general: Hall, Mack, Paivio, & Hausenblas, 1998). Notably, general motivational imagery focused on performance arousal and mastery has been linked to a range of positive outcomes such as self-regulation and self-efficacy (Callow, Hardy, & Hall, 2011; Feltz & Riessinger, 1990; Hecker & Kaczor, 1988; Vadocz, Hall, & Moritz, 1997). Unfortunately, while cognitive and motivational imagery are valuable psychological pre-competition techniques, only Beauchamp, Bray, and Albinson, (2002) have integrated this perspective into golf. The consequent lack of understanding in this area is surprising given the clear anecdotal evidence from elite golfers which supports the use of pre-competition imagery (Ogilvy, 2012). Clearly, such "running through the possibilities" resonates with literature in other sports (cf. Hemery, 1986) and would seem to offer an important tool for pre-tournament preparation in golf.

Pretournament Technical Change/Refinement

Evidence from coaches and players suggests that pre-tournament planning may also effectively include an element of technical change, or at least technical refinement. For instance, Diaz (2008) has previously described how David Leadbetter worked with Trevor Immelman prior to the 2008 Masters tournament to make specific technical changes which

would permit better distance control on approach shots to greens; a specific challenge for that particular golf course. From this motoric perspective, sports psychology literature (e.g. Cumming & Hall, 2002) suggests that the use of cognitive-specific imagery could help a player to implement a technical change prior to a tournament due to its functional equivalence with physical practice (Hall, 2001; Holmes & Collins, 2001) and would therefore represent a core planning feature for particular events.

Tactical Planning

Facilitating golfers' pre-tournament imagery and technical change/refinement, as well as being a vital process in its own right, McCaffrey and Orlick (1989) have also earlier suggested that touring professionals hold mental plans for course management and shot-making strategies. As other work has identified that cognitive-general imagery may be used to image these plans and strategies (Paivio, 1985), the implication for golfers and their support teams is that mental models of an established tactical plan should be developed. However, to date, there has been no research addressing how such pre-tournament planning interacts with meso-level in-game thinking, the attentional demands of a round, and how any ad hoc changes in tactics may influence or be influenced by the player's attentional focus.

2.2.2 The Meso Shot Cycle – Planning, Response, and Clearing

As it takes less than 5 seconds to address the ball and swing the golf club, and usually less than 45 seconds to plan and execute a shot, Bruce (1998) suggested that a golfer who shoots level par (usually 72 strokes) will be planning shots for 25% of their time and playing shots for 2% of their time on the course. This small percentage of time engaged in the planning and execution of shots clearly leaves large gaps of time in-between shots which golfers can fill with a number of potentially effective strategies. Grounding these strategies in established terminology, the most pertinent are *pre-pre-shot preparation* and a *post-shot routine*.

Pre-pre (Pre^2) Shot Preparation

Given the role of cognitive and somatic states for the execution of motor skills (Hardy, Jones, & Gould, 1996), there has been a surprising lack of literature on how golfers prepare prior to playing shots. In one of the few exceptions, Kirschenbaum, Owens, and O'Connor (1998) put forth their concept of *Smart Golf* which involves players' use of the acronym PAR: *Plan, Apply* and *React*. Similar to the broad external focus advocated by Nideffer and Sagal (2006), in which a golfer would assess the hole or shot they are about to play, Kirschenbaum et al.'s approach implies that golfers must plan certain elements of their shot *prior* to beginning their pre-shot routine. Specifically, *personal par* involves a player adjusting the expected score on a hole based on handicap; the *conservation* principle involves the player using more conservative shots where possible; under the *wide first* principle, the golfer is encouraged to aim for the widest part of fairways and greens; and finally, the *safety first* principle encourages the golfer to go for safer means of escape if their previous shot puts them in trouble. While face-valid assertions for many, these guidelines are too simple for most if not all elite golfers who normally won't play to a handicap and, should they want to compete at the top of the field, need to play generally more attacking shots, aim at smaller targets, and take more calculated risks. Kirschenbaum et al.'s advice to use these general principles in specific situations is also clearly problematic from an applied stance.

However, whilst the applicability of Smart Golf to elite players can be challenged over its simplicity, these authors' broader suggestion that players should engage in a certain amount of cognitive preparation prior to starting their pre-shot routine is both face-valid and conceptually justified. As noted above, however, we have little understanding of what this process best consists of and how it is best played out in professional golf performance.

Post-shot Routine

Beyond the golfer's pre[2]-shot routine, an area of further interest at the meso-level of performance is what elite golfers are or should be doing after a shot; in short, their post-shot routine. A post-shot routine includes cognitive and behavioral processes that can help golfers to "put away" a shot, shift attention to the next one, and excel under pressure, although few clear, empirically-based guidelines for this process have been identified in elite golf (cf. Finn, 2009; Hill, Hanton, Matthew, & Fleming, 2010; Kirschenbaum, 1997; Kirschenbaum et al., 1998). One suggested model for a post-shot routine is the "4-F" model (Kirschenbaum, 1997), a four stage process which includes: *Fudge* (an exclamation of dissatisfaction after hitting the bad shot); *Fix* (redoing the swing using a practice swing to correct the problem); *Forget* (forgetting about the problematic shot and remembering that nobody plays perfect golf); and *Focus* (focusing attention on the next shot and in a positive manner). Whilst once again providing seemingly face-valid suggestions this model lacks thorough empirical support and only seems applicable after a bad shot.

More recent work in bowling has also supported the notion and benefits of post-shot routines. Indeed, while Mesagno, Hill, and Larkin (2015) found no significant gain in performance after a post-shot routine was introduced, participants felt that this improved or protected their attentional control, focus on the task, re-focusing between shots and games, ability to block distractions, attention after an error, emotional control, constructive reflection, confidence, and self-awareness. As the authors pointed out, however, knowledge on post-shot routines across a range of sports requires expansion.

2.2.3 Enhancing Macro and Meso Routines: Working With the Support Team

Although it is the golfer who executes each shot, practice and evidence suggests that a golfer and their support team – which may include a coach, psychologist, conditioner but most notably the caddie – work together over macro- and meso- level planning processes (cf. Aitken & Weigand, 2007; Mackenzie, 1997; Reinman, 1999). Drawing on work on Shared

Mental Models (Mascarenhas & Smith, 2011) (hereafter SMMs), the team decision making process will logically (or optimally) involve gathering, processing, integrating, and communicating information to arrive at task-relevant decisions. This does not necessarily require that a consensus be reached amongst team members, nor does it suggest that all team members are involved in all aspects of the decision (Mathieu, Goodwin, Heffner, Salas, & Cannon-Bowers, 2000). It does, however, require that each team member processes and filters raw data, applies expertise, communicates relevant information, and (appropriately) makes recommendations to others (Cannon-Bowers, Salas, & Converse, 1993). As well as coordinating and synchronizing their actions with teammates, SMMs also help individuals to predict their colleagues' behavior and needs (Kraiger & Wenzel, 1997; McIntyre & Salas, 1995). Recognizing that differences in mental models will result in greater process losses (via the reduction in team coherence), the implication of these points is that members of the golf team (i.e., player and support staff) must hold common and/or overlapping representations of task requirements, procedures, and responsibilities (Mathieu et al., 2000).

Of course, team members will not always agree on performance decisions. Indeed, some disagreement would seem essential if decision making is to be optimized (Bowman, 1998). Accordingly, Cannon-Bowers et al. (1993) suggested that complex tasks dictate that multiple mental models are shared amongst team members. For elite golf, and to aid optimal decision making processes, the most relevant of these authors' frameworks would appear to be the task, team interaction, and team member models. Task models describe and organize knowledge about how the task is to be best accomplished (e.g., pre-tournament logistical procedures, course management strategies, predicted problems and contingencies). Team interaction models describe the roles and responsibilities of team members, interaction patterns, information flow, communication channels, role interdependencies, and information sources. Finally, team member models contain information which is specific to teammates,

such as their knowledge, attitudes, preferences, strengths, weaknesses, and behavioral and emotional tendencies (Cannon-Bower et al., 1993; Mathieu et al., 2000). By addressing and optimizing each of these frameworks, it seems both logical and likely that the focus, functions, and interactions of the golfer and support team will therefore be enhanced. Indeed, and irrespective of the way which such SMMs are linked (e.g., communication processes, strategy, coordinated use of resources: Klimoski & Mohammed, 1994), it is imperative that a golfer is supported by individuals who share his or her performance models and who are also willing to positively disagree at crucial but appropriate moments.

Professional tournament golf poses a number of challenges including large periods of time which need to be filled between shots and holes (Bruce, 1998; Lavallee, Bruce & Gorley, 2004), distractions such as crowds and scoreboards, working with a support team before, during, and after performance (Lavallee et al., 2004), and controlling the breadth and direction of attentional focus over the whole performance (Hellström, 2009). Whilst Aitken and Weigand (2007) have suggested strategies such as conversation, music, games, and nutrition breaks to deal with distractions and fill the gaps before and between shots and holes to date no peer-reviewed studies have explored these. Furthermore, while some studies have considered the importance of a caddie in professional golf (Lavallee, 1998; Lavallee et al., 2004), no research has investigated how SMMs can effect team decision making and the attentional demands of their player. Finally, although research has shown that a narrow external focus of attention can be best for shot execution (Wulf & Prinz, 2001), no studies have explored the pre-requisite shifts in attention at the pre-shot planning and post-shot analysis levels, and how support team members, their SMMs', and the information they supply (or indeed hold back) can influence these shifts.

2.2.4 Micro (Pre-Shot) Level Routines

Whilst this chapter has highlighted the importance of both macro and meso-level processes (plus the input of a player's support team) in successful golf performance it is also important to highlight the impact that micro-level (pre-shot) routines may have on performance. Indeed, and as already discussed, much previous literature on psychological skills usage in golf has focused upon packaging these skills in to a pre-shot routine for use before shot execution.

Described as "a sequence of task-relevant thoughts and actions which an athlete engages in systematically prior to his or her performance of a specific sports skill" (Moran, 1996, p. 177) research across sports has demonstrated the potential benefits and impacts from using a structured pre-shot routine (cf. Cotterill, 2010). In the case of golf, Boutcher (1992) suggested five main benefits derived from the use of pre-shot routines, specifically: improving concentration by focusing on task relevant cues; hoping to overcome a natural tendency to focus on negatives; selection of the appropriate motor schema; prevention of 'warm-up' decrements; and the devotion of excessive attention to the mechanics of their automatic skill. However, whilst these outcomes would logically seem to improve performance results from studies which have investigated the effects of learning and implementing a structured pre-shot routine have been mixed (Boutcher & Crews, 1987; Cohn, Rotella, & Lloyd, 1990; Hellström, 2009; Kingston & Hardy, 2001). Therefore, it is important to investigate if and how other levels of performance (i.e., the macro and meso-levels) may impact overall golf performance.

2.2.5 Concluding comments

Currently research from other sports and non-professional golf can partly fill gaps in knowledge around the attentional demands of the whole golf performance, effective meso-level processes (pre and post shot), and the impact of team SMMs on performance. However,

in order to fully fill these gaps and move the understanding of professional golf performance forward empirical research needs to be conducted in to these areas.

2.3 A BEST PRACTICE STRUCTURE FOR FOCUS PATTERNING: WHAT IT OFFERED AND WHAT WE NEEDED TO KNOW

With multiple factors and multiple agencies involved from pre-tournament to pre-shot levels (the latter being when total control is held by the player: Lavallee et al., 2004), planning in professional golf is clearly a complex process. To facilitate the development of knowledge and practice in this critical yet unexplored area, and based on the models of Nideffer and Sagal (2006) and Kirschenbaum et al. (1998), Figure 2.1 shows the existing "best evidence" structure for the patterning of focus before and after a golf shot, before the programme of work described in this thesis was completed.

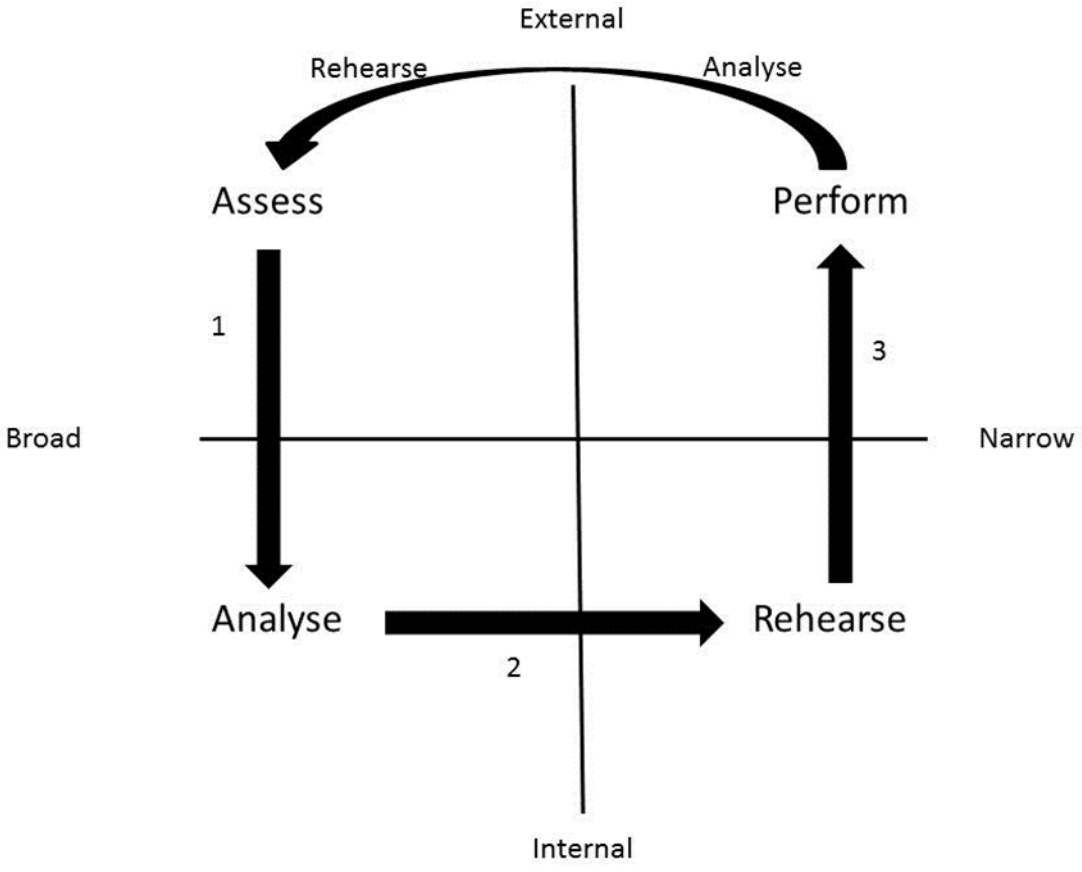

Figure 2.1 Extant best practice structure for focus patterning. Adapted from "Dimensions of Attention", by Nideffer & Sagal 2006 in J. M. Williams (Ed.), *Applied Sport Psychology: Personal Growth to Peak Performance,* p.384. Copyright 2006 by The McGraw-Hill Companies, Inc.
And "Smart Golf" by Kirschenbaum, D.S., Owens, D. & O'Connor, E.A, 1998, *The Sport Psychologist, 12,* p.271-282. Copyright 1998 by Human Kinetics Publishers, Inc.

As conveyed, arrowed lines 1, 2, and 3 show the patterning of focus for playing a golf shot put forward by Nideffer and Sagal (2006), a conception which resonates with other work discussed earlier in this chapter (e.g., Hellström, 2009; Kirschenbaum, 1997; Kirschenbaum et al., 1998, Thomas, 2001). However, this previous research does not answer a number of key questions relating to the patterning of focus *during a full round* of golf. For example, while Nideffer and Sagal (2006) propose that a player should start with a broad external focus for assessing the required shot (including wind strength and direction, distance to the flag, and the lie of the ball), what is not explained is *when* this information gathering begins, and *where* this information is gathered from. Notably, Lavallee et al. (2004) state that in some player-caddie relationships, the player merely asks the caddie for the distance to the flag whereas other caddies are far more involved in information gathering and decision making processes.

After assessing the shot, and as depicted in Figure 2.1, the golfer then moves to analyze the possibilities of how to play the shot. Nideffer and Sagal (2006) have stated that thoughts at this stage may include reflections on prior experiences in a similar situation against any changes in technique and equipment which the golfer has since made. Unfortunately, and once again, however, it is not clear where and indeed at what point the player shifts their attention during this process to gather relevant information. Following on

from the analysis stage, the player's attention is then proposed to shift to a narrow and internal orientation which supports rehearsal of the technique required to execute the shot effectively (Nideffer & Sagal, 2006). At this stage, responsibility shifts to the player and the caddie can (or should?) no longer have any influence (Lavallee et al., 2004). Finally, and as attentional focus literature suggests (Bernier et al., 2011; Wulf & Prinz, 2001), focus should then shift again to a narrow and external orientation to enable the most efficient execution of the skill (e.g. focus on a small, specific target).

Once a golfer has performed a shot, there appears to be a lack of consensus within the literature on exactly what they should then focus on and for how long. Interestingly, and suggesting that focusing for a whole round is not feasible given its lengthy duration, Tiger Woods (2001) has revealed that he allows himself 10 seconds to dwell on a previous poor shot (cf. the Fudge factor mentioned earlier) before focusing on the next shot. Indeed, Hellström (2009) has recently discussed the need for skilled golfers to plan and train for the ability to focus and refocus rather than engage a constantly "switched on" state. More realistic in this scenario therefore, and as suggested earlier in this chapter, would be the golfer undergoing a post-shot routine to "put away" a shot (be it good, bad, or indifferent), enter a period of relative relaxation, and then later switch back on for the next shot. As discussed previously, however, there has been no consensus within the golf and sport psychology literature of what thoughts, behaviors, and timings should comprise an effective post-shot routine.

Indeed, consider again Kirschenbaum's (1998) 4-F model which suggests the player's first course of action after hitting a bad shot is to swear (Fudge) before progressing to Fix the swing. However, in order to effectively fix the swing, the golfer will need to perform some level of assessment on the shot, including where the ball started in relation to the target, where it finished, its trajectory, and the quality of the strike (Jacobs, 1993). Only then can

the golfer work out if it was a swing fault that caused the poor shot or an error in decision making (e.g., choosing the wrong club). In an elite context, this is a process which could often involve the caddie, making yet more demands on the SMMs of the immediate support team. In this manner, a golfer's focus of attention should once again become broad-external to assess the reasons *why* they achieved (or suffered!) the given outcome (regardless of how good the shot was) but then become narrow-internal to rehearse the correct action and "fix" the identified fault before assessing the next shot (Kirschenbaum, 1997).

2.4 CONCLUSION

2.4.1 What next?

As identified throughout this chapter, there are a number of gaps which need to be filled in order to refine and validate any model for the patterning of attentional focus during a round of golf. Most significantly, it is necessary to develop knowledge of: (a) whether effective macro-planning can remove or reduce the need to attend to certain cues while playing (and thus decrease the attentional demands of a round); (b) the make-up of effective pre-pre and post-shot routines and how these meso-level processes affect shot planning and responses; and (c) how SMMs between the player and support staff affect shot planning and responses.

Considering macro-planning first, although the research of McCaffrey and Orlick (1989) outlined the macro-planning processes which elite golfers engage prior to competition, research has not addressed how such preparation may (and should) affect in-game attentional focus and meso-planning. For example, is it possible to remove the need to attend to certain irrelevant and/or detrimental cues while playing with thorough macro-planning? Secondly, while post-shot routines have been addressed in prior research (Finn, 2009; Kirschenbaum, 1997; Mesagno et al. 2015) no work has assessed their cognitive, temporal, and behavioral elements in professional golf. Accordingly, exploratory interviews which consider

performers' perceptions on each of these factors, including their links with shot outcome and execution of a following pre-shot routine, should prove worthwhile. Additionally, it would also be useful to assess the potential variability in post-shot routines as different shots afford a golfer more time to perform a post-shot routine than others. For example, a golfer who hits his/her tee-shot 250 yards into trees could have well over 5 minutes to reflect on his/her previous shot whereas a player on the putting green may only get 1 minute between his/her ball coming to rest and having to play again. Similar to the proposed merits of different pre-shot routines for different shots (cf. Cotterill et al., 2010), this should also tackle the important question of whether golfers should have different post-shot routines for different shots? Furthermore, future research should also outline how systematic and well-practised shifts in attentional focus within a post-shot routine can be used to aid planning for subsequent shots. To achieve this goal, "stimulated recall" protocols could be deployed which record golfers whilst they play and then interview them after performance to assess thoughts and behaviours at the meso-level of performance (Lyle, 2003).

Finally, this chapter has also outlined the potential importance of SMMs in player-caddie relationships and how this element could impact on shifts in attentional focus with respect to meso-level information gathering. Notably, as previous investigation has tended to focus on the basic structure of caddying and ways to enhance its utility (Lavallee et al., 2004; Mackenzie, 1997), only an unpublished study by Lavallee (1998) has focused on the role that caddies play in maintaining players' attention and collecting/providing pertinent shot information.

While players' collection of information may simply be a matter of personal preference or experience, a survey of the comparative use of caddies and other strategies, as well as the consequent outcomes which they support, would also seem desirable. Furthermore, consideration of which information gathering style to adopt should logically be

based on more than personal preference alone. This gap needs closing and could be initially achieved though non-participant observation of players and caddies followed by interviews using stimulated recall (Patton, 2002; Lyle, 2003).

2.4.2 Concluding Comments

The ability to effectively regulate attention over the full preparation and execution phases of golfing performance is a critical yet unexplored area. Significantly, as both macro- and meso-level planning processes shape and support in-game cognition, this broadened perspective on the allocation and patterning of attentional control carries significant promise for advancing golf-specific theory and practice. Under this perspective, the investigation of pre-event planning processes, the cognitive, behavioural, and temporal elements of routines *between* shots and holes, and the interactions of a golfer's support team will provide a more rounded and detailed picture of the demands and factors underpinning golfing success.

Reflecting these gaps and concerns, in Chapter 4 I begin to answer these questions from the perspective of elite golfers and support practitioners.

Chapter 3- The chosen research philosophy and methodology

3.1 INTRODUCTION

The aim of this chapter is to outline and justify the chosen philosophy and methodology for the programme of study. Specifically it will identify and explain the rationale behind the chosen philosophical approach and how that, along with the research aims, influenced and framed the methodological decisions made during the research process. The need for researchers (particularly in the area of Sport Psychology) to understand and locate their research within a specific philosophical paradigm (e.g., positivist, post-positivist, constructivist, interpretivist, post-structuralist, etc.) and understand the implications these approaches have on ontology, epistemology and the chosen methodological approach has received increased attention in the literature (Culver, Gilbert, & Sparkes, 2012; Krane & Baird, 2005; Sparkes & Smith, 2009). Reflecting these debates, my chosen research philosophy and subsequent methodological decisions adhere to recommendations made within contemporary literature.

The choice of philosophical approach was also influenced by a number of factors, namely: (a) my professional background as a PGA professional, coach, and coach educator; (b) the variety of opinions surrounding all aspects of golf performance; and (c) the lack of knowledge surrounding the area under investigation (cf. Chapter 2). Consequently, a pragmatic research philosophy was adopted. In order to illustrate how this approach impacted upon the thesis, I provide an overview of the pragmatic approach to research focusing specifically on its relevance to the topic area. Subsequently, details are provided on the methodologies used in the thesis contextualized against the pragmatic approach and the objectives of the thesis (cf. Chapter 1).

3.2 THE PRAGMATIC RESEARCH PHILOSOPHY

Pragmatism as a research philosophy traces its origins to the work of James (1907) and, more recently, Pierce (1984). It is a "philosophy of knowledge construction that emphasizes practical solutions to applied research questions and the consequences of inquiry" (Giaccobi, Poczwardowski, & Hager, 2005, p. 19). The pragmatic approach of finding practical solutions to applied problems also aligns with my style of coaching and educating. In fact a key driver for me in undertaking this course of study was to answer a question which arose from my desire to constantly seek practical solutions to issues I encountered in practice. In my time both playing and coaching golf, I began to question the relationship between time spent outside the pre-shot routine and performance, and what golfers should or should not be thinking and doing. Although suggestions and inferences could be made from existing research, I didn't feel that research clearly articulated how this could be best applied in a golf context to improve performance and provide an accessible model or processes for practitioners to use. Reflecting this gap between academia and the practical application of that knowledge, pragmatism has been championed as an alternative way to examine human behaviour in a sport context and bridge the gap between academic study and the practical concerns of practitioners i.e., sport psychologists, athletes, and coaches (Giaccobi et al., 2005).

Reflecting the viewpoint that pragmatism is an alternative way to examine human behavior there are a number of ontological and epistemological views which separate it from other research philosophies and thus make it an appropriate paradigm through which to investigate the objectives of this thesis. In the following section I explore and explain the ontological and epistemological views underpinning pragmatism by contrasting them with the philosophical assumptions of positivism and constructivism.

Ontology refers to the philosophy of the existence and nature of phenomena; generally this refers to questions about reality, what is real, and whether an objective reality exists independent of the researcher i.e. is knowledge measurable and observable (i.e., objective) or is it something that is experienced (i.e., subjective) (Creswell, 1994; Giaccobi et al., 2005; Jones, 2015). Epistemology deals with knowledge, its nature, source, and legitimacy (Giaccobi et al., 2005; Jones, 2015). Extreme positivism adopts the ontological and epistemological view that reality can be objectively measured and understood through the application of scientific methods which would remove influence from the researchers. Reflecting this stance, positivists believe that scientific findings are generalizable over time and in different contexts, thus making it possible to develop "truths" about the world devoid of social, cultural and historical context (Giacobbi et al., 2005; Lincoln & Guba, 2000). On the other hand, constructivism adopts the philosophical view that knowledge is subjective, individualized and context specific. In contrast to positivism, the existence of truths about reality are denied and, instead, the focus is on the social, historical, and value driven process of knowledge claims. Thus for constructivists, "reality" is constructed through the socially situated activities of people and communities (Giacobbi et al., 2005; Lincoln & Guba, 2000).

While the definitions presented above point to positivists and constructivists having dichotomous epistemological views (Lincoln & Guba, 2000), pragmatists argue that these viewpoints exist as different ends of a continuum and thus, the choice of which approach to take depends upon the research question and point of the research process (Giacobbi et al., 2005). Consequently, pragmatism places more focus on the implications of thinking or acting in one way other another. Thus, the main concerns for pragmatists are: (a) the extent to which shared knowledge can be generated; and (b) what shared behaviours can be facilitated from this shared knowledge (Morgan, 2007). Furthermore, as long as a study produces useful applied implications which make a difference to practice (Bryant, 2009), interaction across

paradigms is promoted. Therefore, in terms of this thesis, the pragmatic approach leads to a research programme which seeks player and support team perspectives (as per a constructivist approach and as seen in Chapters 4 and 5), in addition to examining the extent to which those findings are generalizable (as per a positivist approach and as seen in Chapter 6).

3.3 METHODOLOGICAL CONSIDERATIONS

Given that the pragmatic approach prioritizes methodological over philosophical issues and opts "for methods and theories that are more useful to us within specific contexts (e.g., answers to practical problems: Giacobbi et al., 2005, p.21)" the pragmatic approach to the programme of study influenced, and importantly did not restrict, the chosen methods. Additionally, and in line with the pragmatic approach, the research process used multiple methodologies in an iterative programme (Giacobbi et al., 2005) which focused on the evolution of thought and accumulation of knowledge (Corbin & Strauss, 2008). The following section details the broad methodological approach of the thesis whilst Chapters 4, 5 and 6 discuss and justify the chosen data collection methods for each study.

Reflecting the overall aims of the study, the thesis adopted a qualitative approach. However, in Chapter 5 the qualitative data is treated also treated in a quantitative manner, similarly in Chapter 6 quantitative performance data was collected to supplement the qualitative analysis. In regards to the qualitative approach this was chosen for Chapter 4 as this was ideally suited to my aim of exploring perceived best practice in an understudied area (Denzin & Lincoln, 2008). Importantly in this regard, qualitative study aims to develop a rich understanding of a construct's processes and qualities rather than its outcomes and frequencies (Denzin & Lincoln, 2008), and further aligns with the pragmatic approach through generating a useful map of the world as opposed to a correct one (Strean, 1998) which is context specific (Giacobbi et al., 2005).

Chapter 5 also adopted a qualitative methodology through the use of stimulated recall and follow-up semi-structured interviews (Lyle, 2003). This assisted me in understanding the processes by which events and actions occurred, and facilitated a unique, rich, perspective on thoughts and behaviors for each individual (Maxwell, 1996; Strean, 1998). However, in order to allow comparison of the use of meso-level processes between good and bad shots, the data were also treated in a quantitative manner. Specifically, frequencies were calculated on the number of times that each meso-level process was coded during the deductive content analysis. A chi-square test of independence was then applied on the reported use of meso-level processes for good and bad shots to determine if any significant dependence existed for the variable of shot outcome. The conversion of qualitative into quantitative data was deemed appropriate in this instance as it allowed me to examine differences in the reported frequency of the use of meso-level processes between shot outcome, in addition to any potential qualitative differences in the content of the processes. Although previous authors have argued that mixing research paradigms serves neither paradigm well (Andersen, Williams, Aldridge, & Taylor, 1996), and that placing a frequency count after a category of processes is tantamount to saying how important it is, in this case and given my aims, it was deemed appropriate whilst also aligning with the tenants of pragmatism by prioritizing methodology over a specific philosophical approach (Giacobbi et al., 2005; Krane, Andersen, & Strean, 1997).

Finally, in Chapter 6 a case study methodology was selected. Given the desire to identify if development of meso-level processes had a positive impact on performance, and adopting interventions unique to each participant this was deemed an appropriate approach (Jones, 2015; Stake, 2006; Yin, 2014). More specifically given the aims of the chapter, a multiple-case studies approach was deemed most appropriate (Stake, 2006).

In summary, a selection of 'horses for courses' was applied, though always grounded in research-based examples.

3.4 ADDRESSING TRUSTWORTHINESS

The trustworthiness of both data collection and analysis processes were addressed throughout the programme of study. In the following section, I report on trustworthiness issues associated with the main data collection and analysis methods (i.e., semi-structured interviews, stimulated recall, case study research, inductive content analysis, deductive content analysis, and thematic analysis) used in the thesis and how these were addressed.

3.4.1 Semi-structured Interviews

Given that the process and outcome of interviews are shaped by the levels of rapport and trust with participants (Sparkes & Smith, 2009), during the interview process these elements were addressed through: (a) prior investigation of all interviewees' careers to convey appreciation of their history and situation, including their current performance level and achievements to date; and (b) knowledge of and empathy with the various roles and demands in high-level golf due to my experience as a former University Golf Team member, PGA professional coach and player in PGA events. Throughout the studies undertaken, particularly high levels of rapport were evident, with participants often wishing to discuss contemporary issues in golf and contacting me for feedback on the overall results of the studies.

3.4.2 Stimulated Recall

Stimulated recall (SR) was used as the primary data collection method in Chapter 5 and as one of the data collection methods in Chapter 6. Consequently, its' use forms an important part of this thesis. Given the importance placed upon SR, it is important to note that this procedure is not without its disadvantages, especially if inappropriately deployed (for a comprehensive review, see Lyle, 2003). Consequently, the proposals of Gass and

Mackey (2000) were closely followed in order to increase the trustworthiness of the procedure. Firstly, the time delay between the event and recall was minimized. Specifically, interviews were carried out on the day of competition and no more than 30 minutes after the completion of play. Secondly, a threat to trustworthiness is the possibility that individuals create explanations between prompted actions and intentions (i.e., creating a priori theories to explain actions). To counter this, participants were informed that I was interested in their thoughts and behaviours at certain parts of the round but offered no indication as to why this was exactly the case. Finally, it was also important to ensure that questions and follow-up prompts and probes did not alter the cognitive process employed at the time of the event (Gass & Mackey, 2000). In order to fulfill this requirement, the interview guide required the participant to initially describe what they were doing, thinking, and feeling at specific points *before* secondly being asked to explain *why* they were behaving, thinking, or feeling that way. During this process, I strived to remain neutral, both verbally and non-verbally, as to whether the reported behaviours, thoughts, and feelings were positive or negative, thus aiming to decrease the chance that the participant would try to provide the "right" answers (Jones, 2015).

3.4.3 Case Study Research

Given that the case study in Chapter 6 was based primarily on the collection of qualitative data (i.e., from the exit interviews) Bassey's (2003) checklist was used to ensure trustworthiness in the data collection process. Firstly seeing each participant on a weekly basis enabled *prolonged engagement* with each case and helped to achieve *persistent observation of emerging issues*. Additionally, I used *triangulation* of data in an attempt to corroborate findings (e.g., the actual and perceived impact/s of the interventions), these multiple methods and regular contact with participants then assisted in obtaining a *thorough account* of the players' experience in the exit interview.

3.4.4 Data Analysis

Along with the data collection methods, trustworthiness of data analysis processes was also addressed. In regards to the inductive content analysis used in Chapter 4 (Côté, Salmela, Baria, & Russell, 1993), trustworthiness was addressed through the following steps. Firstly, constant comparison (Corbin & Strauss, 2008) ensured that interpretations were continually re-evaluated and reasserted. Further, a member of the supervisory team reviewed meaning units coded from an early interview and then assessed the labels given to meaning units from roughly 10% of all other interviews, including their fit with the overall thematic structure. In the few cases of different views, reflective and critical discussion took place until agreement was reached. To aid our awareness of our interacting assumptions and to provide a full critique of developing themes, another member of the supervisory team was also a *critical friend* throughout (Faulkner & Sparkes, 1999). Finally each participant was asked to check their transcribed interview, followed up by phone calls and emails, to discuss our interpretation of their quotes used in this chapter. This process revolved around gaining assurance over my accuracy, balance, fairness, and respect (Sparkes & Smith, 2009).

With regards to the trustworthiness of the deductive content analysis used in Chapter 5 (Biddle, Markland, Gilbourne, Chatzisarantis, & Sparkes, 2001; Krane, Anderson, & Strean, 1997), a similar process was followed. Additionally, however, and given the deductive nature of the analysis member checks were used with all participants to assess the extent to which they felt that their quotes represented the meso-level processes they were coded against.

Finally, in Chapter 6 Thematic Analysis was deemed the most appropriate method of analysis (Coolican, 2014). In order to facilitate within-case and cross-case analysis, the analysis was completed following the process recommended in multiple-case study literature (Stake, 2006). With regards to the trustworthiness of this process, similar processes to the

ones used in Chapters 4 and 5 were followed. In particular: a member of the supervisory team reviewing initial meaning units; critical discussion between myself and that supervisory team member in the case of differing views; the use of the second member of the supervisory team as a critical friend; and participants checking their interviews followed by discussion around my interpretation of their quotes used in the chapter.

Chapter 4- This is what we do with the rest of the day!

Exploring macro and meso levels of elite golf performance

4.1 INTRODUCTION

In Chapter 2 I highlighted that, despite the volume of research on psychological skills used in, and associated with the performance of golf skills, much of this has focused on the pre-shot routine and shot execution. However, given that these processes account for very little performance time whilst on the golf course (as little as 25%) it is surprising that more research has not addressed what golfers could or should be doing and thinking in the remaining 75%. Indeed, I suggested that more research was required on the cognitive, behavioural, and temporal elements of routines used between shots and holes. Additionally, in order to manage the attentional demands of the entire golf performance experience, investigation also needed to explore the critical role of the support team and pretournament planning.

Although some research was available to draw on, which allowed me to highlight two key meso-level processes (specifically pre-pre(pre^2)-shot preparation and the post-shot routine), plus suggest that that SMMs between the player and support team would be important in directing player attention at both macro- and meso-levels, much of this research was flawed in one way or another. Specifically, although some research had been produced in these areas, it was drawn from other sports or domains, was not empirically based and/or had not been submitted to peer review (i.e., it was mostly anecdotal in nature), or was deemed inappropriate for elite golfers. Consequently I argued that in order to begin to fill some of the gaps in knowledge, it was necessary to expand knowledge in both the macro- and meso-level processes in elite golf, including the influence of shared mental models between player and support team. Reflecting these shortcomings, I suggested that exploratory interviews be

conducted which considered performers' perceptions on each of these areas. However, in order to create a sufficiently rich and representative picture of these processes, I felt it was essential to explore opinions from not only golfers but also key stakeholders (i.e., caddies, coaches, and psychology support specialists) with experience of working with a number of golfers. Therefore, reflecting the desire to fill some of these gaps in knowledge, the purposes of this chapter were threefold. Firstly, I aimed to identify what was perceived to constitute effective planning at the macro-level (i.e., pre-round) of performance by elite golfers and support team members, including how this impacts on a golfers' attention at the macro- and meso-level of performance (i.e., the time between shots, including the lead up to the pre-shot routine). Second, I aimed to investigate what elite golfers are and potentially should be focusing their attention on at the meso-level of performance through the same multiple perspectives. Finally, I intended to explore if and how SMMs between player and support team were perceived to influence the golfer's attention and thinking at both macro- and meso-levels.

4.2 METHODS

4.2.1 Participants

Data were collected from 16 participants who included four professional golfers, four coaches, four caddies, and four psychology specialists. The majority of participants (two caddies, three players, four coaches, and four psychology support providers) were purposively sampled through personal contacts, with all additional participants recruited through snowball sampling (Frost, 2011).

All of the players held playing rights on tours across various levels. Specifically, one player held playing rights on the EuroPro Tour, one held a European Tour card, and two were members of the European Seniors Tour (one of these had previously played on the European Tour for over 20 years and had one victory). To be included in the study, players were also

required to have a minimum of 3 years' experience of playing professional golf. Players' ages ranged from 26-54 (M = 40, SD = 14.50) with experience as a full-time playing professional ranging from 3-29 years (M = 11.75, SD = 11.70).

For support team participants (i.e., the coaches, caddies, and psychology support providers), inclusion criteria required at least 5 years' experience working with professional players who had competed at national or tour level. Coaches were also required to be PGA qualified while psychology support providers were required to be educated to a minimum of degree level (two of the four were chartered sport and exercise psychologists through the British Psychological Society) and be working, or have worked with elite amateur or professional golfers. All of the support practitioners had worked in elite golf for between 5 and 27 years (M = 11.25, SD = 7.15 years), had experience working with multiple golfers (the least experienced had worked with four professional golfers), and were aged between 23 and 55 (M = 37.75, SD = 7.10).

4.2.2 Procedure

Prior to each interview, participants were sent information about the purpose of the study and a copy of the interview guide (see Table 4.1). Based on my pragmatic approach (Giacobbi et al., 2005) and the study's explorative nature, this guide consisted of open-ended questions that elicited responses on broad areas of relevance informed by the literature and my own applied experience. Specifically, these questions firstly addressed attentional focus over the course of a tournament (including pretournament, pre-shot, post-shot, in between shots and holes, and post-round). More specifically, example questions included: What do you/what do you want your players to focus on before a tournament, a round, and a shot? What do you/what do you want your players to focus on after a shot? Is there a preferred sequence or series of steps? Is there a rhythm to this per shot, hole, or round? What support do you get/give during a tournament and round? The interview then secondly sought to

identify if and how players prepared for required shifts in attention, strategies employed while playing to effectively shift attention, and the variability of attentional focus (e.g., any differences in what players focused on when playing well versus poorly). Here, example questions included: Do you train or practice for shifts in attention or focus and refocus? If so, how? What strategies do you employ or suggest to shift attention correctly whilst playing? Do these processes vary? If so, when and how? Built around these core questions, follow-up probes and prompts were also developed to clarify and elaborate on key points and to support consistency across participants in terms of topics covered (Patton, 2002). However, these probes were different between participant role reflecting their differing expertise and inputs. Pilot interviews were carried out with one PGA professional (a full-time player) and one PGA coach to assess the content, clarity, and coherence of the interview guide (no changes were made from this process). All interviews were then conducted at a convenient place and time (in most cases, the facility where each participant worked) and, following introductions and preliminary 'warm up' conversation, lasted between 30 and 60 minutes (M = 41, SD = 8.20). Ethical approval was granted, confidentiality assured, and informed consent given by all participants.

Table 4.1 Interview Guide

1. Attentional focus over the course of a tournament

QUESTION	PROBE	AIM – WHAT AM I INTERESTED IN
What do you focus on/what do you want your players to focus on through the course of a round? What support do you get/give during a round (tournament)? How do you use this? Is there a series of steps/preferred sequence? Is there a rhythm to this per shot, hole, round?	• Pre-tournament • Pre-shot • Post-shot • In between shots/holes • Influence of caddie (SMMs)	**How attention shifts and what players focus on from a macro (pre-tournament) to a micro (pre-shot) level including times periods in between.** **Influence of support team.**

2. Strategies to shift attention whilst playing

What strategies do you employ/suggest to shift attention correctly whilst playing?	• Any differences between different shots i.e. post-drive vs. post-putt • After a good shot vs. after a bad shot. • At what point do you start planning for the next shot? • Coping with distractions e.g. crowd, score, playing partner.	**What strategies are employed during playing from both the player and caddie to shift attention correctly i.e. not dwell on bad shots/holes.**

3. Influence on variability of attentional focus

How does this process vary and when?	• Specific examples • What influence can the caddie have during the round? • When playing well, badly, under pressure, different shot types, rhythm of hole/round.	**What effect if any controlling attentional focus has on performance.**

4. Training for shifts in attention

Do you train/practise for shifts in attention (or focus/refocus)? If so how?	• MST • Integration with practice or stand alone • Specific examples	**If players train for the required shifts in attention and how they do it.** **Coherence between what players do and what the support team suggest they should do.**

4.2.3 Data Analysis

Given the lack of prior research in the focal area, an inductive content analysis was deemed appropriate (Côté, Salmela, Baria, & Russell, 1993). This analysis followed three key phases: preparation, organizing, and reporting. In the preparation stage, interviews were transcribed ad verbatim then emailed to each participant to ensure that the answers given at interview accurately and fairly represented their views; no changes were requested through this process (Sparkes & Smith, 2009). Following this, each transcript was read several times to optimize familiarity and understanding (Côté et al., 1993). In the organizing phase, qualitative analysis software (QSR NVIVO 10) was used to transform raw data units into thematic hierarchies. This process involved grouping data into themes (named using content-characteristic words) and constantly comparing these themes and their constituent data to establish distinct factors (Corbin & Strauss, 2008; Côté et al., 1993). This abstraction process continued as far as possible without losing the overall meaning of themes. Finally, higher order themes were generated to provide an overall account of the data.

4.3 RESULTS

The aims of this chapter were to: (a) identify what constitutes effective planning at the macro-level (i.e., pre-round) in elite golf and how this impacts on golfers' attention at the macro- and meso-levels of performance; (b) investigate what elite golfers are and potentially should be focusing their attention on at the meso-level of their performance; and (c) probe if and how SMMs between the player and their support team influenced golfers' attention and thinking at macro- and meso-levels. Table 4.2 shows the processes and actions of players and their support teams at both macro- and meso-levels, as well as their perceived impact on the focus and nature of player attention. While not a primary focus of this study, Table 4.2 also details the perceived impact of macro- and meso-level processes and actions on other reported psychological factors.

Table 4.2 The Processes and Actions of Players and Their Support Teams at the Macro-Level and Their Perceived Impact on the Focus and Nature of Player Attention

	Impact	
Player and/or Support Team Processes and Actions	**Impact on the focus and nature of player attention**	**Impact on other psychological factors**

Macro-Level
• Preparation of course strategy
  • Caddie arriving before the first practice round to begin preparation[1]
  • Testing and tweaking course strategy[2]
  • Preparing for course specific challenges[3]
  • Contingency strategies[4]
• Support team carrying-out off-course tasks for the player[5]
• Consistent preparation routine[6]
  • Mental Rehearsal[7]
  • Consistent arrival day[8]
  • Consistent volume of preparation work[9]
• Support team reinforcement of player abilities and approach[10]
• Development/refinement/rehearsal of meso-level routines[11]
	Macro-Level
	• Managed cognitive load[5]
	• Sole focus on golf performance over logistics[2 5 6]
	• Consistency of thoughts and behaviours[6 8 9]
	• Focused on golf for the appropriate amount of time[6 8 9]
	
	Meso-Level
	• Managed cognitive load [2 3 4 9]
	• Reduced need to plan and execute unfamiliar shots in play[3 4]
	• Reduced ad hoc decisions made in play [2 4]
	• Staying in the present[11]
	• Limited internal and external distractions[11]
	• Limited past and future thinking[11 17 25]
	• Shot information collected systematically[11]
	• Relevant shot information processed[11]
		Macro-Level
		• Optimised confidence[1 3 4 7 10]
		• Minimised performance anxiety[3 4 7 10]
		• Increased feeling of preparedness[1 2 3 4 6]
		• Decreased chances of mental fatigue[6 9]
		Meso-Level
		• Minimised performance anxiety[2 4 7 10]

Table 4.3 The Processes and Actions of Players and Their Support Teams at the Meso-Level and Their Perceived Impact on the Focus and Nature of Player Attention

	Impact	
Player and/or Support Team Processes and Actions	**Impact on the focus and nature of player attention**	**Impact on other psychological factors**

• **Post-shot Routine**
  • Reaction[1]
  • Reflection and Reasoning[2] (and Rehearsal[3])
  • Confirmation/revision of mental models[4]
  • Acceptance[5]
  • Neutralize[6]
• **Pre[2]-shot routine**
  • Bringing attention back to golf[7]
  • Collecting, receiving, and processing shot information[8]
  • Consideration (and adaptation) of the course strategy[9]
  • Committing to a decision[10]
• **Caddie contributing to meso-level processes**
  • Caddie managing the performance environment[11]
  • Caddie knowledge of the player and their game[12]
  • Caddie contributing and discussing shot information[13]
  • Caddie helping the player to switch on and off from golf[14]
	• Managed cognitive load[11 12 13 14]
	• Staying in the present[5 14]
	• Limited internal and external distractions[6 11 25]
	• Limited past and future thinking[6 14]
	• Unpacked reasoning behind a good/bad shot[2]
	• Swing thought/feeling provided to take in to the next shot[3]
	• Updated information for planning of next shot[4]
	• Attention focused on golf at the appropriate time[6 7 14]
	• Shot information collected systematically[8 9]
	• Relevant shot information processed[8 9 13]
	• Focused discussion with caddie[8 9 10 13]
		• Regulation of emotions[1]
		• Increased acceptance of previous shot[2 5]
		• Committed decision made before pre-shot routine[10]
		• Optimised confidence[10]

Reflecting the order of events at a golf competition and the aims of this chapter, identified macro-level processes and actions are presented first. This is then followed by key meso-level processes and actions before evidence on the impact of SMMs. Quotes from players are denoted by "PL", coaches by "CO", caddies by "CA", and psychology support providers by "PS".

4.3.1 Macro-Level Processes and Actions

Five key themes were found in relation to macro-level (i.e., pre-round) processes and actions that were perceived to positively impact on player attention. These were: *preparation of course strategy, development/refinement/rehearsal of meso-level routines, support team carrying out off-course tasks for player, consistent preparation routines,* and *support team reinforcement of player abilities and approach*.

I deal first, and primarily, with preparation of course strategy due to its perceived scale of impact during competition (or at the meso-level) and the frequency on which it was discussed.

Preparation of Course Strategy

All participants noted the role that thorough preparation of course strategy had in shaping the focus and nature of player attention during competition. Unsurprisingly, team members had varying inputs on the preparation of course strategy, based on the player's needs and team dynamics. For example, often the coach, caddie, and psychology specialist were all involved in this process, whereas sometimes this was carried out by the player and caddie, or just the player. Despite the different contributions from team members, there was consensus that a key job ahead of an event was to prepare the strategy that would be focused on during play; thus giving the golfer a more holistic focus during their pre[2]-shot routine:

> [Before the tournament we work on] . . . where they want to be hitting from the tee, so looking to focus on an area and what club they require to hit to that area. [So the

> focus is on working out] a specific yardage and putting plans in place so that they've got an opportunity to focus on [pre-planned] golf shots [during competition] rather than technical thoughts of where their golf swing is (CO1).

Reflecting upon the use of the pretournament strategy in play, players and caddies also noted how this up-front plan would be used to consider how they should navigate certain shots and factors such as "no go" areas, hazards, and slopes. Having recognized and evaluated these factors before the tournament started, the player's cognitive load during play was therefore proactively managed; thus helping the player to make "cleaner" in-play decisions:

> [The pretournament plan] gives them a focus [in play] . . . Get it to that area and then once they approach that area they then can go, "right, ok, I know which area I need to put this in [next] for certain pin positions". So [due to] the preparation, a percentage of it [i.e., the meso-level thinking and acting] is done (CO1).

A major part of preparing the course strategy involved the *caddie arriving before the first practice round to begin preparation*. As well as optimizing the accuracy of the final strategy – through the caddie adjusting for "at the event" or "on the day" contextual factors (e.g., course conditions) – this also allowed the player to then use practice rounds for *testing and tweaking course strategy*. Indeed, players widely felt that such fine tuning was their primary aim in practice days; important in that they would then have a clear aim for each shot and, as a result, be less likely to have to make ad hoc decisions in play. In short, they were certain of the shots that they were likely to hit on each hole before the round had started, thus allowing them to channel attention on the most appropriate things at the most appropriate time while keeping resources in reserve to handle the dynamic demands of competition (e.g., changes in weather, having to chase a score, and not hitting the optimal target with their shots). Importantly, this process was not wholly prescriptive (e.g., having written down what

club to hit from each tee) but involved picking out certain predetermined areas to hit to on each hole:

> I will know that I will have to hit it in certain areas. . . . I will try to pick gaps and plot my way around [during the practice days]. . . . . [Then] on the day I'll pick the club to hit that area . . . . [It means] I will roughly know what club it is going to be; obviously I don't know exactly until I get there, but I have a pretty good idea (PL3).

Supporting this process, a psychology specialist (PS1) described how the plan could then be "condensed down" in to "one sentence on [each hole with] how to get to the green and create a chance, [with] the key words highlighted in red". This would then be placed on a laminated card and given to both the player and caddie for reference during the round.

A further aspect of reported importance was *preparing for course specific challenges*; a process that could start in the weeks building up to an event. Similar to the impact of the caddie's advanced planning of the course strategy, such specificity helped to reduce the need to plan and execute unfamiliar shots in play (as well as optimize confidence in one's ability to perform anticipated shots). PL2 believed that this process should be continued up until teeing off: "on the range, again it will be what we are going to face so obviously we go through the shots required [on the course]". This was supported by CO4 who felt that a warm-up should involve "a physical warm-up, some kind of swings to loosen up, then from that point forward you really want to be hitting the type of shots you are going to have to play". To reiterate, a primary aim of this process was to have identified and practiced the type of shots required for the course so that "on the spot" decisions were minimized in play. For example, participants suggested that this could be aided by playing the first four holes on the range: "You know the shots you are going to face [from pretournament plans] . . . so if the first is a par 5 we'll hit driver, 3 wood, and a wedge" (PL2). CO4 also felt that ecologically-valid practice was vital, including hitting in different directions on the range to simulate different wind conditions.

As the final sub-theme in preparing course strategy, participants discussed the important role of *contingency strategies*; in other words, knowing why, when, and how the strategy may change. Any decision to alter the pretournament plan was based on two main factors: a player's standing in the tournament or weather conditions. For example, a player's position in the event shaped how aggressively or conservatively they approached "risk and reward holes", with most preparing for both eventualities: "I will play two balls [in practice rounds] and play the safe and the aggressive options . . . and see how they actually work out" (PL3). PS4 suggested that one's standard of play on the day could also be a deciding factor for the risk and reward balance. As such, it was important to have considered both variations of strategy (i.e., the aggressive and conservative shots) to make it easier for players to make shot selections in play; once again emphasizing the importance of planning "up front" for the management of attentional resources during competition:

> [There may be] two options off the tee, one option might be to be aggressive and hit driver, the other option might be four iron in to position . . . . If they are hitting their driver well [on the day] then they will probably hit driver, [but] if you are not quite feeling confident then at least you have the backup plan [i.e. four iron for position]. Sometimes the backup is more important than the plan for when you are ripping it, that's the thing that keeps you in the tournament. (PS4)

As noted above, participants also felt that environmental factors (especially wind conditions) needed to be considered. For example, while preparing for the Senior Open, PL4 stated:

> If there is no wind [then] certain bunkers might be in play so you hit a two iron; if it is down wind you can knock it over them with driver, or into the wind you can't reach with driver . . . I had got a feel for the course off the tee [so] I was quite comfortable [in the event] with how I was going to play [each shot].

Once again, therefore, the macro-level planning for variations in strategy before play was felt to manage cognitive load at the meso-level of performance, as well as direct attention to the most relevant factors at any given point in a round.

Development/Refinement/Rehearsal of Meso-Level Routines

In addition to tournament specific preparation, participants discussed how macro-level time periods were used for the development, refinement, and rehearsal of meso-level routines specifically the processes, thoughts, and behaviours used before and after shots. Carrying out this process before the start of a tournament was felt to have a number of benefits to golfers at the meso-level of performance when competing including: assisting players in staying in the present; limiting internal and external distractions; limiting past and future thinking; allowing shot information before a shot to be collected in a systematic manner; and ensuring that once the relevant shot information has been collected that it was correctly processed before arriving at a shot decision.

CO2 discussed the work he would typically see his players doing before a tournament with sport psychologists and how practicing meso-level routines would assist players in rehearsing the management of their attentional focus at the meso-level of performance:

> The players will typically work with a psychologist and they will work on their routines on the range as well [as on the course]. So we go through the pre-pre-shot routine [the decision making before a shot] and pre-shot routine [practice swings and preparing to execute the movement] and hit a series of shots literally working on the mindset and focusing on the correct things in the correct sequence.

Practicing the pre^2-shot routine (i.e., the decision making routine before the pre-shot routine) was considered an important element of macro-preparation as this allowed players to practise their thinking time as well as the golf swing and thus more closely replicated what

they would be expected to do at the meso-level of performance. Specifically PS4 described how he preferred players to practice before a tournament:

> I encourage them after every shot to step off the [driving range] mat. . .that breaks the practice up and makes each shot individual when they are off the mat I want them to consider every shot like they would do on the course then step on to the mat when they are ready to play. . .it is important to practice the mental skills and processes as well as the golf swing.

To reiterate, macro-level development, refinement, or rehearsal of meso-level routines was felt to assist players in directing their attention in the correct manner at the meso-level of performance.

Support Team Carrying Out Off-Course Tasks for Player

As well as the specialist support relating to their area of expertise support team members at times were also required to carry out logistical, off-course tasks for the player. The perceived benefits of this for the player were management of their cognitive load at the macro-level (i.e., they had less things to think/worry about) and allowing them to focus their attention solely on preparing to perform. This was illustrated by CA1:

> I'm there to support him [the player] to focus on his golf, that's his job. . . . so for example he might be wanting to have his clubs re-gripped and that might mean you have to hang around a few hours for them to be ready, or if he is after a new shaft that is delivered at 4 [pm], he's gone at 12 [pm] so you're the one staying.

The carrying out of activities away from the course for the player also included activities such as: "marking the expected pin position for the week on the course planner" (CA2); "condensing the pre-tournament strategy in to one sentence per hole which is then placed on a laminated card, and given to the player" (PS1); or just taking care of any off-course duties that allowed the player to concentrate on their preparation, for example: "if he needs

something doing, like passes being sorted out for friends or family one of us in the team will go and do it, he's there to play golf and concentrate on preparing as best he can" (CO1).

In this case the support team practitioners felt that in addition to their expected role specific duties, part of their role within the macro-level preparation was to support the player in anyway necessary. Removing administrative tasks from the player reduced their cognitive load (i.e., there were less things for them to think about) and allowed them to focus solely on preparing for their performance.

Support Team Reinforcement of Player Abilities and Approach

One macro-level process that was felt to not have an impact on player attention but still have an impact on other psychological factors at both the macro- and meso-levels was the support team reinforcing players abilities and approach. This process was adopted by all support team members, with the exact process and content varying depending upon support team role. The main perceived benefits of this process were to optimize player confidence and minimize performance anxiety. Coaches in this sample were typically concerned with reinforcing swing thoughts/feeling which had been worked on away from the tournament, as CO1 stated:

> You just have to tell them that all the hard work has already been done, at a tournament you don't do anything new, unless something is drastically wrong, you are just reinforcing the work you have done away from the tournament.

Whereas psychology specialists tended to reinforce players' use of psychological skills such as: "routines, commitment, focus, imagery, really reinforcing those key skills" (PS4). On the other hand caddies, possibly because of the amount of time spent with the player or unavailability of other support specialists, would give reinforcement in to a variety of areas such as: "swing technique if he is struggling. . . his coach can't be there all the time so I will sometimes have some input" (CA4); "putting because he couldn't get it up to the hole last

week. . . so had no confidence at all. So yeah, I worked with him on this putting" (CA2); or course strategy: "ultimately he's the boss so what he says goes, we will chat about it and I'll have my input but ultimately if we disagree I will back his decision" (CA1).

Consistent Preparation Routines

Underpinning these macro-level processes was the requirement for the preparation routine to be as consistent as possible. The three main elements that participants felt should be kept consistent were the use of *mental rehearsal, arrival day,* and the *volume of preparation work.* A consistent preparation routine allowed player attention at the macro-level to be consistently focused on the right things (i.e., preparing to play their best) at the appropriate time. Reflecting on the changes in preparation he has seen over 25 years of caddying CA3 felt that:

> Golfers have changed, they are much more professional and regimented, when I started [25 years ago] you [the player and caddie] would travel on the Tuesday morning, play Tuesday afternoon. The golfers would then go out and have a pint or two Tuesday night then play the pro-am on Wednesday. They don't do that anymore.

However, reflecting the importance of consistency in any professional preparation routine CA2 revealed how golfers he had caddied for would change their arrival day and the volume of preparation work carried out for more important events, and the effect that had:

> When preparing for the majors? For most of them, totally different, overkill. For XXXX and XXXX [both European Tour winners] I found they arrived too soon and played way too much sometimes between 36 and 54 holes before the tournament starts. Trying to take in too much and ending up taking in very little. . . then come Friday they are mentally and physically drained.

He went on to describe the routine of the player he currently caddies for, an experienced, major champion:

> Now he will focus on his golf when he is at the golf course, but what he learnt over the years, he's 45 now, is to ignore the pristine driving range and stacks of golf balls. When he's done his work he'll go to the hotel room and Skype the family. . . . a lot of the new guys on tour can't do, they never switch off.

One final process which was thought to be important to a consistent preparation routine and which had a positive impact on psychological factors at both macro- and meso-levels was the use of *mental rehearsal*. This was felt to optimize confidence and minimize performance anxiety. For example, and reflecting the functional equivalence of imagery, macro-level mental rehearsal of playing the golf course to the course strategy helped to minimize performance anxiety at the meso-level "because you're standing on the tee and if your mental rehearsal has been good then you've already successfully played this shot many time" (PS3). Additionally at the macro-level this process could optimize player confidence as PS1 described: "when you prepare the course strategy it's important to visualize yourself performing it successfully. . . then when you get to the first tee you're full of confidence in that plan".

To reiterate, a player's preparation routine will impact on both their attention at the macro-level and other psychological factors at both the macro- and meso-levels. Consistency of the preparation routine is important in supporting consistency of thoughts and behaviours, and maintaining focus on golf for the appropriate amount of time during tournament preparation.

4.3.2 Meso-Level Processes and Actions

Addressing the second aim of this chapter, three themes were found in relation to what players are or should be focusing on at the meso-level of performance (i.e., the time between shots and holes, including the lead up to a pre-shot routine). These were a *post-shot routine, pre*^{2}*-shot routine,* and *the caddie contributing to meso-level planning processes*.

Post-Shot Routine

When asked what should be done after a shot in competitive play, participant responses coalesced around five sub-themes. Firstly, participants described how immediately after a shot they would expect some kind of *reaction*, especially if the shot was a bad one. This ranged from "a lot of that [slamming the club] into the bag or club thrown at the bag" (CA3) to "twirling the club after a good shot" (CO2). PS1 also felt that this instant response was useful: "get a reaction, whether it is anger, technical; get shut of that reaction from the last shot". In sum, dealing with emotion, whether "positive" or "negative", was perceived to allow golfers to direct their attention appropriately later in the post-shot routine.

The second step of the post-shot routine related to considering the reasons behind the shot outcome. Highlighting the permanence of this *reflection and reasoning* process, CA4 noted: "there will always be a post-mortem after a shot whether it is good or bad". Further, CA4 described how caddies often aided the post-shot analysis; something which also helped to develop player-caddie understanding and support latter stages of the post-shot routine:

> Sometimes he will hit a shot that might end up really well but he will say "I took a little bit [of distance] off that" . . . . [It will have been a] club that we have talked about and agreed but inside his head he has thought "I will take a little bit [of distance] off it" . . . . Wherever the ball has ended up we will discuss [the shot].

Unsurprisingly, a similar process was described after poor shots; for example, PL2 reported that "we might have a little chat about it; say if . . . it was probably the wrong club to hit". For some players, but certainly not all, identifying the reasons for a poor shot led to rehearsal of a corrected swing; although all agreed that competition "was not the time to disassemble the golf swing" at the expense of having "one thought or corrected feeling" (CO4).

After reflecting on a shot, participants commonly discussed the *confirmation/revision of mental models* to assist in planning for subsequent shots. This included directing attention

towards how well the player was striking the ball, the distance the ball is travelling, or other environmental factors such as how far the ball is running on the ground or the strength and direction of the wind. CA4 offered an example of such alteration in work with a new player:

> Sometimes he will hit a shot that might end up really good but he will say "I took a little bit off that" and that was what we are working on [in our discussion post-shot], because he will hit a club that we have talked about and agreed . . . . [Understanding how he plays] is still a learning curve . . . . Wherever the ball has ended up we will discuss it and how can we improve it [i.e., our decision making] going forward.

Once mental models had been confirmed or revised, the next element of the post-shot routine was *acceptance* of the shot outcome. The purpose of this stage was to help the player move on from the previous shot (whether good or bad) and keep their attention in the present. As CA1 stated: "I've seen players two holes down the line and they are still hitting bad shots because they are thinking about that [last bad] one". Similarly, PS4 felt that acceptance was vital in moving on from previous shots: "if you have hit a poor shot one of the factors I want them to have is acceptance . . . if you can't accept it you can't move on" (PS4).

Participants then discussed how the final element of a post-shot routine should be for players to *neutralize* their focus and dissociate from performance. This was perceived to help protect the player from overthinking past or future events; in short, getting lost in outcomes, evaluation, and uncertainty. Indeed, PS4 felt that it was important to focus on "anything but the performance" after a shot. This was supported by CO4:

> While you are sort of not engaged directly in the shot or preparation for the shot it's nice to leave the [mental] competitive zone. Then you are not dwelling on things which have happened prior, or trying to sort of second guess what is coming up, or what you need to be doing, or what so and so is doing, or if you need to shoot a certain score. I think that works more efficiently.

Notably, all participants felt that the ability to dissociate from performance between shots and holes was aided by the caddie: "My caddie is quite good in that sense . . . . He's very chatty, quite loud, thinks he's quite funny, he'll just go off on one and tell a story" (PL2). Indeed, filling time between shots and holes with conversation with the caddie was perceived to help limit the influence of irrelevant distractions associated with competing in elite golf. It is at this time where CA4 believed caddies "make their money":

> If we don't speak [between shots] and he is thinking about 'if I hole this [putt to make a birdie]' I will be three behind', it is really important to get them totally away from the golf course. What did they do last night? What are they doing on their week off? . . . It is really important to get them to switch off otherwise I imagine by the time they get to [the] 9[th hole] they would be absolutely [mentally] obliterated.

Pre^2-Shot Routine

Following the post-shot routine, participants reported on a process to return from a dissociative focus and move back into planning for the next shot (i.e., before starting their pre-shot routine). Termed in this study as the *pre^2-shot routine*, the first part of this process was *bringing attention back to golf* at the appropriate time. There was consensus that the pre^2-shot routine should begin sometime before the player arrived at the ball but not necessarily triggered by a rigid distance. Indeed, while some were slightly more specific than others (e.g., "I would want someone to start maybe 20 yards behind the ball": PS2), the exact starting point varied in relation to factors such as player and support team preference or the perceived challenge of the next shot. For example, if the ball was in the trees rather than the fairway, then the routine and decision making process may be started earlier. Offering some general guidance, PS4 suggested that a good starting point for the pre^2-shot routine may be when players have split from their playing partners and informal conversation has ended; at this point, players might then enter "your own little bubble, I call it a shot bubble sometimes .

. . . My only focus [now] is to make great decisions here and execute with commitment".

Once the player's attention was back on their performance, participants felt that they should then focus on *collecting, receiving, and processing shot information*. This systematic process was felt to ideally start before the player reached the ball and could include: walking past distance markers, assessing the lie, sighting the target, and feeling the wind strength and direction. At the ball, players then received further information from the caddie based on a *consideration and adaptation of the course strategy* developed pretournament**.** Indeed, due to the dynamic nature of tournament golf, no amount of up-front planning could remove the need to adapt a plan on at least some occasions; such as responding to changes in the weather. Beyond the level of individual shots, participants also reported that such adaptation could be more complex and may involve changes to the strategy for a number of holes, especially if "you are coming close to the cut line, or you have to attack or defend" (CA3).

As the final part of the pre^2-shot routine, participants commonly described the value of *committing to a decision*. Indeed, while the caddie had considerable influence throughout the pre^2-shot routine up to this point, responsibility for the shot in this finally stage shifted entirely to the player. Accordingly, the caddie's role was felt to become one of optimizing the player's confidence, even if they did not entirely agree with their decision: "he's the boss . . . [and will make all every final call] "unless it was suicidal" (CA3).

Caddie Contributing to Meso-Level Processes

The third aim of this chapter was to identify if and how SMMs between golfer and their support team influenced attention at macro- and meso-levels. As suggested by many of the quotes presented thus far, the greatest impact of SMMs was found at the meso-level between players and caddies. Indeed, these quotes have indicated how such SMMs contributed to players' decision making, particularly in the pre^2-shot routine and the reflection and reasoning part of the post-shot routine. As such, the Results section is

concluded by providing a description and supporting quotes for the remaining themes listed under *caddie contributing to meso-level processes* in Table 4.2.

One of the most impactful actions of the caddie on player attention at the meso-level was *managing the performance environment.* Specifically, participants described how the caddie carried out tasks such as management of the crowd, being aware of the pace of play, and being aware of scoreboards; all working to manage the player's attentional focus and load. Regarding the latter, team member mental models were important in underpinning how and when caddies used scoreboard information. For example, the general consensus was that players should "ignore leader-boards as it doesn't do them any good" (PS2). Team member mental models therefore allowed players to task the caddie with assessing leader-boards and trusting them to decide when to supply information about one's standing in the tournament:

> For me, if you get to the 18th tee and you have a two shot lead on a par five you'd just hit an iron off the tee wouldn't you? That would be my job [i.e., to know the position in the tournament] and point that out.

Participants also revealed how caddies helped to manage the player's attentional focus and load during play by *contributing and discussing shot information* in the pre-shot routine. Underpinning this process was *caddie knowledge of the player and their game.* As suggested by the earlier quote on a caddie helping a player to neutralize their attention, it was noted how established team member and task mental models could help players to think more effectively during meso-level phases; in sum, the caddie, to some extent, already knew what the player was thinking and could thereby streamline their thinking and decision making processes:

> I know what he is thinking . . . . If I get to the ball before him and . . . it's for instance 181 to a back pin with a tiny bit of [head] wind I know straight away he's going to want to hit 6 iron and I know a little 6 iron going through the wind with no spin is going to go over the green. Seven [iron] probably won't get [all the way] there. So I

will change it [i.e., the distance given to the player] from 181 to 178; it's only 3 yards different but in his mind 178 is so much less than 181 and he will hit a 7 iron [to avoid going over the back of the green] . . . I know the way he plays and the way he thinks.

4.4 DISCUSSION

4.4.1 General Discussion

The aims of this chapter were threefold. Firstly, I aimed to investigate views on what constitutes effective planning at the macro-level in elite golf and how this impacts on golfers' attention at the macro- and meso-levels of performance. Secondly, I sought to explore what elite golfers are and potentially should be focusing their attention on at the meso-level of their performance. Finally, I intended to explore if and how SMMs between the player and their support team influenced golfers' attention and thinking at macro- and meso-levels.

With regards to the first aim, McCaffrey and Orlick (1989) previously highlighted the importance of pretournament planning in golf, including the development of course strategy. As identified in this study, the processes and actions in Table 4.2 extend McCaffrey and Orlick's points and offer guidance on specific elements and stages of macro-planning. In particular, the results outline key logistical considerations, guidance for developing, testing, and tweaking course strategy, and the roles and responsibilities of team members. As well as contributing to positive effects pretournament, macro-planning also had a notable impact at the meso performance level; the most common being management of the player's attentional focus and load in play. Indeed, by considering factors like distances, target areas, hazards, slopes, and any contingencies up front, as well as practising anticipated shots and scenarios in the lead up to the event, this approach was deemed to allow players to manage their attention, in part, through clear objectives and expectations. On a theoretical level, Attentional Control Theory (Eysenck, Derakshan, Santos, & Calvo, 2007) would posit that macro-level activities can allow for dominance of the top-down, goal-directed attentional system instead of the

bottom-up, stimulus-directed system during play. In other words, effective macro-preparation can provide players with a continual set of goals to work against over their whole round; thus promoting a task focus and the central executive's ability to inhibit and return attention from threat-related stimuli. Consistent with prior research, freeing up attentional resources by managing cognitive load was felt to allow golfers, when required, to use the stimulus-driven attentional system to selectively focus on important task-relevant and situational factors (e.g., weather or standing in the tournament: Corbetta & Schulman, 2002; Eysenck et al., 2007).

As well as optimizing resources for in-play thinking, effective macro-planning was also felt to support appropriate focus during execution phases. More specifically, by already being familiar and comfortable with adaptations to shot selection and technique *ahead* of the event, the lure of consciously tweaking technique could then be limited and a more holistic focus promoted throughout performance. Indeed, participants revealed that their macro-plans informed many aspects of their pre^2-shot routine; something which has been overlooked in prior research (e.g., in the *plan* element of the *PAR* model: Kirschenbaum et al., 1998). In short, consideration and adaptation of the macro-plan during shot preparation (i.e. the pre^2-shot routine) was deemed to help players come to a well-considered decision before entering and committing to their pre-shot routine.

At a meso-level, these findings also shed light on what elite golfers are and potentially should be focusing on in the pre^2-shot routine as well as the purpose that this routine serves. More specifically, an effective routine was felt to involve the golfer (with the support of the caddie) bringing attention back to golf, collecting and processing task relevant information, considering and adapting course strategy, and then committing to a decision ahead of entering the pre-shot routine. This routine builds upon the previous player-caddy decision making model put forward by Lavallee, Bruce, Gorley, and Lavallee (2002) and Aitken and Weigand

(2007) by providing detail on how players and caddies use pre-prepared course strategies and situational factors to make a decision on the next shot and additionally highlights the importance of bringing the player's attention back to golf at the start of the routine. Importantly, the pre^2-shot routine is conceptually and procedurally different to the pre-shot routine as it relates to shot preparation (i.e., using a broader and more external focus of attention to collect and interpret relevant shot information) rather than the priming of the actual shot (i.e., using a narrower and internal focus of attention: Cotterill, 2010; Cotterill et al., 2010). As the pre^2-shot routine revolved around contextual specificity (i.e., what is the *best* shot selection for the specific situation against the specific strategy for this hole), it also challenges Kirschenbaum et al.'s advice for golfers to prioritize aiming at widest parts of fairways and greens, playing more conservatively, taking a safety first approach, and playing to a personal par.

Building on Kirschenbaum et al. (1998), Finn (2009), and Mesagno et al. (2015), these results also provide a first, *research-based* account of what elite golfers deem to constitute an effective post-shot routine. In contrast to Kirschenbaum's (1997) 4-F model which focused on responses to poor shot outcomes only (the first step being *fudge*), participants in this study suggested that reacting on some level to *all* shots was useful. Following this initial reaction, Kirschenbaum stated that golfers should then look to *fix* the prior swing by making a practice swing. However, to understand what went wrong (or right) with the last shot, participants first advised a period of *reflection and reasoning* to identify the most salient features behind the outcome (e.g., strategy error or an effective tweak for changing weather). There was also no consensus on the value of rehearsal swings in a post-shot routine; a finding that resonates with inter- and intra-individual inconsistencies between practice and actual swings shown in recent research (Carson, Collins, & Richards, 2014). Indeed, while some suggested that the course was no place for technique based thoughts,

others promoted focus on a holistic cue to reinforce correct technique (Winter, MacPherson, & Collins, 2014).

After a *fix*, Kirschenbaum suggested that golfers should *forget* their previous shot in a manner similar to the notion of *acceptance* in this study. However, these findings suggest that there should first be a *confirmation/revision of mental models*. Specifically, this process was deemed important for preventing a mistake being made twice and assisting in the planning of subsequent shots. Finally, Kirschenbaum's 4-F model proposed that golfers should *focus* positively on the next shot. This is in stark contrast to the finding in this study that players should *neutralize* their attention at the end of the post-shot routine; a point that is more consistent with other practitioners' accounts (Aitken & Weigand, 2007). Indeed, such dissociation was felt to deliver a number of benefits, such as decreasing mental fatigue (in comparison to maintaining an associative focus), helping to stay in the present (Cohn, 1991), and inhibiting distractions (Friedman & Miyake, 2004). However, while it may be useful to dissociate from performance after a shot, work in other sports has suggested that attentional focus is fluid and influenced by factors such as anxiety, self-efficacy, and task intensity (e.g., Aitchison, Turner, Thompson, Micklewright, & Gibson, 2013; Eysenck et al., 2007; Hutchinson & Tenenbaum, 2007). Thus, dissociating from performance will clearly be a challenging process, especially when confidence is impaired or in particularly stressful situations. Similar to adaptive pre-shot routines (Crews & Boutcher, 1986), it seems logical to suggest that post-shot routines should also be capable of moulding around a host of expected (and unexpected) contexts.

In relation to the final aim of this chapter, the influence of SMMs on player's attention at macro- and meso-levels was apparent throughout the findings. At the macro-level, caddies, coaches, and psychology specialists generally all inputted to course strategy; however, their exact input was mediated by shared team interaction mental models (i.e.,

based on a shared understanding of how they needed to work together: Cannon-Bowers et al., 1993). Further, participants revealed that shared team and task models allowed team members (especially the caddie) to develop a preliminary strategy before the player had even arrived at a competition. Once again, this approach worked to manage the player's attentional focus and load leading up to and then within their performance. During performance itself, participants noted how caddies – through shared team member, interaction, and task mental models – supported and influenced golfers' thinking during the pre[2] and post-shot routines (as well as the other time in between shots and holes). Indeed, through understanding the player's character, the way they played, and the course strategy, caddies often seemed to know what to say and when to say it (Aitken & Weigand, 2007; Lavallee, Bruce, & Gorley, 2004; Simpson et al., 2011). In this case, such expertise helped players to focus their attention on the most appropriate things at the most appropriate time; including dissociating from golf between shots and holes (Aitken & Weigand, 2007; Simpson et al., 2011; Swann, Piggott, Crust, Keegan, & Hemmings, 2015).

4.4.2 Limitations

While providing a number of novel insights, this study was not without its limitations. For example, the acquired perceptions may have been susceptible to recall issues and self-preservation. As the study prioritized the development of meaningful rather than generalizable findings from a representative sample, it is also possible that other approaches currently being used by elite golfers were not elicited. Conversely, however, the decision to include support practitioners allowed corroboration of player accounts, broadening of the pool of experience (given that these individuals had worked with multiple high-level players), and better consideration of the role of SMMs. It is also worth considering other characterizing traits in support of study quality (Sparkes & Smith, 2009). Specifically, methodological coherence (Mayan, 2009) was aided by using a pragmatic philosophy to

inform the identification of practice-oriented research questions, participant selection (i.e., individuals that could provide a range of views on the topic), and data analysis (i.e., a focus on the *process* of attentional patterning at macro- and meso-levels of elite golf performance: Denzin & Lincoln, 2008; Giacobbi et al., 2008). Specific strategies for optimizing trustworthiness within the data collection and analysis were also targeted (cf. Methodology section). Finally, as pragmatic study aims to develop novel and useful ways of addressing applied issues (Giacobbi et al., 2005), it is also important to consider the "so what?" principle (Bryant, 2009). Specifically, if the results relate to tangible applied artefacts then what difference do they make to practice-focused theory and consultancy itself?

4.4.3 Concluding Comments and What Next?

On this vein – and while all of the themes in Table 4.2 are practical implications in their own right – this chapter has stressed the value of proactively addressing macro- and meso-level processes and actions to optimize attentional patterning in elite golf performance (as well as other psychological factors). As suggested by coverage in this chapter, preparation of course strategy and structured post-shot and pre^2-shot routines represent two primary targets. The findings also offer clear advice on what each of these processes might involve (e.g., a process of reaction, reflection and reasoning, confirmation or revision of mental models, acceptance, and neutralize for the post-shot routine). The role of an elite golfer's support team has also been emphasized, with the development and maintenance of SMMs encouraged; particularly between player and caddie. Of course, the accuracy and efficacy of these recommendations requires empirical validation. Indeed, a useful progression is to explore the extent to which the themes described by participants in this study are actually engaged by golfers and their support teams before and during play; including when they are playing well and not so well. Future work should also delve deeper into the mechanisms of effectively deploying macro- and meso-level processes. For example,

the suggestion that golfers should dissociate attention from their performance between shots requires greater exploration. In addition future work should also explore how SMMs in golf are developed and sustained, especially given the logistical (e.g., travel) and cultural (e.g., perfectionist norms) challenges of elite golf.

In conclusion, this chapter has started the process of filling gaps identified in Chapter 2 of what elite golfers are and potentially should be attending to outside of their pre-shot routine. Specifically, it is clear that optimal attentional patterning was perceived to be strongly influenced by macro-level preparation, meso-level routines, and support team interactions. However, despite the suggestions of "best practice" given here by experts in the field there is a need to explore if golfers actually follow this best practice. This issue is addressed in Chapter 5.

Chapter 5- This really is what we do with the rest of the day! Checking and clarifying what high-level golfers do during the meso-level of performance

5.1 INTRODUCTION

In the preceding chapter the views' of elite level golfers, caddies, coaches and psychology specialists were explored on what golfers should do with "the rest of the day" (i.e., the meso-level time periods whilst competing). However, given that this study relied on retrospective interviews alone, the extent to which the findings were reflected in real-time golf performance was unknown. Consequently, there was a need to explore what golfers *actually* did during these periods in competitive play and what effect, if any, this had on performance.

To summarise previous findings, in Chapter 4 I reported on the perceived benefits of three meso-level processes: *caddie contribution to meso-level processes* and, of most relevance to this Chapter, the *pre^2-shot routine* and the *post-shot routine.* Supporting previous ideas on the value of a decision making routine before the pre-shot routine (e.g., Kirschenbaum et al., 1998; Nilsson, Marriott, & Stirk, 2005), an effective pre^2-shot routine was felt to involve the golfer bringing their attention back to golf, collecting and processing shot-relevant information, considering this information against their course strategy, and then committing to a decision ahead of entering into the pre-shot routine. Participants identified that this routine allowed them to focus their attention on golf at the appropriate time, systematically process relevant shot information, and commit to their imminent shot.

In terms of the processes that were perceived to constitute an effective post-shot routine, a 5 –step process was described. The first step was a *reaction*, either positive or negative, which assisted in regulating emotions immediately after a shot. Second was a

period of *reflection and reasoning* to unpack the reason(s) behind the shot outcome. Potentially this may also include the rehearsal of a corrected swing to give the player a swing thought or feeling for the next shot. The third step involved *confirmation or revision of mental models* with the caddie, therefore assisting with the planning of subsequent shots. Fourth was *acceptance* of the shot outcome before the player finally *neutralized*, or dissociated their attention from their performance. This was one stage of the post-shot routine which required additional investigation. Indeed, while contemporary research and anecdotal evidence had suggested that allowing one's mind to wander or to focus on present moment experiences that are unrelated to performance may be functional in these time periods (Bernier et al., 2009; Giacobbi et al., 2004; Hayslip et al., 2010; Rotella, 2004, 2008) prior to this thesis there was a dearth of research on the precise pros and cons of this approach in high level golfers and in real time.

Recognising the merits of real-time research it was possible that the findings in Chapter 4 may have been negatively affected by the study's retrospective design. It is possible that participants may have forgotten or embellished what they actually did (Stone, Schwartz, Neale, Shiffman, Marco, Hickcox, & Cruise, 1998), be influenced by the associated performance outcome (Brewer, VanRaalte, Linder, & VanRaalte, 1991), be influenced by the way questions are phrased (Brewer et al., 1991), and provide what they feel may be the "correct" answer (Coolican, 2014; Nisbett & Wilson, 1977; Whitehead, Taylor, & Polman, 2015). Reflecting these shortcomings, assessment of what golfers should do at the meso-level of performance would benefit from methods that tap into live experience.

Reflecting another potential shortcoming of Chapter 4 it was also unknown whether the identified meso-level processes were specific to perceived better performances; in short, did elite golfers use different processes when playing poorly? Or did they use the same processes but sub-optimally? Notably, Bortoli, Bertollo, Hanin, and Robazza (2012)

identified that athletes experience different emotional states, exhibit different behaviours, have different levels of focus, and exert different levels of control when performing to different standards. From a golf perspective, this notion has been supplemented by Swann, Keegan, Crust, and Piggott (2016), who found that excellent performance was characterised by players either "making it happen" or "letting it happen". Despite the apparent efficacy of the meso-level processes reported in Chapter 4 there was a consequent need to explore whether those processes were actually associated with better performance through real-time study.

Whilst Chapter 4 also highlighted the potential impact of macro-level processes and the influence of player and support team SMMs at both the macro and meso levels of performance due to issues of accessibility over the entire tournament preparation period this Chapter will focus solely on meso-level as opposed to meso *and* macro-level processes. Furthermore, due to difficulty in accessing players who consistently used the same caddie in every tournament players were selected who did not use a caddie thus the potential influence of the caddie in play has been removed. The implications of this are discussed in the Discussion (5.4.3).

Given the gaps identified above, the purposes of this Chapter were twofold. First, I sought to explore what a representative sample of high-level golfers actually did and thought at the meso-level of their performance. As such, this would provide an opportunity to corroborate, refine or suggest changes to the constructs in Chapter 4. Second, I aimed to identify if any differences existed in the deployment of meso-level behaviors and thought processes before and after perceived good shots and perceived bad shots. Given the lack of prior real-time research in this area, it was felt that this approach would support a practically-meaningful advance and further help researchers, golfers, and those who advise them to

better understand effective behaviors and thought processes during periods that make up the majority of time in high-level golf performance

5.2 METHOD

5.2.1 Participants

Data were collected from six male, high-level golfers who were recruited through purposive sampling (Frost, 2011), having previously competed against the lead researcher. Three of these players were PGA professionals (one with playing rights on the PGA EuroPro Tour), one was a playing professional (on the EuroPro Tour), and two were amateurs with handicaps of +2 and 0. These levels are comparable to other studies which have used "high-level" (e.g., Carson, Collins, & Richards, 2016) or "elite" golfers (Hill et al., 2010). Additionally, while the players in this study were a mix of professionals and amateurs, the amateurs competed at national level and were aspiring future professionals. The players' ages ranged from 19 to 28 years old (M = 23.00 years, SD = 3.16 years), they had between 6 and 15 years golfing experience (M = 9.83 years, SD = 3.13 years) and had been competing at their highest level for a minimum of one year.

5.2.2 Procedure

Prior to participating, potential participants were sent information about the purpose and procedure of the study, informed consent forms, and a copy of the interview guide. Upon accepting the invitation to participate, each participant was contacted to acquire their playing schedule and to identify when it would be convenient to collect data over four competitive rounds. Consequently, data were captured at PGA EuroPro events for two of the professional golfers, with data captured at regional PGA events for the other two. For both amateur golfers, data were captured during consecutive rounds of British University events.

In each participants' competitive round, the first stage of data collection involved non-participant observation of the golfer over the full duration of their performance. The

player was also recorded for their whole round via a GoPro© camera – as worn by myself – in order to capture footage to prompt the player during an interview after the round (Lyle, 2003). While filming and observing each participant, the lead researcher also made field notes to identify key points for discussion in the interview (Jones, 2015). After completing each round the player was allowed roughly 30 minutes to attend to their post-round administration. During this time the field notes were reviewed by the lead researcher. Following discussion with each participant regarding what they felt were particularly good and bad shots during their whole round, players selected a minimum of six and maximum of 12 video clips, with an equal number relating to good shots and bad shots required.

Following this step, and in order to assess the golfer's thoughts and behaviours before and after shots, a stimulated recall (hereafter SR) protocol was employed. SR is a research procedure through which cognitive processes can be investigated by inviting participants to recall, when prompted by video footage, their thinking during an event (Lyle, 2003). SR was chosen in this study instead of alternatives such as think aloud (hereafter TA: Ericsson & Simon, 1993; Lyle, 2003) due to its relatively non-intrusive nature. Indeed, while both TA and SR procedures have been used previously within golf research (Pierre & Smith, 2012; Nicholls & Polman, 2008; Whitehead, Taylor, & Polman, 2015a, 2015b), it was felt that a TA protocol would provide greater interference to naturalistic thought processes and have a greater impact on task performance (Klatzky, 1984) by promoting a more internal focus of attention (Calmeiro & Tenenbaum, 2011; Masters, 1992; Whitehead et al., 2015a).

The first stage of the SR interview involved the participant and lead researcher watching the previously selected clips on a laptop while the semi-structured interview took place. Three main questions were used to explore the meso-level processes before and after these shots: What were you doing at this point? What were you focusing on? What were you thinking and feeling? Follow-up prompts and probes developed from the field notes were

used for clarification and elaboration on the nature of (and reasons for) the behaviors and thoughts described by the participant. Example probes included: I noticed here that you slammed your club in to the ground after your shot, what were you thinking and feeling at this point? After this shot I noticed you appeared to look at the divot in the ground, what were you thinking? What were you focusing on when doing the practice swings after this shot? Can you describe to me what you were doing here with your course planner and distance measuring device? What you were thinking about here while waiting for your turn to play? For clarity, the overall discussion around each video clip covered the start of the shot planning process (as identified by the participant) through to when the player felt that they had moved on from the shot by either neutralizing their attention or starting the process of focusing on their next shot. Additionally, although this study used the meso-level processes identified in Chapter 4 for the deductive analysis, participants were not explicitly asked about these meso-level processes in the interviews but rather to provide an open description of what they were doing and thinking before and after shots. Post-round interviews lasted between 32 and 45 minutes (M= 38.00, SD= 3.50). Ethical approval was granted, confidentiality assured, and informed consent given by all participants.

5.2.3 Data Analysis

Qualitative Analysis

Given my first aim of exploring what a sample of high-level golfers actually did and thought at the meso-level of their performance against the processes identified in Chapter 4, a deductive content analysis was deemed appropriate (Biddle, Markland, Gilbourne, Chatzisarantis, & Sparkes, 2001; Krane, Anderson, & Strean, 1997). As such, the meso-level processes identified in Chapter 4 were used to categorize the interview data. Specifically, the analytical process commenced with revisiting all 24 interviews to increase familiarity and understanding of the information obtained. Subsequently, qualitative analysis software (QSR

NVIVO 10) was used to create two main nodes: the first was labelled "pre^2-shot routine: good shots" and the second was labelled "pre^2-shot routine: bad shots". In both of these main nodes, the pre^2-shot routine processes from Chapter 4 were then listed; to confirm, these were: bringing attention back to golf; collecting, receiving, and processing shot information; consideration (and adaptation) of the course strategy; and committing to a decision. I then deductively placed the meaning units from all transcribed interviews into the relevant main node (i.e., good shot or bad shot) and relevant process (e.g., bringing attention back to golf). For any meaning units that did not code to one of the themes reported in Chapter 4, a separate node labelled 'other' was available where meaning units could be placed for a potential later inductive analysis; however, given that only a handful of 'other' meaning units were coded, and these data were not relevant to the study purposes (i.e., participants were not discussing the preparation of, or reactions to, shots) the data was not subject to further analysis. This entire process was then replicated for the analysis of the post-shot routine data, again using the good versus bad distinction and the themes reported in Chapter 4; which were: reaction, reflection, and reasoning (and rehearsal); acceptance; and neutralize. Given that no participants in this study used a caddie, confirmation/revision of mental models between player and caddie (see Chapter 4) was not used as a category for the analysis.

Quantitative Analysis

In order to address if any differences existed in the deployment of meso-level behaviours and thought processes before and after both perceived good and bad shots, frequencies were calculated on the number of times that each meso-level process was coded during the deductive content analysis (see frequency count in Tables 5.1 & 5.2). A chi-square test of independence was then carried out on the reported use of meso-level processes for good and bad shots (see Table 5.3) to determine if any significant dependence existed for the variable of shot outcome. The conversion of qualitative into quantitative data was

deemed appropriate in this instance as it allowed me to also check for the presence of differences in the reported frequency of meso-level processes between performance levels (i.e., *in addition* to any potential qualitative differences). Additionally, the use of multiple methods to analyze the data aligned with my overarching pragmatic approach (Bryant, 2009). It is also important to note that, in this case, the use of a frequency count was not taken to imply that one category or process was more important than any other but simply to indicate what steps were more or less frequently reported (Krane, Andersen, & Strean, 1997).

5.3 RESULTS

Against the themes developed through retrospective methods in Chapter 4, the first aim of this study was to explore what a representative sample of high-level golfers actually thought and did at the meso-level of their performance. Secondly, I aimed to identify if any differences existed in these players' deployment of meso-level thoughts and behaviors before and after perceived good and bad shots.

Regarding my first aim, the deductive analysis of the stimulated recall interviews coded 604 meaning units to the pre^2-shot routine and post-shot routine processes identified in Chapter 4. Notably, none of the data fell outside of these meso-level processes (i.e., no participant reported any additional or different steps during their pre^2- or post-shot routine to those reported in Chapter 4). Tables 5.1 and 5.2 show these meso-level processes and representative quotes from participants for both good and bad shots. In short, these results show that the golfers were using the same pre^2- and post-shot processes identified in Chapter 4. However, while participants reported using every step across all of their interviews, the frequency data pointed to notable variation in the relative use of these steps (i.e., some steps in the pre^2- and post-shot routines were reported particularly more or less frequently than others across all of the participants). For example, *collecting, receiving, and processing shot information* in the pre^2-shot routine was reported more than any other process. Furthermore,

reflection, reasoning (and rehearsal) and *neutralize* were the most frequently reported processes in the post-shot routine. As such, this would suggest that some of the steps in the pre^2- and post-shot routines were either: (a) more or less relevant for different shots; (b) more or less established or primed parts of the players' repertoires; (c) more or less prominent when recalling thought processes after completion of their round; or (d) some combination of the preceding factors. Further consideration of the different levels of use will be addressed in the Discussion section. For the Results section, however, focus shall remain on the primary finding that all of the pre^2- and post-shot routine steps identified in Chapter 4 were used by all participants throughout their rounds.

In relation to my second aim, chi-square analysis revealed no significant difference between performance levels for reported use of both the pre^2- and post-shot routine; in other words, good and bad shots were *not* statistically linked to the use of more or less of the steps in the pre^2- and post-shot routines (Table 5.3, $p > .05$). As such, the findings suggested that the golfers used the steps in the pre^2- and post-shot routines in a similar fashion between good and bad shots. Further, some of the quotes in Table 5.1` convey some interesting similarities in application before good and bad shots; in particular, the collecting, receiving, and processing of shot information. Notably however, and despite these similarities, some other quotes in Tables 5.1 and 5.2 also highlight some clear *qualitative differences* in the application of the steps in the pre^2- and post-shot routines. In short, the results suggest that, in some respect, it was not so much that the routines associated with bad shots had steps missing or added but rather, that some of the steps were not used or experienced in the same way as they were with perceived good shots. To illuminate these qualitative differences and similarities, I now provide a detailed description of how both of these meso-level processes were used in relation to perceived good and bad shots; drawing upon the data presented in Tables 5.1 and 5.2 plus supplementary quotes. To confirm, while every participant did not

report every step of the pre[2]- and post-shot routine for every shot that they discussed, the following section reflects the case that all steps were referenced by every participant across their full data collection process.

Table 5.1 Illustrative Quotes of Pre^2-Shot Routine Processes Used by Participants

Pre^2-Shot Routine Process	Illustrative Quotes- Good Shots	Illustrative Quotes- Bad Shots
Bringing attention back to golf (n = 65)	"When I see the ball [in the distance] my options begin to run through my mind" (P3) "As I'm walking up [to the ball] I start to look where the flag is, get a grasp of where the wind is" (P5)	"It was a little difficult to concentrate on that tee shot because I was still thinking about the missed putt on the previous hole" (P1) "That previous one [bad shot] affected me for the next few holes. . .I couldn't get it [the previous bad shot] out of my head with the irons" (P4)
Collecting, receiving, and processing shot information (n = 107)	"When I've got the yardage book out I am trying to take on as much information as I can from the course planner and pin position, working out how far the bunkers are in to the green, how far the pin is on [the green], what it is to the top of the slope, where the wind is going, how many yards behind the flag I have got" (P1) "I was looking at the lie and it looked like it would come out a little bit quick [i.e. with less spin than usual], the pin was at the back [of the green], it was 165 [yards] but probably playing 15 [yards] less [due to the lie]" (P5)	"137 yards to the flag, it was straight in to the wind, downhill, probably playing 133 [yards], it was 125 [yards] to get past the bunker and on to the green to the left if I did pull it, the grass was lying in to me in the rough" (P1) "It was uphill, slightly in to the breeze, I think I had 105 yards, if I hit my 52 [degree wedge] full it maybe goes 110 [yards] but I thought uphill, in to the wind, and it was a relatively cold day as well" (P6)
Consideration (and adaptation) of course strategy (n = 32)	"So on that tee shot with the pin at the back you know [from the practice rounds] you want to be long because it's going to be so difficult putting from the front of the green. . . so I made sure I took one more club" (P2) "I can hit driver in to the ditch [with no wind] so I would usually hit 3 wood but because it was in to the wind I went with the driver" (P4) "I took one more club there because I know from playing here a lot that the shot plays longer than the yardage" (P5)	"I should have just stuck with the plan from the practice rounds, I let what had happen the other day [coming up short of the green] influence my club selection" (P1) "Not having a proper practice round meant I didn't really know where I was going [aiming] from that tee shot" (P3) "The strategy I had before went out of the window there, I definitely should have stuck with it" (P4)
Committing to a decision (n = 70)	"That [yardage to the hole] was just the perfect number [yardage] for a 9 iron, perfect lie in the fairway, I felt I was swinging it well with my irons so could just really commit to it [the club selection]" (P2) "That yardage and pin position were perfect for me so I could just really commit to the shot" (P4) "That shot was either a hard 9 [iron] or an easy 8 [iron] given that it was better to come up a little short [of the flag] I committed to the hard 9 [iron] and hit it perfect" (P5)	"I struggled [to commit to the decision to hit driver] on this shot because the previous two times I had played the shot I hit poor drives [with the driver]. . .so when I got over the ball I just wasn't comfortable" (P1) "I was just thinking too much about the swing and that made it hard to commit" (P2) "That was probably the wrong shot to hit there but I couldn't commit to the correct shot because of some of the bad chips I had hit previously" (P4) "I had no bad thoughts [about the shot] what so ever, I was thinking "I've got this" and just hit it left [a bad shot]" (P3)

Table 5.2 Illustrative Quotes of Post-Shot Routine Processes Used by Participants

Post-Shot Routine Processes	Illustrative Quotes Good Shots	Illustrative Quotes Bad Shots
Reaction (n = 69)	"That putt was important for momentum and the fist-pump was just to try and push me on" (P3) "[I was thinking] that's the best shot of the year!" (P6)	"This reaction [slamming the club in to the ground] is probably a combination of, well, from the tee shot on the last to that shot there it is just a build-up [of frustration]" (P1) "I felt better once I'd done it [slamming the club in the ground] I'd been dying to do it for a few holes" (P2)
Reflection and reasoning (and rehearsal) (n = 97)	"I just thought actually I hit that shot exactly the way I wanted, the wind was just a little stronger than I thought" (P1) "That was a good shot and the rehearsal was just to reinforce that a little more" (P2) "I looked back and thought that was a well-played stretch of difficult holes which really took the pressure off for the last 2 [holes]" (P4)	"It was a miss-strike, I just totally mistimed it, I didn't get it. . .[with the practice swings] I was just feeling what to do next time" (P2) "I feel like I'm replaying the swing from the delivery position and that's where if I hit a bad shot I will focus my attention" (P3) "That's [the shot to the left] just my bad shot, I get a little 'handsy' and flip it over so I don't feel the need to do a practice swing afterwards" (P4)
Acceptance (n = 61)	"You can't get frustrated if you hit a good shot but not the best result, you've just got to accept it and move on because you can't control it [the ball once it has been struck]" (P4) "There was nothing I could do about it [a bad bounce], so there was no point getting angry" (P5)	"That bogey on the last had a knock on effect which affected the momentum. . .it was an easy hole and you shouldn't be making bogey from where I was. . .that one was hard to take" (P1) "Its definitely harder to accept [and move on from] a bad shot when I'm [generally] playing poorly, when I'm playing well I tend to just get on with it, forget about it" (P5)
Neutralize (n = 103)	"[in between shots] I just go to what I call my special place and that's basically me imagining myself being on beach somewhere with the lads having a cocktail" (P1) "I was just making an effort throughout the round to switch off by chatting to them [playing partners]" (P3) "I just try [when walking after a shot] to think about anything other than golf, maybe talk to my playing partner about what he has been up to in the last week" (P6)	"I think had I been able to have some banter with my playing partners I would have been a lot more relaxed and probably played better" (P1) "I was trying too hard and thinking too much, thinking all the time about my next shot" (P2) "Because I hit a bad shot straight away I was thinking about the next one and rushing to get to it [the ball]" (P5)

Table 5.3 Frequency of Reported Meso-Level Processes (Expected Counts in Parentheses) by Shot Outcome

Meso-Level Process	Good	Bad
Pre^2-shot Routine		
Bringing attention back to golf	32 (35.11)	33 (29.89)
Collecting, receiving, and processing shot information	60 (57.80)	47 (49.20)
Consideration (and adaptation) of macro-plan	23 (17.28)	9 (14.72)
Committing to a decision	33 (37.81)	37 (32.19)
Post-shot Routine		
Reaction	21 (26.97)	48 (42.03)
Reflection and Reasoning (and Rehearsal)	32 (37.92)	65 (59.08)
Acceptance	28 (23.85)	33 (37.15)
Neutralize	48 (40.26)	55 (62.74)

Pre^2-shot Routine: X^2 (3, N = 274) = 6.222, p>.05, V = 0.09
Post-shot Routine: X^2 (3, N =330) = 7.317, p>.05, V = 0.09

5.3.1 Pre^2-Shot Routine: Consistencies and Differences Across Good and Bad Shots

When discussing the pre^2-shot routine, players reported *bringing attention back to golf*. Before good shots this process often started before reaching the ball, as shown in Table 5.1. Starting the process before arriving at the ball required players to have their attention in the present and allowed them to begin considering some key shot information such as pin position, distance of the shot, and any potential hazards. Conversely, in the build up to bad shots, players' attention was often focused on the past, in particular on previous bad shots. Consequently, focusing on previous bad shots negatively impacted the planning and execution of impending shots as shown in the quotes from P1 and P4 in Table 5.1.

As well as the process of (eventually) bringing their attention back to their current shot, players discussed *collecting, receiving, and processing shot information*. This stage was discussed in detail by all participants for both good and bad shots; indeed, this process was the most frequently discussed stage of the pre^2-shot routine independent of shot outcome. Within this process, players showed an in depth consideration of factors such as: distance of the shot, adjusted distance of the shot (to account for a shot that was uphill or downhill or for wind strength and direction), hazards which needed to be carried or avoided, pin position on the green, the distance and trajectory of potential clubs, and how the lie of the ball may affect

the shot. In addition to the quotes in Table 5.1 for both good and bad shots, P4 clearly illustrated the level of detail required in this process:

> The first thing I do is get the yardage, then I start to think whereabouts [on the green] I want to land it [i.e., the ball], how it will react on the green, what the wind is doing and how that will affect the shot . . . . You can get an idea of that from watching your playing partners, see how their ball reacts which then gives me a better idea what club to hit.

In addition to collecting information from the environment relating to their shot, participants also reported *consideration (and adaptation) of the course strategy*. Before good shots, noticeably greater usage of this process was reported in terms of raw frequencies (see Table 5.3). Additionally, qualitative data highlighted a link between playing well and having a course strategy available to assist in decision making in the pre[2]-shot routine, as illustrated by the quote from P2 in Table 5.1. Indeed, good shots were often associated with reference to the player's pre-prepared course strategy, which could be as simple as a player having "local knowledge": "I took one more club there because I know from playing here a lot that the shot plays longer than the yardage" (P6).

On the other hand, when participants discussed use of a course strategy prior to bad shots, it was typically because a *lack of* or *flaws in* such a strategy made decision making difficult. For example, P3 discussed two bad shots during the same round where he felt one was caused by "not having a proper practice round, [which] meant I didn't really know where I was going [i.e., aiming] from that tee shot" and the other by "playing too aggressively at the wrong time [and] trying to pick up shots on the wrong holes". In this case, and characteristic of others, issues with course strategy were associated with uncertainty in shot and target selection and adopting the wrong strategy at the wrong time.

Finally, players referred to *committing to a decision*. Whereas players commonly reported being fully committed to the decision they had made at the end of their pre[2]-shot routine prior to good shots, bad shots were often preceded by impaired commitment. The quotes in Table 5.1 show the differing levels of commitment reported before both good and bad shots. Often commitment was enhanced before good shots by players' perceptions that they were capable of successfully executing the required shot. Furthermore, and reflecting the thoughts of the group as a whole before good shots, P4 felt that: "the most important thing [with the decision] is to back yourself, it's no good going in to the shot with any doubts [about the decision made]".

Of course, committing to a decision did not *always* lead to a good shot outcome, given the opportunity for errors within the earlier steps of the pre[2]-shot routine, the pre-shot routine, or in executing the shot, as demonstrated by P3: "I had no bad thoughts whatsoever [about the shot], I was thinking 'I've got this' and just hit it left". Typically, however, players felt that bad shots were often caused by a lack of commitment at the end of the pre[2]-shot routine. Indeed, impaired commitment was felt to be caused by a number of factors, such as: previous poor performance on a shot/hole (as per the quote from P1 in Table 5.1); too much focus on swing mechanics, "I was just thinking too much about the swing which made it hard to commit" (P2); being rushed, e.g., by being "on the [match referee's] clock" (P2); doubts over the club selected, "I was in between clubs and just didn't commit to the one I went with" (P3); and focusing on what not to do: "throughout the whole [shot preparation] process all I could think was 'you don't want to go left'" (P1). To reiterate, although being committed to a decision would not necessarily guarantee shot success, players reported that not committing to a decision at the end of the pre[2]-shot routine was *consistently* linked to poorer shots.

5.3.2 Post-Shot Routine: Consistencies and Differences Across Good and Bad Shots

Considering the thoughts and behaviours engaged after shots, players exhibited and discussed a *reaction* and there was a noticeable difference in the frequency and content of this step between performance levels. Typically, bad shots were associated with consequent negative self-talk and physical responses that could be construed as socially undesirable. This included: the use of sarcasm: "good shot, well done" (P5); frustration: "what was that?" (P6); swearing (all players); and slamming clubs in to the ground or golf bag (all players). Despite the often perceived inappropriateness of these thoughts and actions (in regard to formal golf etiquette) players did feel that a reaction after a bad shot could be useful to "get rid of the frustration which has been building up" (P2) and "bring you back in to the present" (P1).

After good shots, participants typically reported fewer overt reactions. When these were reported, however, they reflected positive self-talk and physical responses that could be construed as more socially desirable, such as a fist pump (P3), club twirl (P4), and positive self-talk: "that's the best shot of the year" (P6). In sum, although reactions were evident after both good and bad shots, they were more frequently reported after bad shots and were characterized by more self-depreciating and emotionally-charged content.

As well as an initial reaction to a shot, notable differences were reported in the frequency and nature of *reflection and reasoning (and rehearsal)* after good shots and bad shots. Indeed, in addition to bad shots prompting a greater frequency of reflection, reasoning and rehearsal, the content of this process was markedly different in contrast to good shots. Specifically, after poor shots, the reflection and reasoning process would focus on errors made in either: the strike (e.g., "it was a miss-strike, I just totally miss-timed it, I didn't get it . . . [so with the practice swings] I was just feeling what to do next time": P2); or the swing (e.g., "I feel like I'm replaying the swing from the delivery position and that's where if I hit a

bad shot I will focus my attention": P3). Following the theme of a focus on shot execution after bad shots, participants also often favoured the use of a rehearsal swing after a bad shot to achieve a "corrected feeling of what I need to do next time" (P5). However, post-shot practice swings were not consistently deployed by all participants after bad shots, as demonstrated by P4: "[the shot to the left is] just my bad shot, I get a little 'handsy' and flip it over so I don't feel the need to do a practice swing afterwards". Ultimately, whether players used a post-shot rehearsal swing after bad shots or not, it was universally accepted that after the reflection, reasoning (and rehearsal) process that players should: "park it, accept it, and forget about it [the bad shot]" (P2).

In contrast, after good shots, players' were more focused on the positive features of the shot or the strategy and decision making. In this case, the reflection, reasoning, and rehearsal process was used to reinforce those features plus what might need to be considered next time to make the shot outcome even better. For example, P1 described how although he was happy with the execution of one particular shot, there were still things which could be learned from the outcome in relation to his shot decision making (i.e., pre[2]-shot routine): "I just thought actually I hit that shot exactly the way I wanted, the wind was just a little stronger than I thought". Furthermore, post-shot reflection was used not only to reinforce the positive features of individual shots but also individual holes or series of holes, as revealed by P4: "I looked back and thought that was a well-played stretch of difficult holes which really took the pressure off for the last 2 [holes]". Finally, rehearsal swings were also used by some players after good shots as a way of reinforcing the positive aspects of technical performance: "that was a good shot and the rehearsal was just to reinforce that a little more" (P2). As with the use of rehearsals after bad shots, however, this process was not consistent across participants. Mirroring the thoughts of participants after bad shots, it was also deemed

important to be able to accept the outcome of good shots, even if the outcome was ultimately disappointing due to other factors; as illustrated by the quotes in Table 5.2.

In sum, post-shot reflection, reasoning and rehearsal was used consistently after both good and bad shots. Although the content differed between good and bad shots the end goal of the process was also the same: to assist in accepting the shot by unpacking the reasons behind the shot's success or failure and "fixing" or the reinforcing the reasons for the success or failure. However, in relation to post-shot *acceptance*, Table 5.2 clearly shows that players found accepting the outcome of a good (or well executed) shot much easier than accepting the outcome of a bad shot. Significantly, the lack of acceptance of the outcome of bad shots had implications for the final stage of the post-shot routine.

Indeed, and once again, qualitative differences were evident across good and bad shots in the content of the *neutralize* process, as shaped by shot outcome. After good shots, for example, players typically described how they would "think about anything other than golf, maybe talk to my playing partner about what he has been up to in the last week" (P6). In this regard, P1 reflected on how he would go to his "happy place" to dissociate his attention after a good shot: "imagining myself on a beach somewhere with my mates, drinking a cocktail". Other than daydreaming or talking to playing partners, players also discussed how they might "sing a song in my head" (P6) or "just notice the other things around the golf course" (P3) in order to dissociate their attention from their performance.

In contrast, there was a widely reported difficulty in dissociating from performance after bad shots. In particular, players commonly discussed a focus on past or future shots; P4 provided an example of this focus during a poorly played hole:

> I was just looking back thinking why I didn't hit it [the tee shot] further left? And my third shot, why I didn't go through the gap [in the trees] and why I went to the right and tried to hook it on to the green and then why my chip got such a bad bounce.

On the other hand, some players also discussed immediately focusing on the next shot after hitting a bad shot: "I was trying too hard and thinking too much, thinking all the time about my next shot" (P2) and "because I hit a bad shot straight away I was thinking about the next one and rushing to get to [the ball]" (P5). Clearly the inability to dissociate after and in between shots had a knock-on effect on player attention at the start of the pre[2]-shot routine with players reporting struggling to bring their attention back to the present (see Table 5.1). Indeed, although the interview process did not yield much data on consecutive shots (i.e., players rarely selected consecutive shots to discuss), the observation data suggested that such knock on effects were common and often significant.

5.4 DISCUSSION

5.4.1 General Discussion

The first aim of this study was to explore what a representative sample of high-level golfers actually thought and did at the meso-level of their performance. Secondly, I aimed to identify if any differences existed in the deployment of meso-level behaviors and thought processes before and after perceived good and bad shots. I will now firstly recap the key findings from the results section then, given my pragmatic approach, I will pay particular attention to the practical implications of the findings and highlight where the results have added to and extended knowledge.

With regards to my first aim, findings from Chapter 4 highlighted key meso-level processes perceived by elite golf players and support personnel, namely the pre[2]- and post-shot routines, and the sub-processes involved within each process. Given that the high level participants in this study identified using all of the steps in these processes throughout their interviews, albeit to differing extents, and no different or additional processes were reported, these findings corroborated the constructs identified by participants in Chapter 4 as characteristic of best practice at the higher levels of competitive golf. Interestingly, however,

some of the steps were quantitatively and qualitatively similar when associated with perceived bad shots; indeed, some features of pre^2- and post-shot routines seemed to be particularly well-established. Specifically, the frequency with which collecting, receiving, and processing shot information was discussed, along with the amount of detail offered on what this process involved, suggests that this may be a well-established, and important, part of high level golfers' pre^2-shot routine. Indeed, the use of caddies in high-level level golf, who assist players in collecting and processing shot information (Aitken & Weigand, 2007), suggests that this is an integral part of the decision making process before a shot and is a process which practitioners should focus on developing with high-level or aspiring high-level golfers who don't have the assistance of a professional caddie. This is consistent with Cotterill, Sanders, and Collins (2010), who have previously suggested, "the ability to make clear decisions on selecting the correct club and way to play the shot" (p.57) are crucial.

However, while further quantitative and qualitative similarities existed in the content and application of some meso-level processes across good and bad shots (see Table 5.3), there were also clear qualitative differences in the content and application of many other steps. In the pre^2-shot routine, for example, differences were evident in players' ability to bring their attention back to golf. More specifically, the results suggest that for optimal performance (or more positive shot outcomes) players' attention should be focused on their present shot somewhere prior to arriving at their ball; a process which requires players to know when to, and then how to, move efficiently from a dissociative attentional state (as achieved through the neutralize stage of their post-shot routine) to an associative attentional state (Morgan & Pollack, 1977; Schomer, 1986). Secondly, limited consideration (and adaptation) of the course strategy (due to poor macro-preparation) was linked to bad shots. This finding provides evidence of the impact that pre-tournament planning can have on meso-level thinking, following previous suggestions of its importance in Chapters 2 and 4. More

specifically, the results illustrate that the effective use of a pre-planned course strategy allows for greater dominance of the top-down, goal-directed attentional system in play, over the bottom-up, stimulus driven system. Freeing up the stimulus driven system then allows it to be targeted towards more relevant, threat-related information (such as potential hazards and pin positions) in a more appropriate manner (Corbetta & Schulman, 2002; Eysenck, Derakshan, Santos, & Calvo, 2007).

In final relation to the pre^2-shot routine, the present study has also reported that different levels of commitment to a shot decision were associated with better and worse shots. Indeed, players felt that poor shots were often caused by insufficient commitment to their decision. Although committing to the shot decision did not guarantee shot success of course, in part due to the fact that players still required an effective pre-shot routine and actual execution of the shot (McCann, Lavallee, & Lavallee, 2001), it was felt that not committing to a shot decision was generally detrimental to performance.

In terms of the post-shot routine, qualitative differences were similarly evident when comparing the steps associated with good and bad shots. Specifically, post-shot reactions after good shots were generally self-affirming, motivational, and used to reinforce positive aspects of the shot or outcome. On the other hand, reactions after bad shots were generally negative and disruptive to performance (e.g., psychologically or technically) but could also serve the purpose of regulating emotions and controlling attention, as previous studies and Chapter 4 have suggested (Finn, 2009; Kirschenbaum et al., 1998). Therefore, given the evidence presented here, I would urge consideration of the potential usefulness of negative reactions to bad shots, at certain times and in certain situations, but would also urge caution against the use of negative reactions after *all* bad shots; in short, an individualized and context-specific approach to their use should be adopted.

Additionally, the content of reflection, reasoning, and rehearsal also differed in relation to shot outcome. Namely, reflection and reasoning tended to focus upon the technical aspects of the swing or shot execution after bad shots, whereas this process was used to reinforce positive aspects of the course strategy, decision making, or shot execution after good shots. Reflecting this difference, players need to be aware (or made aware) of what constitutes appropriate post-shot reflection in different contexts. From here, players then need to develop appropriate in-action reflective skills, potentially with a framework or criteria to reflect against, for the reflection to positively benefit subsequent shots (Schön, 1983). For example, realistically appraising the shot's finishing position relative to the target in the context of the shot difficulty (i.e., overall distance, lie of the ball, wind strength and direction, and pin position). Furthermore, the inconsistent and differing use of rehearsal swings after both positive and negative shot outcomes has implications for players and practitioners. Specifically, because rehearsal swings were not used or experienced the same way by all players, caution must be exercised in prescribing and using this post-shot process. For a post-shot rehearsal swing to have the greatest, and most appropriate impact, it seems that players need to know where, when and why using (or not using) a rehearsal swing would be appropriate for them at that specific moment.

Finally, differences were also evident in the content of the final two processes of the post-shot routine. After bad shots, players typically reported difficulty in accepting the shot outcome, which in turn then made it more difficult to neutralize their attention from their performance (as per the final stage of the post-shot routine). Indeed, a lack of acceptance meant that players often spent the time after bad shots ruminating over the shot outcome – a situation which has been shown to be detrimental to performance (Hayslip et al., 2010) – or responding by "concentrating more" but not necessarily on appropriate cues (cf. Bortolli, et al., 2012). Conversely, the outcomes of good shots were much easier to accept and,

accordingly, made it easier for players to consequently move on from the shot and neutralize their attention.

5.4.2 Implications for Practice

Reflecting the qualitative differences across the content and application of certain meso-level processes discussed above, a key overarching implication for practice from this study is that simply performing the steps of the pre[2]- or post-shot routines discovered in Chapter 4 will not necessarily help players to derive the full performance benefit. From a meta-cognitive perspective, it is important for players and practitioners to therefore know *when, where, how, with whom,* and *why* to initiate specific elements of the pre[2]- and the post-shot routine. Indeed, this Chapter suggests that players need to develop such meta-cognitive skills as a method of effectively self-regulating their thoughts and behaviours at the meso-level of performance (Brick, MacIntyre, & Campbell, 2016; Efklides, 2008). For example, negative reactions in the post-shot routine can be facilitative as long as the player is aware of what they are doing, how they are doing it, and for what purpose. Interestingly, this emphasis on explicit and controlled cognition would seem to run counter to, or at least in addition to principles of the increasingly popular dynamical systems/constraints-led approach to coaching practice (e.g., Davids, Araújo, Hristovski, Passos, & Chow, 2012), where the role of thinking is not explicitly and systematically targeted on the assumption that effective behaviours will best emerge from interacting constraints (Davids, Button, & Bennett, 2008). Indeed, the findings from this Chapter suggest that effective performance at the meso-level of high-level golf requires the development of appropriate *attention* (i.e., what to focus on) and, crucially, appropriate *intention* (i.e., actively managing the purpose and nature of that focus: Brick et al., 2015). As such, this Chapter also highlights the need to prioritise the development of performance expertise in high level golfers (i.e., how to think around the course in a way that supports continual adaptation to internal and external conditions) over

performance competencies (i.e., knowing and applying standardized steps of a pre[2]- or post-shot routine).

An area of further consideration for players and coaches, and one which is worthy of future study but is beyond the scope of this thesis, is the use of rehearsal swings after shots. The inter- and intra-participant variation in the use of practise swings identified in this study, combined with the lack of equivalence between practice and real swings (Carson, Collins, & Richards, 2014) calls in to question the efficacy of using rehearsal swings post-shot in order to improve technique in subsequent shots. However, although there may be questionable technical benefit for some golfers post-shot rehearsal swings may still serve a psychological benefit. Consequently, and given the individual differences highlighted it is evident that the use of post-shot rehearsal swings is not black and white but is dependent upon the individual and their perception of its benefits. Indeed, future research which identifies the effectiveness (or ineffectiveness) of post-shot rehearsal swings would be beneficial to players and practitioners.

Finally, the successful use of stimulated recall in this study suggests this may be an alternative method to think aloud for assessing golfers' in-play thoughts (Nicholls & Polman, 2008; Whitehead et al., 2015a, 2015b). Although this method is not without its challenges (i.e., sourcing appropriate equipment, access to players in tournaments, and keeping the time between action and recall to a minimum) the fact that SR allows a less intrusive, more ecologically-valid assessment of golfers' thoughts and behaviours in play makes it a potentially useful tool for both researchers and practitioners. Future research should further investigate the use of SR as an alternative to think aloud protocol.

5.4.3 Limitations

While this Chapter provides a number of bespoke implications for theory and practice, it is important to recognize that it was not without limitation. Beyond

generalisability issues given the selected design and sample size, data veracity may have been restricted to some extent by issues associated with the use of SR. For example, one unavoidable limitation of this method was the potential time delay between performance and recall, particularly if a player selected a shot they hit on the first hole to discuss; in such cases, there were upwards of 5 hours between shot execution and follow-up interview. Furthermore, there were potential issues surrounding the number of shots selected by participants. In designing the study I was aware that some golfers selecting more shots than others may skew the data in favour of processes used by those players. However, I was also aware of the need to collect a sufficient amount of detailed qualitative data from participants. I further felt that players discussing a set number of shots from each round may have proved problematic due to players simply not hitting many bad (or good!) shots during some rounds. Ultimately, however, I feel that the data and quotes presented are not biased towards any individual/s and the results accurately represent the group as a whole. In a similar vein it is also important to note that because the frequency data was used to assess meso-level processes used across all participants rather than between some participants (i.e., I compared all good shots to all bad shots regardless of who hit them) the fact that some players selected six video clips to discuss whereas others may have selected 12 was not detrimental to the quantitative analysis undertaken. Finally, whilst participants in this study all played at a high level, the fact that they did not use caddies differentiates them on one level from the participants in Chapter 4. In particular, this resulted in a lack of reporting on confirmation and revision of mental models in the post-shot routine , meaning that one element of the post-shot routine identified in Chapter 4 has yet to be corroborated and, more importantly, unpacked through real-time research. Indeed, while anecdotal evidence clearly points to role of caddies in affirming or altering mental models, future work needs to explore the specifics of this process and any consequent implications for players' meso-level processes.

While acknowledging these potential shortcomings, I also ask the reader to consider a number of characterizing traits in support of this study's quality (Sparkes & Smith, 2009). Specifically, methodological coherence (Mayan, 2009), or methodological integrity (Levitt, Wertz, Motulsky, Morrow, & Ponterotto, 2017) was aided by using my pragmatic research philosophy to inform our practice-oriented research questions, participant selection (i.e., individuals of an appropriate level for the study aims), and data analysis (i.e., the use of both qualitative and quantitative analysis methods to meet the study aims). Careful focus was also placed on strategies for optimizing trustworthiness within the data collection (especially in relation to the use of SR) and data analysis processes (cf. Methods section and Chapter 3). Regarding the results, I also ask the reader to apply the "so what?" principle (Bryant, 2009). Specifically, as the primary goal for pragmatic work is to generate useful ways of addressing applied challenges (in this case, the management of time between shots and holes in high level golf), I encourage the reader to evaluate the extent to which I have delivered a practically-meaningful advance for golfers and their support personnel.

5.4.4 Concluding comments and what next?

This chapter has highlighted that the meso-level processes identified in Chapter 4 are used by high-level golfers and provide a useful framework to guide golfers towards effective thought processes and behaviours at this level of performance. However, this chapter has also highlighted the need to develop meta-cognitive skills to aid in effective application of those processes. In particular players require an awareness of when, where, how and why to apply these processes given that the content and application of some of the processes will necessarily change depending upon the shot and situation. Furthermore, despite the apparent relationship between effective use of meso-level processes and performance which has been established throughout this thesis there is the need, from an applied perspective, to conduct action-research and intervention studies that up-skill and track high level golfers in this

important area in order to assess any benefit from optimising these skills. Accordingly Chapter 6 takes a sample of high-level golfers through a bespoke, 10 week intervention targeting the development of meso-level skills/processes and assessing their impact.

Chapter 6- "Doing something about it" – An Intervention study

6.1 INTRODUCTION

In the preceding chapters I have painted a picture of what high-level golfers should, and indeed do, do with "the rest of the day". More specifically, by drawing upon understanding from previous research (Chapter 2), the opinions of elite golfers and support team members (Chapter 4) and finally, tracking a sample of high-level golfers over four rounds of competitive golf (Chapter 5), a consistent set of principles and processes have emerged which appear to be positively associated with better golf performance, particularly with regard to the management of time between shots and holes. However, the use of retrospective methods (as used in both Chapter 4 and 5) is not without its limitations (see Chapter 5). Consequently, although the meso-level processes identified so far appear valid and to share a relationship with more positive shot execution and outcomes, there is a need to more clearly clarify the nature of this relationship and investigate if a programme of psychological skills training based around these meso-level processes can improve performance. In this respect, my aim was to "complete the pragmatic circle" by applying and evaluating the knowledge that has been generated on a practically-meaningful area (Chapters 4 and 5).

There has been much research in golf on the benefits of mental skills training which includes, but is not limited to: improved motivation (Beauchamp, Halliwell, Fournier, & Koestner, 1996); perceived positive effects on overall performance (Cohn, Rotella, Lloyd, 1990); improved putting performance (Beauchamp et al., 1996; Boutcher & Crews, 1987; Forlenza, Weinberg, & Horn, 2013); reduction in the frequency of choking occurrence (Hill, Hanton, Matthews, Fleming, 2011); increased adherence to pre-shot routine behaviours

(Cohn et al., 1990); and a positive effect on self-efficacy (Short, Bruggeman, Engel, Marback, Wang, Willadsen, & Short, 2002). Within this body of work, much attention has focused on using mental skills as part of the pre-shot routine or during shot execution (i.e.., a predominantly micro-level focus; as outlined in Chapter 2). Notably, this led Hellström (2009) to state that "research is lacking on what details skilled players are focusing on before, during, and after the swing, and how focus-intensity levels may change during the round" (p.849); in other words the primary focus of this thesis. Furthermore, much of the research cited above has used putting in golf to assess the effects of psychological interventions, often due to the ability to control variables in putting as compared to other types of shots more easily. Building on from the previous chapters of this thesis, further research in to the impact of meso-level processes on *overall* game performance would therefore be of benefit to high-level players and support practitioners.

Certainly, in contrast to the amount of research on micro-level skills and processes, research on the use of meso-level processes in golf is more limited. Amongst the research which is available, Kirschenbaum et al. (1998) and Finn (2009) reported positive outcomes from the use of the *PAR* model; however, as highlighted in Chapter 2, this research was not without its limitations. As a reminder, I critiqued the applicability of the advice offered for high-level golfers and how Kirschenbaum et al.'s advice to use such general principles in specific situations was problematic. Furthermore, their proposed model for a post-shot routine only seemed to consider its' use after bad shots; as a consequence, assessing the potential benefits of a post-shot routine after all shots, as suggested in Chapters 4 and 5, would seem a logical progression of this thesis.

Outside of golf, the effects of a post-shot routine have also been examined. In the case of bowling, Mesagno et al. (2015) found a performance improvement from the use of a post-shot routine (although not statistically significant) in addition to perceived benefits

which included: a positive impact on performance; attentional and emotional control; self-awareness; self-confidence; and motivation. Furthermore, these authors argued that future research should continue to investigate the effect of post-shot routines. Therefore, in addition to representing the next step for this thesis, a study on the development of meso-level skills (including the post-shot routine) would also provide a useful addition to broader, post-shot routine literature.

Finally, given the findings from Chapter 5 and recent research on the importance of meta-cognition in sporting performance (Brick et al., 2015, 2016; Efklides, 2008), the performance effects from training golfers in why, what, when, and how to think at the meso-level of performance needs to be more clearly shown. Indeed, in Chapter 5 I highlighted a number of key considerations which needed to be addressed when training golfers in the use of meso-level processes for them to have the potentially greatest impact. Specifically, the key aim in developing pre[2]- and post-shot routines is for the player to be able to use them as a selective and flexible method of effectively regulating thoughts and behaviours during the meso-level of performance. In order to best facilitate this, I suggested that greater self-awareness from players of what they are doing and focusing on and why, plus the ability to manage that focus and associated behaviour is key to successfully using pre[2]- and post-shot routines. In this way, I suggested that golfers need to be supported in developing how to think their way around the course in an adaptive manner during meso-level time periods, as opposed to simply applying a series of standardised pre[2]- or post-shot steps before and after every shot. Investigating if, or how, proactively developing these meta-cognitive skills can impact performance would clearly be of benefit to golfers and support practitioners.

Therefore, given the findings from the thesis thus far and the requirement to investigate if developing meso-level skills has either perceived or measurable effects on performance, the aims of this Chapter were twofold. Firstly, I aimed to assess the perceived

impact of meso-level interventions with a sample of high level golfers. Secondly, I sought to assess if there was any impact on the players' objective scoring performance through these interventions.

6.2 METHOD

6.2.1 Research Strategy- A Multiple-Case Studies Approach

Given the desire to apply and evaluate the effects of a bespoke, meso-level training programme for a selection of high-level golfers, a case study approach was deemed most appropriate (Stake, 2006). More specifically, given the desire to deliver and evaluate bespoke meso-level interventions that met the needs of individual golfers, as opposed to training all individuals in the same manner, or indeed, training them in all meso-level processes, a multiple-case studies approach was deemed more appropriate than other options such as a single subject multiple baseline design (Barker, McCarthy, Jones, & Moran, 2011; Stake, 2006). This case study design also produces rich data which, in regards to this chapter, would assist in creating a detailed picture of the effects of the meso-level interventions. Furthermore, and in line with my overall pragmatic philosophy, case study research provides empirical descriptions of particular instances of phenomena with emphasis on the real-world context in which they occur (Yin, 2014). Moreover, the use of multiple-case studies enables comparisons that clarify the extent to which any findings are idiosyncratic to a single case (or player) or consistent across several cases (Stake, 2006). Indeed, the use of a multiple-case study approach allowed me to use both within-case analysis as well as cross-case comparisons to identify patterns and consistencies in participants' perceptions and performance. As per the principles of case study design (Yin, 2014), this approach also allowed me to employ a mixed method approach to collect richer and stronger evidence than may have been available through the use of one method alone (Moran, Matthew, & Kirby, 2011).

6.2.2 Participants

Given that Stake (2006) has recommended that multiple case studies should use between four and 10 cases, six high-level, amateur golfers were purposively recruited via personal contacts for the study (Frost, 2011). In order for golfers to be considered for the study they were initially approached with the aim of the study (i.e. to develop meso-level skills and assess their impact) and asked whether they felt that they needed to improve their skills at that level of performance. Those who felt they needed to improve their meso-level skills were subsequently invited to take part, provided with a participant information sheet, and then gave informed consent to take part in the study. Given the aims of the Chapter, those who did not feel they needed to improve their meso-level skills were not considered for the study, however, given that they had expressed an interest in improving their mental skills they were offered additional support with PGA professional coaches separate to this study if requested. Although no professional golfers were included in this sample (as per Chapter 5), the participants competed at the same level of amateur golf as those in Chapter 5. Furthermore, the handicap range of these players would classify them as high-level in a manner consistent with prior research (e.g., Carson, Collins, & Richards, 2016; Hill et al., 2010).

Having started the intervention period with six golfers, one participant withdrew due to personal reasons during week 3 of the intervention period. The remaining five participants who completed the study were male, University students aged between 18 and 20 years old (M = 18.8, SD = 0.68) with handicaps ranging from 1.1 to 3.8 (M = 2.12, SD = 1.06). They had golfing experience ranging from 6 to 15 years (M = 8.8, SD = 3.31 years) and were all competing for both their club and British Universities and Colleges (BUCS) golf teams. Specific details on each participant, including the meso-level area that was identified for improvement, can be found in Table 6.1.

Table 6.1 Participant Information

Participant	Age, experience (years), handicap	Identified area for improvement	Specific meso-level intervention
1	Age = 18 Exp. = 6 H/cap = 1.1	Participant identified that he had trouble dissociating attention in between shots. He would often start thinking about his next shot as soon as he had hit his previous one leading to mental fatigue.	The intervention was based on being able to neutralize attention after a shot and then to bring attention back to golf (or the next shot) at the appropriate time. Player learnt and applied pre^2-shot routine. Distraction strategies such as singing applied to help dissociation.
2	Age = 19 Exp. = 9 H/cap = 1.6	Participant identified that he had trouble controlling his reactions to bad shots resulting in extreme negative reactions which would bleed in to subsequent shots. This was particularly evident in certain rounds where one bad shot could ruin the whole round (i.e. the +12 in the pre-intervention scores).	Post-shot routine with an initial focus on reactions and reflection on shot outcomes. Player was guided through developing in-action reflective skills by reflecting against set criteria (in this case PGA tour average proximity from the hole) after every shot.
3	Age = 19 Exp. = 15 H/cap = 2.9	Participant expressed that, although on the surface he looked like he controlled his emotions well, he often struggled to accept the outcome of bad shots. He also identified that he struggled selecting and committing to an appropriate shot. It was felt that not having a clearly defined shot to commit to could be a factor influencing his reaction to shot outcomes.	A two-stage process initially developing the ability to collect and process relevant shot information to assist in selecting an appropriate shot before using this to assist in committing to the decision made. Player used the traffic light, think box play box, and self-caddie concepts.
4	Age = 20 Exp. = 6 H/cap = 1.1	Participant identified that he had trouble controlling his reactions to bad shots, often leading to focus on technique which would often lead to a break down in performance (as with the +18). However, when playing well (as the -5) he had very few technical thoughts.	The intervention focused initially on post-shot reactions before moving on to reflection, reasoning and rehearsal in the post-shot routine. Player used goal setting (process goals) to reflect back on after every shot, also developed a holistic cue for rehearsal swings.
5	Age = 18 Exp. = 6 H/cap = 3.8	Participant identified that he had issues deciding on and then subsequently committing to an appropriate shot. This lack of mental processing before a shot was mirrored in the low scores in the TOPS.	The primary aim of the intervention was to work on collecting, receiving and processing shot information in the pre^2-shot routine before moving on to committing to a decision. Player used the self-caddie and think box play box concepts.

Note. Exp. = experience of playing golf in years. H/cap = players official golf handicap at commencement of interventions.

6.2.3 Procedure

Pre-Intervention

In order to tailor the meso-level interventions to each individual, the first stage of the study involved a needs analysis with each golfer; this was a four stage process. Firstly, an unstructured interview took place with each participant to gain a clear understanding of their golfing history, aspirations, and any coaching they were currently receiving (technical, mental, or other). In addition to understanding each participant's context, this also helped to build rapport at the start of the process. Secondly, participants were asked to complete the Test of Performance Strategies (TOPS) questionnaire (Hardy, Roberts, Thomas, & Murphy, 2010); this allowed for assessment of any psychological skills or strategies being used at the start of the study so that the intervention could be made as specific to the individual and their current skillset as possible (please note that the results of the TOPS have not been provided here for purposes of brevity and given their role in supporting rather than dictating decisions around intervention). Thirdly, participants were filmed over the course of a competitive round (18 holes) with the footage then being used to undertake a stimulated recall (SR) interview. Mirroring the procedure used in Chapter 5, this involved capturing the footage on a GoPro © camera worn by myself whilst making field notes on observed actions and behaviours of the participants, specifically focusing on the meso-level of performance (i.e., the pre[2]- and post-shot routines, and time in between shots and holes). After observing their competitive round, the footage was reviewed with the player as part of a semi-structured interview. This involved questioning players on the meso-level processes used before and after good and bad shots (as identified by both the participants and myself through use of field notes) to elucidate what processes the participant currently used and if, or indeed, how they felt that these could be improved. Player perceptions therefore provided the primary basis for the interventions that followed. Finally, players were asked to provide their 6 most recent competition scores

to allow comparison with 6 scores after the intervention was completed. A summary of the identified areas for improvement and specific meso-level interventions can be found in Table 6.1.

Intervention

Following the needs analysis process, players were invited to take part in ten 1 hour long individual sessions (one session per week) to work on their specific interventions (summary details of these sessions can be found in Table 6.2 with further details in Appendix 1). In designing the interventions, initial directions were determined from the need analysis and guided by the meso-level principles and processes outlined in previous chapters. It is important to note that although the findings from Chapter 4 suggested the use and benefits from a number of novel meso-level processes, due to the study's aims and design exactly how to develop these processes was not identified, thus the interventions used were based on suggestions from research in other sports and domains, in addition to wider, non-peer reviewed golf literature. Appendix 1 outlines the interventions used, the rationale behind their selection, and the supporting evidence for their use. The initial ideas for interventions were then discussed with each participant in week 1 before being agreed as the focus for action moving forwards. Using feedback and reflections from participants plus my own reflections, weekly sessions were then designed to meet each individual's specific needs as they progressed with the intervention. Thus, the 10 week programme in Table 6.2 reports retrospectively what was ultimately delivered to each participant as opposed to being a 10 week programme that was rigidly set before week 1 and subsequently implemented without adjustment.

All of the intervention work took place at the golf facilities at Myerscough College, which included: the 9-hole golf course; driving range; short game area; and indoor golf academy. Additionally, and wherever possible, I observed participants playing in BUCS

team games to see first-hand if, and how, participants were integrating their interventions with competitive play. To supplement the weekly sessions with myself, participants were also asked to keep a reflective diary to record details of the perceived usefulness of the intervention they were undertaking in relation to their play and practice. The reflective diary was also used to stimulate discussion during the weekly sessions with myself.

Table 6.2 Summary Table of 10 Week Intervention Schedule for Participants

P	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
1	Discussion on proposed intervention and its benefits. Asked to note current pre^2-shot routine.	On-course player demonstrating pre^2-shot routine. Participant questioned on thoughts and behaviours in the routine	Observation of competitive play. Focus on starting the pre^2-shot at the appropriate time.	Outline of work for the next 2 weeks focus on when to bring attention back to golf.	As previous week, however, discussion also around useful thoughts for dissociating attention.	Integrating mental skills practice with technical practice.	Driving range session working on applying pre^2-shot routine in practice.	Observation of player practicing. Feedback given on the improvements made to practice structure	Observation of player on course. Discussion and feedback given on improvements made over the previous weeks.	Summary week. Discussion and feedback on intervention. Feed forward on possible future interventions.
2	Discussion on proposed intervention- post-shot routine to stop bad shots from bleeding in to subsequent shots. Asked to keep note of post-shot reactions over the next week.	Discussion on post-shot reactions noted by the player. Focus for the next 2 weeks was to allow an initial reaction but then use questions as prompts for reflection on the shot outcome.	Observations of competitive play with debrief after play. Focus on reaction and reflection.	Observations of competitive play with debrief after play. Focus on reaction and reflection.	On course session assessing player reactions.	Observation of player in competition particular focus on reflection on shot outcomes.	Observation of player in competition particular focus on reflection on shot outcomes.	Discussion on when and why it would be appropriate to use post-shot routine.	Observation of competitive game. Discussion around how the game was a good example of adaptive use of post-shot routine.	Summary week. Discussion and feedback on intervention. Feed forward on possible future development of the intervention.
3	Discussion on proposed intervention- pre^2-shot routine allowing for greater clarity in decision making. Asked to note current routine.	Discussion on noted routine, unpacked on course, suggestions for improvements to be made.	On course discussing the need to collect appropriate shot information to aid in decision making. Self-caddie concept.	Observation of competitive play, focus on shot selection. Feedback given after the round.	Discussion on how once shot information has been received an appropriate shot must be selected and the need to sometimes play aggressively to a conservative target. Player to use idea of traffic light system for the next week.	On course unpacking player process on collecting shot information and deciding on a colour code for the flag.	Explain the need to commit to a shot and target once shot information has been collected. Think box/play box.	On course observation, particular focus on evidence of use of pre^2-shot routine.	On range highlighting the need to practice the pre^2-shot routine alongside technical skills.	Summary week. Discussion and feedback on intervention. Feed forward on possible future development of the intervention

4	Discussion on proposed intervention- post-shot routine in particular reactions then RRR. Asked to note typical post-shot reactions.	Discussion on typical post-shot reactions and their relationship to performance. Focus for next 2 weeks was to have more frequent, smaller reactions rather than bottling up and having one large, destructive reaction.	Observations of competitive play with debrief on reactions after play. Player to find reactions that worked for him that were more controlled e.g., self-talk as opposed to throwing clubs.	Observations of competitive play with debrief on reactions after play. Player to find reactions that worked for him that were more controlled e.g., self-talk as opposed to throwing clubs.	Player to keep notes on reactions. Moved on to discuss post-shot reflection and moving away from technical thoughts post-shot.	Player to work with coach to develop a holistic, rhythmical cue that can be used after bad shots.	On course observation unpacking reactions and the use of post-shot reflection and rehearsal swings.	On the driving range integrating post-shot routine in to practice schedule.	Observation of player on course. Discussion and feedback given on improvements made over the previous weeks.	Summary week. Discussion and feedback on intervention. Feed forward on possible future development of the intervention
5	Discussion on proposed intervention- pre^2-shot routine allowing for logical, sequential collection of shot information before committing to a decision. Asked to note current routine.	On-course player demonstrating pre^2-shot routine, discussion to unpack.	Work on-course considering all relevant shot information. Player to act as self-caddie.	Discussion on progress to date, player to fill in process completion sheet, aiming for 18 ticks (process done on all shots).	Continuing focus on completing process on all shots. Observation and feedback in competition.	Continuing focus on completing process on all shots. Observation and feedback in competition.	Work on committing to a decision before going in to pre-shot routine. Think box play box	On the driving range integrating collecting and receiving shot information plus think box/play box. Player to integrate mental skills practice in to technical practise.	Observation of practise session and 6 holes played on course, feedback given on progress to date.	Summary week. Discussion and feedback on intervention. Feed forward on possible future development of the intervention

Post-Intervention

Once the 10-week intervention period was over, players were invited back to recomplete the TOPS questionnaire to identify any changes in their general skills and strategies. Secondly, the SR process used in the needs analysis was repeated. Players were recorded over 18 holes in a competitive round. This footage was then used as part of a SR interview to check if and how the players were using the meso-level processes developed during the intervention. These data were not subjected to qualitative analysis as they were simply used to identify if players were using the meso-level processes developed when competing. Finally, an exit interview was used to assess the impact of the intervention in addition to any suggested improvements to either the intervention or the process of its' delivery from the participants (see Table 6.3 for a copy of the interview guide). Following completion of the exit interview, players were also asked to submit their next 6 competitive scores in order to allow comparison against pre-intervention objective performance. Although pre- and post-intervention score were collected from different courses, in different competitions, and in different conditions, and thus were not a controlled comparison, they were collected to provide a gauge on players' performance pre- and post-intervention. Additionally, these quantitative data were used to supplement the qualitative data from participants' perceptions of the interventions.

Finally, although it is recommended to use post-intervention social validation including the player and any significant support personnel (as per Harwood, Barker, & Anderson, 2015) this was not deemed appropriate in this case. Primarily this was due to participants' lack of access to significant support personnel (such as their coach) due to being away from home whilst at University. While most of the participants had a coach they were primarily based at their home club and thus had limited contact with the participants during the intervention period.

Table 6.3 Exit Interview Schedule

Impact and usefulness of the intervention

QUESTION	PROBE
Overall how would you rate the previous 10 weeks of work on your intervention/s?	• Scale from 1-10
Would you say the intervention has been useful? If so, how useful would you say the intervention has been? What has been most useful? The structure? The skills? The practices?	• Reflect on the start of the process, what were the areas for improvement identified? • Has it improved their game • Has it improved their approach at the meso-level • 1 session per week, too much, not enough, just right? • Review some weekly sessions
If you were asked to identify one major/main impact from the interventions/s what would that be? Were there any additional positive impacts derived from the intervention/s?	• Reflect on any key milestones, eureka moments, or specific performances (specifically competitions). • How has it impacted nature and focus of attention before or after shots (depending on specific intervention)? • How has it impacted performance and scores?
Have there been any negative impacts from the intervention/s?	
Do you consider splitting the round into pre[2] and post-shot phases useful or not? If not, why not?	• Were they aware of these phases of performance previously?
Will you continue to use the mental skills learnt/developed once this process has finished? If not, why not? If yes would you like to develop these skills further? How do you think these skills could be developed further?	• How would you develop your own skills? • If teaching these skills to someone how would you do it?

Potential Improvements to the intervention/s

Did you feel like your needs were correctly diagnosed? If not what do you feel the main focus should have been? If you were to change anything about the intervention/s what would it be? Why? What would you add? What you take away?	• Use of SR, TOPs and initial interview • Potential areas for improvement which were considered and then not chosen as primary focus • Reflect on weekly sessions how could these be changed/enhanced? • Delivery of the intervention/s • Content/process of the intervention/s • From initial assessment through to end • What would adding or taking those things away change?

6.2.4 Data Analysis

Qualitative Analysis

Given that the primary aim of this chapter was to assess the perceived impact of the meso-level interventions, analysis was undertaken on the exit interview data. Interviews were transcribed ad verbatim then emailed to each participant to ensure that answers given at interview accurately and fairly represented their views; no changes were requested through this process (Sparkes & Smith, 2009). Following this, thematic analysis (TA) was deemed the most appropriate method of analysis for the exit interview data (Coolican, 2014). Due to the aims of identifying participants' perceptions of the interventions, a data-driven or inductive, bottom-up approach to TA was adopted where I did not start out with any preconceived notions of what the final themes should look like (Coolican, 2014). Following this, the analysis was completed following the process recommended in multiple-case study literature (Stake, 2006). Firstly, within-case analysis was conducted to become familiar with each case as a stand-alone entity. Through this process I familiarised myself with the data of each case by reading and re-reading each individual interview transcript and noting any preliminary patterns within each case. Secondly, QSR NVivo 10 was used to generate initial

codes from each interview. Once the data for each participant (or case) had been collated, cross-case analysis was conducted (Stake, 2006). Within this process I searched for any similarities and differences between cases in order to recognise if any patterns and relationships existed between cases (Stake, 2006). Specifically, codes for each case were compared to identify the extent to which the same codes were present across cases, where the same codes were present these were grouped in to initial themes. Subsequently, the potential themes were reviewed to examine whether the themes 'fitted' the entire data set. Finally, themes were confirmed and collated in to higher and lower order themes.

Quantitative Analysis

In order to assess the impact of the interventions on performance, players were asked to submit their next 6 competitive scores (18 holes) post-intervention. These were then inputted in to MiniTab7 alongside the pre-intervention scores. Two-tailed, paired samples t-tests were then carried out on both the grouped and individual data for scores pre- and post-intervention to assess if the intervention had made any significant difference to players' scores.

Trustworthiness

Processes to enhance the trustworthiness of data collection and analysis were followed as per Chapters 3 to 5. In short, rapport was developed with participants by: (a) investigating participants' prior golfing history to convey appreciation of their current situation and performance levels; (b) knowledge and empathy with their current situation having competed at the same level as participants in the past; and (c) the interview questions and probes were designed to be open-ended to allow participants to express their genuine thoughts and experiences (Jones, 2015). Additionally I kept a reflexive journal which provided opportunities for reflection on the research process, interventions, and how personal experiences and biases were interacting with the research process (Patton, 2002).

Trustworthiness of the data analysis process was also addressed (as per Chapter 3), specifically a member of the supervisory team reviewed meaning units coded from an early interview and then assessed the labels given to meaning units from roughly 10% of all other interviews, including their fit with the overall thematic structure. In the few cases of different views, reflective and critical discussion took place until agreement was reached. Additionally, throughout the process and to aid our awareness of our interacting assumptions and to provide a full critique of developing themes, another member of the supervisory team was also a *critical friend* throughout (Faulkner & Sparkes, 1999). Finally, each participant was asked to check their transcribed interview, followed up by face-to-face meetings, to discuss my interpretation of their quotes used in this chapter. This process revolved around gaining assurance over my accuracy, balance, fairness, and respect (Sparkes & Smith, 2009).

6.3 RESULTS

The aims of this chapter were twofold. Firstly, I aimed to assess the perceived impact of meso-level interventions with a sample of high level golfers. Secondly, I sought to assess if there was any impact on the players' scoring performance after the delivery of these interventions. Table 6.4 shows the higher and lower order themes derived from the thematic analysis undertaken on the exit interviews with all participants. Reflecting the order of the aims of this chapter, qualitative data from the thematic analysis are presented first before results on pre- and post-intervention scores are presented.

Table 6.4 Results from Thematic Analysis of Exit Interviews

Higher Order Themes	Lower Order Themes
Development of specific meso-level skills	• Positive change in post-shot reactions • Development of post-shot reflection • Improved post-shot acceptance • Development of collection and processing of shot information in pre^2-shot routine • Greater commitment to decisions at the end of pre^2-shot routine
Associated general benefits and improvements	• Development of meta-cognitive skills • Enhanced attentional control • Improved emotional control

6.3.1 Development of meso-level skills

With regards to my first aim, participants reported that the interventions had developed a range of specific meso-level skills. Within this higher order theme, five lower order themes were identified as follows: *positive change in post-shot reactions; development*

of post-shot reflection; improved post-shot acceptance; development of collection and processing of shot information in pre^2-shot routine; and *greater commitment to decisions at the end of pre^2-shot routine.*

Positive change in post-shot reactions

Of the participants who worked on developing post-shot processes, both reported a positive change in reactions after shots. During the pre-intervention data collection, both P2 and P4 displayed a range of strong, negative reactions to bad shots ranging from negative self-talk to slamming their club in to the ground. Of the two participants, P2 was more aware of his negative reactions after poor shots; on the other hand, P4 showed a lack of awareness of his reactions after bad shots. Indeed, prior to watching himself as part of the pre-intervention SR protocol, P4 referred to himself as the "ice man" as he felt he remained calm after bad shots, which was contrary to what I saw when watching him play. After a more honest appraisal of his post-shot reactions, P4 admitted that at times he did struggle with negative reactions pre-intervention and that: "the shots I hit in the past, if I hit a bad shot I would think it was the worst possible thing that could ever happen . . . then that is where you would see the [negative] reaction". This was echoed by P2 who felt that "before, if I hit a bad shot I would have a really bad [negative] reaction". Post-intervention P4 described that because he was more aware of his negative reactions and the effect they could have he was now trying to "react to it [a bad shot] in a more positive, or less negative way"; indeed, the change in reactions was not always a case of changing a negative reaction in to a positive one but often involved making the negative reaction less negative, as shown by P2: "so now I know it's ok and actually can be good to have a little [negative] reaction to get it [the frustration] out rather than letting it build-up". To reiterate, participants felt that the development of post-shot psychological skills had led to a positive change in reactions

particularly after bad shots. Although this did not always mean displaying a positive reaction, it did, generally, mean they reacted less negatively than before.

Development of post-shot reflection

In a similar vein to changes in post-shot reaction, both participants who worked primarily on the post-shot processes demonstrated a marked development in their ability to more effectively reflect on their shots. For P2 this was aided through the use of post-shot reflective questions such as: "Was that a good shot? Was that a bad shot? What could I have done better?" In contrast, P4 tended to use the process of reflection more after bad shots, specifically questioning if the outcome "is really that bad? And I think now after most shots it's not really that bad, and that has helped". Furthermore, both participants felt that their reflection was made more effective by having something to reflect against. For example, P2 admitted to being a perfectionist pre-intervention and was very self-critical if the outcome of his shots weren't what he considered to be perfect; post-intervention, however, he felt his post-shot reflection was aided by judging the outcome of his shots versus PGA Tour averages. Undergoing this process helped him to realise that even the best players in the world do not hit perfect shots all the time and thus he felt "there is no point getting mad with yourself [after a shot] when you're like 3 feet away from tour average [for proximity to the hole]". For P4, he centred his post-shot reflection around carrying out his mental processes for each shot and felt after a shot "I would just look back and think did I carry out my processes, if I did then there isn't much else I could do". To reiterate, the interventions undertaken helped in developing participants post-shot reflective skills primarily by giving them an understanding of how to reflect and criteria to reflect against.

Improved post-shot acceptance

Pre-intervention, both P2 and P4 had expressed issues with accepting the outcome of bad shots which would often lead to a series of bad shots or poorly played holes as shown by

P2: “sometimes I found it hard to accept my bad shots even if they weren’t actually that bad. . . I would be really hard on myself which would hurt my game”. This was also shown in one pre-intervention round from each participant (+12 for P2, and +18 for P4). Participants felt that improvement in reflective skills (the preceding process in the post-shot routine) had assisted in their ability to accept shot outcomes as illustrated by P2:

> If you’ve hit a bad one and you can look back on it and think ‘is it really that bad?’ And then think ‘well no, it’s not, maybe I just mishit it, or actually I can get it up and down from there’ then it’s much easier to accept it and move on.

Reflecting how the interventions had facilitated the improvement in, and development of, acceptance period, P2 felt he was now:

> Able to accept a golf shot. Unfortunately you are not always going to be able to hit a perfect golf shot but you have to be able to accept it, you are the one that hit it; your playing partner has not hit it here. You made the golf swing so you’ve got to get on with it.

Furthermore P4 understood the importance of post-shot acceptance and accepting all shot outcomes : “Either way [whether it is a good or bad shot] I have to accept the shot outcome and move on there’s no point dwelling on it [the outcome]” and that “keep thinking about it [the previous shot] doesn’t help [performance] you have just got to accept it’s done and move on”

In sum participants felt that the interventions aided the development of post-shot acceptance which subsequently allowed them to more effectively move on from their previous shot.

Development of collection and processing of shot information in pre^2-shot routine

Participants who worked on developing skills in their pre^2-shot routines described developing their ability to collect and process shot information, specifically in terms of giving

more careful consideration to all relevant shot factors. Indeed, prior to their interventions both P3 and P5 had described how they felt they were generally poor at making decisions due to not fully considering all relevant factors before their shots. For example, P3 felt that before the intervention he might "consider things like the wind or pin position" but usually "I would just get a yardage [distance for the shot] and pull a club out [of the bag]". Similarly, P5 felt that "before I just would really put my bag down, get the distance and then get a club I didn't think of anything else". My observations mirrored these participants' reflections as they would often appear to make quick decisions (therefore missing key details, such as the best side of the pin to miss on) and end up in bad positions (e.g. to the right of the green with the pin on the right), usually leading to dropped shots. Reflecting on the changes made during the intervention, however, P3 felt that he was now "focussing on more factors" such as "the wind, places not to miss, where to try to the leave the shot so I've got an easier next shot or putt". In a similar vein, P5 reflected on the process of now acting as a self-caddie when collecting and processing shot information:

> So now I make sure that I think what would the caddie tell the player? So I make sure I get the wind strength and direction, where the flag is, where I want to leave it for my next shot, stuff like that, not just whipping the club out of the bag and hitting it.

Watching both participants during and post-intervention they began to make noticeably less course management errors, have less penalty shots, and if they missed a green with an approach shot they began to miss on the correct side (i.e. missing to the left if the pin position is on the right of the green, thus giving them an easier chip). This was reflected in players' post-intervention perceptions with P3 believing that "using that [traffic light] system allowed me to make better decisions on when to attack the flag and when to maybe play more defensively . . . so now I'm not hitting it into as many bad spots". Additionally, P5 felt that "my shot making decisions as a whole are so much better now . . . which has helped me to hit

it into better positions". This improvement in course management and decrease in decision making errors was also reflected in their improved and more consistent scoring (see Table 6.5).

To summarise, players who undertook development of pre^2-shot routine processes developed their ability to collect and process more (and more relevant) shot information before their shots.

Greater commitment to decisions at the end of pre^2-shot routine

The final meso-level skill that players discussed developing through the intervention process was commitment to decisions at the end of the pre^2-shot routine. P1 felt that, pre-intervention, he would often second-guess his decisions by allowing himself "too much thinking time" due to "getting the club out [of the bag] before the 3 other people had played and that allows more time for you to doubt yourself". Indeed, Players 3 and 5 felt that their poor consideration of shot factors pre-intervention made it difficult to then commit to a decision on the shot to hit, as reported by P3:

> Before doing the traffic lights system, I would often think "well I need to hit it safer here" but then I wouldn't really take all the factors in to consideration and come up with a decision and target that I could really commit to . . . I'd just end up aiming at the flag when I should have been playing safer and then [ending up] getting in trouble.

Following the intervention period, players reported feeling more committed to their decisions before entering the pre-shot routine; in particular, P5 found the use of a decision line useful to delineate the pre^2-shot routine from the pre-shot routine:

> So now I'm considering all the things [shot influencing factors] much more, doing the self-caddie thing we talked about and then that line [decision line] has really helped; now I make sure I am happy with the decision I've made before I go over that line.

As evidenced, the development of earlier stages of the pre^2-shot routine and specific interventions (i.e. the traffic light system and decision line) helped players to commit to their decision before entering their pre-shot routine.

6.3.2 Associated general benefits and improvements

In addition to the development of specific meso-level skills, there were also other general benefits and improvements associated with the interventions. Within this higher order theme were three lower order themes, they were: *development of meta-cognitive skills, enhanced attentional control,* and *improved emotional control.*

Development of meta-cognitive skills

One particularly key psychological outcome from the interventions was the development of meta-cognitive skills. More specifically, participants described that they were more aware and capable of controlling what, when, why and how they were thinking following the interventions and were now more focussed in their thinking. Reflecting on the development of these skills, participants firstly described how they had become more aware of their thoughts and behaviours through the stimulated recall protocol and how that was affecting their performance. Reflecting on the increased awareness of their thought processes, P4 felt that:

> I was more aware [of my reactions] because I thought I was totally calm on the golf course but then you look [at the video] and it made me realise that [controlling reactions] was the part of my game that really needed looking at.

Additionally, P1 felt that "it was really useful to have video evidence of what I was doing; I became aware of it and then we could assess it and work to improve it".

Supporting the use of SR, participants also felt that the feedback received in individual sessions had helped in improving self-awareness of their current meta-cognitive skills. Indeed, P1 felt that from the individual sessions he now knew "more and more about

my game and how it is affecting my rounds". Furthermore, when discussing the effect his negative reactions where having on his performance, P4 stated that he was "much more aware of it now" and that "I wouldn't say the bad reactions have completely stopped now but I am much more aware of what I am doing".

In line with this greater self-awareness of their thoughts and behaviours, participants also noted that following the interventions they understood the importance of performance-appropriate thinking and learning how to think correctly. Indeed, P2 felt that from undergoing the interventions he had "learned how to think" whilst P4 was now "concentrating on the process of getting my thinking right". With regards to knowing when and what to think, participants who had undergone development of their post-shot processes demonstrated particularly notable understanding of when to use or not use the processes, as illustrated by P4: "I tend to focus more on doing the post-shot stuff after bad shots but sometimes after good shots as well, it depends really on the situation or how I am feeling, or how the shot has finished". Furthermore, P2 suggested that "after a good shot there is nothing really to reflect on apart from maybe a little bit of reinforcing self-talk" and that he tended to use post-shot processes "mainly after bad shots". This conscious control over when and what to think was also demonstrated by participants who worked on pre[2]-shot routine processes. For example, P1 suggested that at the end of the intervention period "there is still a conscious effort to think: right, now is the time to think about my shot" and that "I still have to think about it [when to think about the shot]" although "for some shots it's not so bad but I mostly still have to think about it [i.e., when to start thinking]".

Clearly, becoming more aware of and developing, meso-level thought processes prompted participants to become more aware of: their own thoughts during that performance time period; what effective thinking is at the meso-level; and when and how to deploy those thoughts and skills in a contextually-appropriate manner.

Enhanced attentional control

Through developing the meat-cognitive skills of knowing what to think and when some participants also felt that the interventions enhanced attentional control throughout the meso-level of performance through ontrolling what they focussed on and when. Specifically, P1 felt that the intervention had assisted him in focussing his attention on golf at appropriate times. Pre-intervention he felt that during a round he spent too much time thinking about his next shot which led to him becoming mentally fatigued by the end of the round. Post-intervention he felt that "I'm now spending less time on the course thinking about my game" and that "I now have this [pre-pre-shot] routine where I don't start to think about the shot until it's my turn. . . which shortens the time I've given myself to think". Similarly P2 reflected that the post-shot routine had helped to control when to think about his previous shots and when to dissociate his attention:

> "So I'll allow myself that bit of time after a shot to reflect on it, what went wrong? What went right? But then I want to talk about something else, what are you doing tonight? Are you going out? That sort of thing".

Indeed he felt the concept of only focussing on golf at appropriate times in the round helped to "not over-focus myself, yeah I know there's times when I need to concentrate but I like to talk [in between shots] about something other than golf".

Improved emotional control

Secondly, participants who undertook training on post-shot processes discussed the interventions' impact on emotional control, particularly during bad rounds or after bad shots. For example, P4 discussed how during a particularly challenging round he had used his post-shot processes throughout, which helped him "to stay pretty level-headed" and that following those processes "helped me to stay calm all day, so that really helped a lot". Furthermore, P2 reflected that, following the intervention, his emotional reactions to bad shots had "gone from

not being horrendous, but not good, to now being much more controlled" and that this then had a positive effect on his game: "If I do hit an horrendous shot then my temper is not going to overflow and that is not going to [then] effect the rest of my game".

6.3.3 Impacts on performance

The second aim of this chapter was to assess any impact on the players' scoring performance through the aforementioned interventions. In order to do this, participants submitted their previous 6 competitive scores pre-intervention and then their next 6 competitive scores post-intervention, in addition data is presented from participants reflections on the impacts on performance noted in their journals. The results for individuals scores and grouped data are shown below in Table 6.5.

Table 6.5 Impact of intervention on scoring performance pre- to post-intervention

Participant	Pre-intervention score to par (6 rounds)			Post-intervention score to par (6 rounds)			95% CI for Mean Difference		
	M	SD	n	M	SD	n		t	df
1	1.67	1.86	6	3.17	3.31	6	-6.09, 3.09	-0.84	5
2	3.83	4.79	6	1.83	3.82	6	-2.35, 6.35	1.18	5
3	5.67	4.08	6	2.83	2.71	6	-2.20, 7.86	1.45	5
4	3.50	7.74	6	1.67	2.34	6	-7.52, 11.18	0.50	5
5	7.17	3.54	6	3.33	1.86	6	-0.33, 8.00	2.36	5
Grouped	4.37	4.86	30	2.57	2.78	30	-0.35, 3.95	1.71	29

Note. All results non-significant

Although all participants with the exception of P1 showed a decrease in both mean score and standard deviation pre- to post-intervention, none of these differences were statistically significant. However, the trends do point to a marked improvement in scoring (for 4 of the participants) and a lack of statistical difference does not mean that there was no *meaningful* difference in perceived and actual performance. Indeed, players' perceptions were that their scoring had improved both in terms of overall scores being lower, and their overall scoring being more consistent (i.e. lower variance in round to round scores).

Reflecting the data above P2 felt that he had "seen a massive decrease in my scores" so too P3: "I think it definitely has improved my scores"; P4: "I haven't really had any bad scores maybe the worst was 4 over par in really bad conditions"; and P5: "I feel like my scores have got better". Although his post-intervention scores did not improve P1 felt that during the intervention period he had "improved my scores". In relation to improved consistency of scoring which is shown by the decreasing standard deviations above, two participants reflected the thoughts of the group over all with P4 feeling that he had "some really bad scores" before the intervention but that now "from week to week my scores are much more consistent", similarly P5 described how "I haven't had any really low scores but I think I have just been much more consistent".

Finally, when considering all of the pre- and post-intervention scores for all participants there was once again a marked decrease in both mean score and standard deviation. Importantly, however, that difference was not statistically significant.

In regards to participants reflections noted in their journals there was a general consensus that the interventions had helped to improve their performance. P1 noted that during the intervention period he had shot his best ever score (-5) and that the intervention had "really helped, usually if I got 1 or 2 under (par) I would start to think about making it in to the clubhouse but the pre^{2}-shot routine helped me to stay in the present and keep making birdies. The only time it slipped was on the 18th I should have birdied that as well". Throughout his journal P3 noted that the use of the traffic light system was starting to leave him "lots of birdie chances" and that he was making "less mistakes. . . hitting it in to better places" and that was making his scoring "generally better and more consistent". Reflecting on his overall performances in University team games over the intervention period (5 wins and 1 draw), P2 felt that "post-shot reflection, self-talk and acceptance helped me to forget about the bad shots and helped me to remember the good shots so when I was having a bad

round I could still grind out a win". Finally, acknowledging the improvement in his performance over the intervention period P5 felt that at the start he "made a lot of mistakes [in decision making] which made scoring hard" but at the end he had noticed "an improvement in shot making decisions" which had given him "more opportunities to make birdies, less bogies and improve my scores".

Therefore, although the data collected on score pre and post-intervention show no significant performance improvement from the interventions reflections from exit interviews and participants' journals suggest a perceived improvement in performance, development of meso-level skills, and other associated general benefits and improvements.

6.4 DISCUSSION

6.4.1 General discussion

The aims of this chapter were twofold. Firstly, I aimed to assess the perceived impact of meso-level interventions with a sample of high level golfers. Secondly, I sought to assess if there was any impact on the players' objective scoring performance through these interventions. This section will discuss the major findings from this study in relation to current literature whilst also addressing strengths and weaknesses of the study.

In relation to my first aim, the first perceived impact from undertaking interventions targeted at meso-level processes was the development of specific meso-level skills in both the post- and pre^2-shot routines. This is consistent with research in golf which has shown that following a mental skills training programme leads to development specific mental skills (Finn, 2009), in this case skills in both the pre^2- and post-shot routines were developed or enhanced.

Firstly, in the post-shot routine there was a positive change in players reactions, in particular after bad shots, which was facilitated by players becoming more aware of their reactions (via the SR protocol). It is important to note that the intervention did not remove all

negative reactions but rather, made players more aware of the effects of an overly negative reaction, thus players' reactions to bad shots became more positive and facilitative to subsequent shots. Furthermore, the improvement in post-shot emotional responses found in this study mirrors previous findings from Mesagno et al. (2015) who found that use of a post-shot routine in bowling improved players' perceived emotional control.

Secondly, participants reported development of post-shot reflective skills. In order to facilitate this development players were taught what to reflect against and how after each shot in order for the reflection to benefit their performance, otherwise known as reflection in action (Schön, 1983). For one player, post-shot reflection centered round realistically evaluating his performance, specifically the finishing proximity of his shots from the hole. Indeed, realistic performance evaluations have been shown to be a key psychological characteristic for those aspiring for excellence (MacNamara, Button, & Collins, 2010), additionally, in the case of golf, being able to reflect upon shot outcomes and realistically appraise them is a key post-shot skill which can impact subsequent performance (Hill et al., 2010). Furthermore, this study supports the findings from Chapter 4 that developing appropriate post-shot reflection positively influences acceptance of shot outcomes

In the pre^2-shot routine the development of collecting and processing shot information was facilitated by two interventions, firstly P5 followed guidance from Aitken and Weigand (2007) and acted as a self-caddie. Secondly, P2 used the traffic light system for grading pin position difficulty. Developing the ability to collect more, relevant shot information and then process it effectively positively influenced decision making, specifically by assisting players to make better shot decisions and less course management errors which is key in optimising scoring performance particularly when performing sub-optimally (Aitken & Weigand, 2007). In this case making better shot decisions and less course management errors positively influenced the decrease in players' scores and improved scoring consistency.

In addition to the development of specific meso-level skills there were also associated general benefits and improvements derived from the interventions. Specifically these were the development of meta-cognitive skills, enhanced attentional control, and improved emotional control. Through the process of developing meso-level skills, participants reported the development of meta-cognitive skills, specifically players learned what to think and act, and how (via an understanding of the meso-level processes) but also when and why to think and act (or not) that way. This development of appropriate *attention* (i.e., what to focus on) and appropriate *intention* (i.e., actively managing the purpose and nature of that focus: Brick et al., 2015) was highlighted in Chapter 5 as a meso-level, meta-cognitive skill required for high-level golfers. Furthermore, in relation to appropriate intention, participants showed an awareness of, and the ability to adapt and regulate their thinking and behaviour (Brick, et al., 2016; Efklides, 2008). Indeed, I have already highlighted in Chapter 5 the importance of developing performance expertise (i.e., how to think around the course in an adaptable manner) over performance competencies (i.e., simply learning and applying standardised steps of a pre[2]- and post-shot routine). This was shown in this case through participants contextual use of post-shot processes dependent upon shot outcome (i.e., using post-shot processes only at appropriate times).

The second associated benefit from the interventions, and one closely related to the development of meta-cognitive skills, was the enhancement of attentiional control. Specifically by developing an awareness of what to think and when players were better able to control how and where they directed their attention. Indeed, the positive benefits of this mirror the results from Chapter 4 with participants reporting that through the use of meso-level processes they found it easier to stay in the present and their thinking of past or future events (or shots) was limited.

The final associated benefit from the interventions was a perception of improved emotional control from the use of a post-shot routine. As previously discussed, prior research (Mesagno et al., 2015) has found that implementing a post-shot routine has a positive impact on athletes' perceived ability to control their emotions. Additionally, participants from Chapter 4 also felt that post-shot processes aided in controlling emotions. Specifically, and as was also suggested by participants in this study, a reaction, even a negative one, if carried out appropriately (in terms of timing, thoughts, and actions) could have a positive effect on emotions and prevent players from becoming frustrated and "blowing up" or potentially choking (Hill et al., 2010).

In regards to my second aim, although there were no statistically significant improvements in performance (scoring) post-intervention, four players did improve their mean score and lower the standard deviation with only P1's scoring deteriorating. Although the difference in scoring was not statistically significant, players did perceive it to be meaningful and their reflections on their scoring during the intervention period show this. It is also worth stating that, especially at high levels, statistical and performance significance may be different! This mirrors findings from previous studies which have investigated the impact of meso-level skills on performance and reported non-significant differences in performance measures but positive psychological benefits such as improved attentional and emotional control, and improved self-confidence (Kirschenbaum et al., 1998; Mesagno et al., 2015).

6.4.2 Implications for practice

Given the applied and practical nature of this study there are a number of novel insights which provide guidance for golfers and practitioners on how to develop meso-level skills and the benefits associated with doing so. Firstly, this is the first study since Kirschenbaum et al. (1998) to support and evidence the benefits of training meso-level skills

on golf performance, and also the first study to train golfers in the use of the meso-level processes identified in Chapter 4. The evidence presented here suggests that developing appropriate meso-level skills (from Chapter 4) has a positive impact on performance alongside other benefits similar to those identified in previous studies (Hill et al., 2010; Kirschenbaum et al., 1998; Mesagno et al., 2015).

Secondly, the importance of developing meta-cognition highlighted in this chapter and Chapter 5 implies that in order to effectively learn and then deploy meso-level skills players should be assisted in not just learning the processes or skills themselves (i.e. the what and how to think and act) but also develop an understanding of when and why to think (or act) in a certain way, or not. Furthermore, this study supports the findings from Chapter 5 in prioritising the development of performance expertise over performance competencies in order for players to derive the maximum benefit from developing meso-level skills.

Finally, this study has also made a start in identifying useful tools for developing meso-level skills. Practitioners should reflect on the findings of not only this Chapter but the thesis as whole to find ways to develop additional tools, interventions, and strategies for effectively developing meso-level skills.

6.4.3 Strengths and limitations

This study has made a useful further addition to the literature on meso-level skills in golf. This was in part due to strengths in the overall design of the study including the use of multiple and novel (i.e. SR) data collection methods which allowed for a rich, coherent picture to emerge. Additionally the level of players used in this study, although different to previous studies in this thesis, was consistent with the level of players used in previous studies of high-level golfers (Carson et al., 2016; Hill et al., 2010).

Although this study provided a number of novel insights, it was not without its limitations. Firstly, the use of case study design is not without its potential disadvantages.

First of all, given the qualitative nature of some of the data collection methods used, the extent to which results are generalizable is limited (Coolican, 2014). Secondly, there is an obvious lack of repeatability due to the individualised nature of the case studies; no two cases are the same, meaning such work is inherently often not replicable. In this instance, however, this uniqueness, and my overall pragmatic approach, was part of the reason for carrying out the case studies (Coolican, 2014; Giaccobi et al., 2005). In short, the individual focus and approach are key features of the work. Finally, the close relationship required between the researcher and participant, essential in case studies in order to access rich information from the participant, may raise issues in relation to the trustworthiness of that data collected. However, when these issues are addressed and managed, the pragmatic approach suggests that the close relationship between researcher and participant is advantageous (Giaccobi et al., 2005).

Secondly, although the sample size fell within the suggestions of Stake (2006), the one withdrawal left participant numbers towards the lower-end of the recommended amount. Had a larger sample size been used it is possible that different or additional data may have emerged; for example, additional benefits and associated improvements from the interventions. Finally, collecting data from more than 6 rounds pre- and post-intervention would potentially have yielded some statistical significant difference in the results. Additionally, and as noted in the Method, pre- and post-intervention scores were likely influenced by a number of factors out of my control: specifically, the course on which the rounds were played, the weather conditions, and the nature of competition being played in (which may have had a psychological impact on the player).

6.4.4 Concluding comments and what next?

To conclude, this Chapter has highlighted that the development of meso-level skills indentified throughout this thesis has a positive impact on performance, together with other

associated benefits. It has also supported the findings from Chapter 5 that development of the meso-level processes needs to be performed in conjunction with educating players on why and when to use meso-level skills, particularly in relation to the post-shot routine. Whilst the thesis up to this point has provided a number of novel insights and contributions to both golf and the sport psychology literature, there are still potential avenues for future research which will be discussed in Chapter 7.

Chapter 7 Conclusion and recommendations

7.1 RESTATING THE RESEARCH PROBLEM

At the beginning of this thesis, I outlined how I was broadly interested in what high-level golfers should do with their time on the course when they are not executing their shots. I aimed to provide answers to this broad question by addressing three overarching aims, namely: a) to explore perceptions of attentional focus 'best practice' from players, coaches and support staff and determine its congruence with current sports psychology literature (i.e., what should players being thinking and doing outside of shot execution?); b) to analyse high-level golfers over time to determine any significant patterns in practice which relate to attentional focus 'best practice' (i.e., what do golfers actually do? And do they follow the best practice suggested?); and c) To apply an intervention based on models of best practice in order to train for the attentional demands of high-level golf (i.e., does following the best practice identified improve golf performance?). The aim for this conclusion therefore is to answer these questions by drawing on the major discursive findings from each chapter of the thesis. Furthermore, in answering these questions I suggest avenues for future research.

7.2 WHAT SHOULD PLAYERS DO WITH THE REST OF THE DAY?

In addressing this question I reviewed the extant literature (Chapter 2) and carried out interviews with elite golfers and support team personnel (Chapter 4). In suggesting an answer to this question it is important to note that, given my pragmatic approach to this thesis, Chapter 4 ,which addressed what golfers should do with the rest of the day, was carried out from a constructivist, epistemological viewpoint. As a consequence, the findings may not be generalisable to all golfers (Giacobbi et al., 2005; Lincoln & Guba, 2000). However, the data that emerged from the interviews point to a set of principles or processes for use at the meso-level of performance. Principles which, for certain individuals and in

certain contexts, may provide guidance on what to do at this performance level. Indeed, some previous literature had considered meso-level processes. However, as I outlined in Chapter 2 this was limited in both scope and applicability to high-level golfers. Specifically, Kirschenbaum et al. (1998) had suggested the use of both a pre[2]- and post-shot routine as part of their *PAR* model. However, in Chapter 2 I criticised the applicability of those processes to high-level golfers and the use of general principles in specific situations. Given the findings from this thesis, I am able to offer a different perspective and guidance from that of Kirschenbaum et al. on what golfers should or could be doing at the meso-level of performance. Although I suggest similar processes (pre[2]- and post-shot routines: see 7.5), the content of these routines differs from those suggested by Kirschenbaum et al. Furthermore, I would argue that, from the evidence presented in this thesis, in addition to learning what these processes are and how to do them golfers should be aware (particularly in regards to post-shot processes) of when and why they should be used. In short, players need to develop appropriate meta-cognitive skills as highlighted in Chapters 5 and 6.

7.3 WHAT DO GOLFERS ACTUALLY DO?

Building on the findings of Chapters 2 and 4, Chapter 5 tracked six high-level golfers over four tournament rounds each in order to assess what they did and thought at the meso-level of performance, whether they followed the suggestions of best practice from Chapter 4, and if there was differing use of these processes between good and bad shots. The data suggested that the players in the study did use the meso-level processes identified in Chapter 4. Furthermore, some of those processes were reported more frequently than others and thus, appeared to be more relevant for all shots and/or more established/primed parts of players' repertoires (i.e., collecting receiving and processing shot information; reflection, reasoning (and rehearsal); and neutralize). Secondly, although chi-square analysis revealed no significant differences between shot outcomes and use of meso-level processes (implying that

golfers used the steps in the pre^2- and post-shot routines in a quantitatively similar fashion between good and bad shots), there *were* qualitative differences in the application of the steps in the pre^2- and post-shot routines. Specifically, players in this sample suggested that with perceived bad shots some of the steps were not used or experienced in the same way as they were with perceived good shots.

With regards to the use of pre^2-shot routine processes, poor shot outcomes were generally attributed to not carrying out, or carrying out correctly, specific steps of the routine including: bringing attention back to golf (or the current shot); consideration of course strategy; and commitment to a decision. Therefore, I would recommend that golfers spend the time to develop and consistently deploy a pre^2-shot routine. Notably, in the post-shot routine, players suggested that although the quantitative use of post-shot processes was similar after good and bad shots, there were important differences in the use and content of the processes. Indeed, this would appear to make logical sense and further question Kirschenbaum et al.'s (1998) suggested use of general principles in specific situations. For example, the content of reflection was markedly different between good and bad shots. As one might expect after a bad shot, reflection usually focused on the reasons for the bad shot (often technical in nature), whereas if reflection was used after a good shot it was used to reinforce positive aspects of the course strategy, decision making, or shot execution. Similar differences were noticed in the use and content of post-shot reactions and rehearsal swings depending upon shot outcome.

Whilst Chapter 5 suggested that players used the processes identified in Chapter 4, the differing use of post-shot processes depending on shot outcome has important implications for golfers and support practitioners. I have already covered this in Chapters 5 and 6, but given its importance it is worth reiterating. In order to derive the full performance benefit from the use of pre^2- and post-shot routines, players should be supported in developing *what*

each process should include, *how* it should be carried out (i.e., what to focus on and how), and, most crucially, *why, when* and *where* to use the processes (i.e., being able to appropriately manage the purpose and nature of that focus). Therefore, and as recommended in Chapter 5, I reiterate that players and support personnel should prioritise the development of performance expertise (i.e., how to think around the course in a way that supports continual adaptation to internal and external conditions) over performance competencies (i.e., knowing and applying standardised steps of a pre[2]- or post-shot routine).

7.4 DOES THE DEVELOPMENT OF MESO-LEVEL PROCESSES BENEFIT PERFORMANCE?

Previous research in golf and other sports (Hill et al., 2010, 2011; Kirschenbaum et al., 1998; Mesagno et al., 2015) has suggested positive effects on both performance and other psychological factors from the use of meso-level processes. Adding to this, Chapter 4 also highlighted a number of positive effects on both the focus and nature of players' attention, and other psychological outcomes derived through the use of meso-level processes (see Table 4.1). However, given that the positive effects cited in Chapter 4 were based upon players' and support practitioners' perceptions, it was necessary to investigate if developing meso-level skills had any perceived or measurable effects on performance. Consequently, Chapter 6 highlighted that undertaking a 10 week intervention targeted at improving meso-level skills had two perceived effects: development of specific meso-level skills; and associated general benefits and improvements (Table 6.4). Additionally, although there was no statistically significant improvement in scoring for participants, all players felt their scores and scoring consistency had improved as a consequence of the interventions. The improvement in scoring and other associated benefits identified in Chapter 6 mirrored findings from previous research and Chapter 4 and further supports the development of the meso-level processes identified in this thesis as a way to improve golf performance.

7.5 WHAT DOES THIS LOOK LIKE IN PRACTISE?

Given that pragmatic research aims to generate practically useful information that makes an impact on applied practise one of the key question to answer in concluding this thesis is: what does this look like in practise? Or in other words how can golfers apply the findings from this thesis to benefit their own, or their client's, performance? Reflecting on the major finding from this thesis has led me to design a model which encapsulates all the key processes (both macro and meso) which have been discovered through this course of study. Additionally two micro-level processes are included to complete a 'shot-by-shot cycle' of processes players should carry out on the course. This is shown below in Figure 7.1 and replaces the best practise structure shown in Figure 2.1. In time this model should be developed by adding methods of training/developing the processes identified.

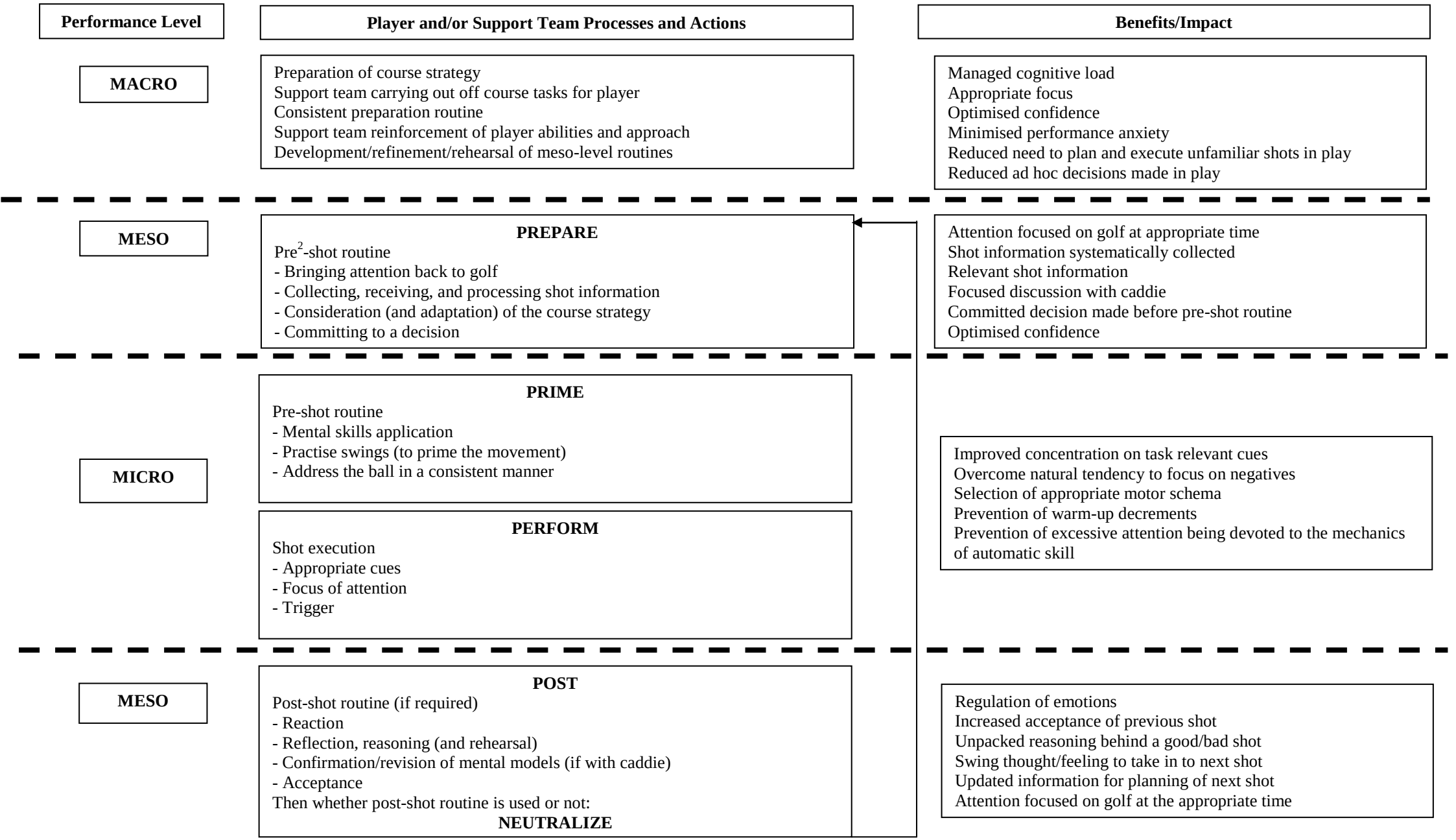

Figure 7.1 Shot-by-Shot Cycle showing macro, meso and micro level process

7.6 STRENGTHS, LIMITATIONS, AND DELIMITATIONS OF THE THESIS

Having considered the strengths and limitations of each empirical chapter I now discuss the overall strengths, limitations, and delimitations of the thesis. Firstly, throughout the thesis coherence was ensured with the tenants of a pragmatic approach outlined by Giaccobi et al. (2005). Consequently, this thesis has produced practical knowledge gains with useful applied implications which make a difference to practice (Bryant, 2009). Secondly, as per the pragmatic approach I prioritised methodological over philosophical issues (Giaccobi et al., 2005), thus the use of mixed-methods throughout the thesis allowed for triangulation of data. This approach allowed collection of richer and stronger evidence than may have been available through the use of one method alone (Moran et al., 2011). In a similar vein the use of an innovative method of data collection (i.e., Stimulated Recall; Lyle, 2003) further adds to the practical knowledge gains produced.

Although I have highlighted throughout the thesis the novel insights and practical knowledge generated it is important to note that it was not without its limitations. Firstly, although it has been acknowledged throughout the thesis, it is worth reiterating that the chosen methods and participant recruitment mean the results may not be generalisable, however, as per the pragmatic approach I focused on the development of meaningful rather than generalisable findings. Secondly, the use of only high-level golfers means that the findings may not be applicable to all golfers, indeed other meso-level processes may be appropriate to lower-level golfers. Furthermore, the use of only male golfers from the UK and support team personnel who worked primarily with male golfers may have influenced the findings. Specifically, it is possible that results may have been different if participants were female, involved in ladies golf, or from different countries, due to different social and cultural norms. Reflecting these potential cultural differences, one of the caddies from Chapter 4 discussed how he had caddied for a young, Korean, male professional on the PGA tour and

was told when he was employed that his job was simply to carry the bag and focus purely on golf (he stated how the players' father had said to him 'no talk, only golf'). In relation to potential differences between males and females through personal experience and anecdotal evidence it would appear that caddies are often used differently in the ladies professional game when compared to the mens'. For example it is more common to see the caddy involved in assisting players in aligning before their shot on the LPGA tour versus the PGA tour. Furthermore, although Chapter 4 highlighted the importance of caddies in supporting the meso-level processes used by professional golfers, due to issues of accessibility subsequent participants did not use a caddie. If the participants in Chapter 5 had used caddies then it may be possible that given the real-time support offered by caddies players may have reported using meso-level processes in a different manner. Furthermore, if the players in Chapter 6 had used caddies then, given the findings from Chapter 4, it would have been pertinent to include the caddie to some extent in the training of meso-level processes. Consequently, accounting for the inclusion of a caddie may have changed the type and nature of interventions used.

Finally, it is important to acknowledge the outcomes of studies published after the completion of the empirical elements of this thesis, specifically in regards to rigour in qualitative research. Prior to the completion of this thesis qualitative studies in sport psychology had largely used member checks as a method of validating the interpretation of data collected and subsequent results (Lincoln & Guba, 1985; Sparkes & Smith, 2009). However, Smith and McGannon (2017) have recently criticised this approach and suggested the use of member reflections as an alternative. Using this approach, and allowing participants to reflect on the findings of the thesis, it may have been possible that additional data and insight would have been generated.

7.6 RECOMMENDATIONS FOR FUTURE RESEARCH

Although in Chapters 2, 4, and 5 I made recommendations for future research, many of these were addressed throughout the thesis. In addition, however, here I outline potential avenues of future research related to the content and findings of this thesis which would add to the golf and sport psychology literature.

Firstly, although the role of the caddie in professional golf has been investigated and discussed previously (Aitken & Weigand 2007; Lavallee et al., 2004), as far as I am aware this thesis is the first to consider the importance of SMMs between the player and caddie. Whilst I suggested it would be useful to expand research in this area, that was beyond the scope of this thesis. However, future research should investigate how SMMs are developed between players and caddies, and if it is possible, through training, to facilitate more effective and efficient development of player-caddie SMMs. As part of any future study into player-caddie SMMS, it would also be of interest to investigate if well-developed and/or overlapping SMMs differentiate between successful and less successful player-caddie relationships.

Secondly, this thesis has highlighted the usefulness of stimulated recall to investigate in-game cognitions from both a research and applied, practical perspective. Although not without its flaws (see Chapter 3), I would argue that SR is a viable and arguably more effective alternative to the contemporarily popular think aloud protocol. It is certainly more ecologically valid when investigating cognitions under competitive circumstances, where think aloud may be overly intrusive to the player. Future research should seek to investigate the relative merits and pitfalls of both methods to allow researchers and practitioners to make more informed decisions when selecting methods for assessing in-game cognitions.

Finally, the focus of this thesis has been on high-level golfers. Extending this research to explore the use of meso-level processes across a wider range of abilities and handicaps would provide further guidance to players and practitioners. Indeed, just because the meso-level processes identified in this thesis positively benefit high-level golfers the effects may not be

the same with high-handicap golfers, or potentially other meso-level processes may be more beneficial to lower-level players.

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Appendix 1- Interventions used in Chapter 6

1. Self-Caddie

Building on the ideas of successful caddying in Aitken and Weigand (2007) the participant was asked to act as their own caddie. Firstly, they were questioned about what information they thought a caddie would provide to a player before a shot. Once they had some initial ideas they read pages 27-32 of Aitken and Weigand (game plans and planning for shots) to gain a clearer understanding of the type and amount of shot information given from caddies to players before a shot. Additionally the player was directed to youtube videos to watch interactions between players and caddies before shots, specifically Steve Williams and Tiger Woods, and Phil Mickelson and 'Bones' to once again identify the amount, and types of information provided by the caddie. We then worked on applying this level of detailed planning in to the pre[2]-shot routine supported by the use of self-talk.

2. Traffic Lights System

This is a common system used for course management in golf with no definite, initial source. The system works by grading pin position as 1 of 3 colours either: red, amber, or green. Green pin positions are 'go' pin positions and the player should be playing an aggressive shot towards the flag. Typically these pin position are either: in a position on the green away from trouble; or the player has a short-club (such as a wedge) for their approach which they are confident they will be able to hit close to the hole. Red pin positions are 'stop' or 'no go' pin positions, the player should be looking to play away from this pin position. Typically these pin positions are either: in a position on the green near hazards (such as bunkers, water, or major slopes); or the player a long-club for their approach which they are not confident they will be able to hit close to the hole without running the risk of hitting their ball in to a hazard. Amber pin positions are 'proceed with caution' pin positions,

they are pin positions will typically play more cautiously to than a green pin position, but more aggressively to than a red flag. Typically these are pin positions which: may have a hazard on one side of the pin (e.g., water to the right of the green); not suit the player's favoured shape of shot (i.e., a pin on the right side of the green for a player who likes to draw the ball); or fall in a mid-range distance where the player is not confident in consistently hitting the ball close to the hole (i.e., 125-175 yards).

In developing this system with the player it was important to unpack what a red, amber and green flag was for them, and when the situation may mean that an amber flag becomes a green or red flag e.g., chasing vs defending a lead.

3. Think Box, Play Box, and Decision Line

Nilsson, Marriott, and Sirak (2005) outlined the process of breaking pre-shot processes in to decision making (think box) and executing (play box) elements. This was used to delineate the difference between the pre^2-shot and pre-shot routines. Players were encouraged to have a definitive difference between their pre^2-shot routine (the think box) and pre-shot routine (play box), this was aided by the use of a decision line. Players were encouraged to stay behind an imaginary decision line whilst preparing for their shot (pre^2-shot routine), then when they had committed to a decision (as per the final process of the pre^2-shot routine) they could step over the line and begin their pre-shot routine. In practice players were encouraged to either use an alignment stick to indicate the decision line, or use stepping off and on the driving range mat as the decision line.

4. In-action Reflection (Schön, 1983)

Given that participants in Chapters 4 and 5 had outlined reflecting on a shot's outcome and the potential reasons for a good or bad shot, participants were provided with a framework

of how to reflect in-play and what to reflect against. Thus, Schön's (1983) model of in-action reflection was used to allow participants to effectively reflect on their shot outcomes but importantly use that reflection to positively benefit subsequent performances (i.e. what will you do differently in the future?). Furthermore, by giving criteria to reflect against (i.e., carrying out pre-shot processes, and an assessment against PGA tour proximity averages) players were able to make a more objective assessment of their performance.

5. Holistic, Rhythmical Cues for Post-Shot Rehearsal Swings

Although there is very little research on the effective use of practise swings in golf (c.f. Carson, Collins, and Richards, 2014) and none on their effective use post-shot recent research from Winter, MacPherson, and Collins (2014) has suggested that in order to optimise performance under pressure the use of holistic, rhythmical technical cues holds benefits over focussing on specific movements. In this case this leads to a post-shot rehearsal swings that focus on timing or the overall body motion rather than disassembling the swing in to component parts during performance.

Appendix 2- Peer reviewed publications

Davies, T., Collins, D., & Cruickshank, A. (2014). So what do we do with the rest of the day? Going beyond the pre-shot routine in professional golf. *International Journal of Golf Science, 2,* 163-175. doi: 10.1123/ijgs.2014-0008.

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