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This is what we do with the rest of the day! Exploring the macro and meso levels of elite golf performance

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**This is what we do with the rest of the day! Exploring the Macro and Levels of Elite
Golf Performance**

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18

Abstract

19

Despite substantial research in golf on pre-shot routines, our understanding of what elite

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golfers are or potentially should be focusing on beyond this phase of performance is limited.

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Accordingly, interviews were conducted with elite-level golfers and support practitioners to

22

explore what golfers are and should be attending to before competition and between shots and

23

holes. Results pointed to a number of important and novel processes for use at macro (i.e.,

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precompetition) and meso (i.e., between shots and holes) levels, including the role of shared

25

mental models across team members.

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Keywords: attention, macro-planning, pre²-shot routine, post-shot routine

27

28 **This is what we do with the rest of the day! Exploring the Macro and Meso Levels of**
29 **Elite Golf Performance**

30 Previous research has outlined a range of valuable mental skills for optimizing golf
31 performance (Hellström, 2009). Notably, a large body of this work has adopted a *micro* (i.e.,
32 short term: immediately around a single shot) focus; primarily on pre-shot routines (Cotterill,
33 2010). However, while this process is clearly important for elite players, it accounts for very
34 little actual performance time. Indeed, if it takes roughly one minute to perform a pre-shot
35 routine, hit the golf ball, and then react to the shot, players who take 72 shots during a 4 hour
36 round may only be involved in such micro-level activity for 72 minutes. Therefore, to extend
37 theory and practice in elite golf performance, there is a need to explore what elite golfers are
38 and potentially should be focusing their attention on outside of pre-shot and shot execution
39 stages; or, in other words, during the *meso* (i.e., the rest of the time between shots and holes)
40 and *macro* (i.e., across the whole round, including preparation) levels of performance.

41 Interest in the focus and nature of performer attention has a long history in sport (e.g.,
42 Garfield & Bennett, 1984; Loehr, 1994; Ravizza, 1977). Attention has been defined as “what
43 we are thinking about (or not thinking about) or what we are aware of (or not aware of) when
44 we perform activities” (Magill & Anderson, 2014, p. 201) and studies in golf have largely
45 considered this construct at a micro (or pre-shot) level. Specifically, results from these works
46 have shown that pre-shot routines that are tailored to performers’ needs and goals can have a
47 positive impact on performance (Cotterill, 2010; Cotterill, Sanders, & Collins, 2010; Crews
48 & Boutcher, 1986; McCann, Lavalley, & Lavalley, 2001). Due to the small amount of time
49 that a golfer actually spends on a pre-shot routine and swing, however, recent work has
50 reinforced earlier calls (e.g., Hellström, 2009) for greater exploration of attentional patterning
51 at meso- and macro-levels (Davies, Collins, & Cruickshank, 2014). For clarity, the meso-

52 level of golf performance relates to the time in between shots and holes while the macro-level
53 of golf performance relates to the time before and after a round. Indeed, both of these time
54 periods may play a significant role in performance given the potential for maladaptive
55 thoughts in these moments around, for example, tournament expectations, course strategy,
56 past or future shots, tournament position, current score, or an opponent or partner's score
57 (Hayslip, Petrie, McIntyre, & Jones, 2010). In sum, there is a knowledge gap in the macro-
58 and meso-level processes and actions involved in successful elite golf performance.

59 Considering what we do already know about macro-level processes, pretournament
60 planning has long been identified as important to elite golfers. Indeed, McCaffrey and Orlick
61 (1989) found that general performance strategies are best prepared in advance; a process that,
62 in research with other sports, has been shown to help performers feel more relaxed, prepared,
63 and in control (Blumensein & Lidor, 2008; Collins & Cruickshank, 2015; Gould & Maynard,
64 2009). Importantly, these outcomes have also been linked to peak performance (Cohn,
65 1991). As we are not aware of any research that has explored the actual elements of effective
66 macro-planning in elite golf, performers and their support personnel (e.g., coaches, caddies,
67 and psychologists) have therefore presumably approached this challenge using personal
68 experience and social norms of "best practice" and non-peer reviewed sources such as Aitken
69 and Weigand (2007). As such, it is reasonable to suggest that targeted research would help to
70 identify then rigorously evaluate and optimize these macro-level processes.

71 As well as macro-level factors, Davies, et al. (2014) recently stimulated discussion on
72 meso-level processes in elite golf; or what is done in the broader time periods before and after
73 a swing. This includes the golfer's post-shot routine, their use of time between shots and
74 holes, and their pre²-shot routine (i.e., the pre-pre shot routine: the preparation routine
75 engaged *before* a pre-shot routine, as characterized by a broader and more external focus of

76 attention to collect and interpret information on the shot rather than the priming of the actual
77 shot). Despite these meso-level periods accounting for the bulk of time a golfer will spend on
78 the course, exactly what golfers are or should be doing and thinking in this period has
79 received little attention in literature. In terms of what has been advised, Kirschenbaum,
80 Owens, and O'Connor (1998) previously proposed a pre²-shot routine based on four
81 principles. Specifically, *personal par* involves a player adjusting the expected score on a
82 hole based on handicap; the *conservation* principle involves the player using more
83 conservative shots where possible; under the *wide first* principle, the golfer is encouraged to
84 aim for the widest part of fairways and greens; and finally, the *safety first* principle
85 encourages the golfer to go for safer means of escape if their previous shot puts them in
86 trouble. While face-valid assertions for many, these guidelines are too simple for most if not
87 all elite golfers who normally won't play to a handicap and, should they want to compete at
88 the top of the field, need to play generally more attacking shots, aim at smaller targets, and
89 take more calculated risks. Kirschenbaum et al.'s advice to use these general principles in
90 specific situations is also clearly problematic from an applied stance.

91 Beyond the golfer's pre²-shot routine, an area of further interest at the meso-level of
92 performance is what elite golfers are or should be doing after a shot; in short, their post-shot
93 routine. A post-shot routine includes cognitive and behavioral processes that can help golfers
94 to "put away" a shot, shift attention to the next one, and excel under pressure, although few
95 clear, empirically-based guidelines for this process have been identified in elite golf (cf. Finn,
96 2009; Hill, Hanton, Matthew, & Fleming, 2010; Kirschenbaum, 1997; Kirschenbaum et al.,
97 1998). Recent work in bowling has also supported the benefits of post-shot routines. Indeed,
98 while Mesagno, Hill, and Larkin (2015) found no significant gain in performance after a post-
99 shot routine was introduced, participants felt that this improved or protected their attentional

100 control, focus on the task, re-focusing between shots and games, ability to block distractions,
101 attention after an error, emotional control, constructive reflection, confidence, and self-
102 awareness. As the authors pointed out, however, knowledge on post-shot routines across a
103 range of sports requires expansion. In the case of the present paper, exploring meso-level
104 time periods in elite golf may help to identify what is or should be attended to during this
105 process and the perceived impact that these features have on performance.

106 As further identified by Davies et al. (2014), one particularly important part of macro-
107 and meso-level processes in elite golf is the input of the player's support team. Indeed, elite
108 golfers will often work with all members of their support team at some point during the
109 preparation and performance period; usually consisting of a coach, caddie, and psychology
110 specialist. These practitioners can play a significant role in what the golfer attends to (and
111 what they don't) before, during, and after competition, with optimal input from each logically
112 relying on strong and trusting relationships (cf. Hemmings, 2011; Simpson, Bell, & Flippin,
113 2011). On top of this, it would seem vital that a golfer and their support team also hold
114 shared mental models (hereafter SMMs) relating to the task (i.e. how the team will respond to
115 task demands), team interaction (i.e. how each individual will contribute to the task alongside
116 others), and team member needs (i.e. how each team member will behave and react) to
117 maximize "on the day" potential and minimize process losses (Cannon-Bowers, Salas, &
118 Converse, 1993; Davies et al., 2014).

119 Owing to the fact that the player cannot receive advice from their coach or
120 psychology specialist during play, the direct input of these support team members is confined
121 to the preparation of performance before the tournament starts or between rounds. Somewhat
122 uniquely, however, the player *is* able to draw on another support team member – the caddie –
123 in "real time". While a caddie's role in supporting a golfer's attention "in play" is apparent,

124 there are a lack of peer-reviewed studies on how this is enabled via macro-level processes
125 (i.e., what the player and caddie do before and after play). Considering broader literature,
126 Aitken and Weigand (2007) have reported on experienced caddies' perceptions of their roles
127 and contribution to the golfer's performance including the communication process, decision
128 making (including having a game plan and shared goals), barriers to success, and how
129 caddies can help players to switch on and off. As of yet, however, no work has considered
130 the role and contribution of other members of the support team who a golfer will commonly
131 work with during the macro time periods (i.e., a coach and a psychology specialist and what
132 effect this work, in conjunction with the caddie, has on golfers' "in play" attention).

133 Given the gaps identified in our Introduction, there is a need to expand our knowledge
134 in both the macro- and meso-level processes in elite golf, including the influence of shared
135 mental models between player and support team. In order to create a sufficiently rich and
136 representative picture of these processes, it was essential to explore opinions from not only
137 golfers but also key stakeholders with experience of working with a number of golfers. Thus,
138 the purposes of this paper were threefold. Firstly, we aimed to identify what is perceived to
139 constitute effective planning at the macro-level (i.e., pre-round) of performance by elite
140 golfers and support team members, including how this impacts on a golfers' attention at the
141 macro- and meso-level of performance (i.e., the time between shots, including the lead up to
142 the pre-shot routine). Second, we aimed to explore what elite golfers are and potentially
143 should be focusing their attention on at the meso-level of performance through the same
144 multiple perspectives. Finally, we intended to explore if and how SMMs between player and
145 support team were perceived to influence the golfer's attention and thinking at both macro-
146 and meso-levels.

147

Methodology

148 Research Philosophy and Strategy

149 Reflecting the applied basis of our aims and desire to develop practically-meaningful
150 knowledge, our approach in this study was driven by a pragmatic research philosophy. Under
151 this perspective, methods are selected on their suitability for answering the research questions
152 and not dictated by one particular epistemological view (Giacobbi, Poczwardowski, & Hager,
153 2005). Indeed, our aim was not to develop generalizable “truths” (as per extreme positivism)
154 or an interpretation that couldn’t be deemed more or less accurate than others (as per extreme
155 relativism) but rather, to provide practically meaningful insights on a particular applied
156 challenge; as supported by our own experience of consulting and performing in elite golf (the
157 first author is a PGA professional with extensive coaching and playing experience and the
158 other authors have consulted in elite-level golf; Giacobbi et al., 2005). Given our aim to
159 explore perceived best practice in an understudied area, a qualitative research strategy was
160 thereby adopted (Denzin & Lincoln, 2008). Importantly, qualitative study aims to generate a
161 useful map of the world rather than a correct one (Strean, 1998). In line with our pragmatic
162 philosophy, this approach also allowed us to probe perceptions in particular detail (Denzin &
163 Lincoln, 2008).

164 Participants

165 Data were collected from sixteen participants which included four professional
166 golfers, four coaches, four caddies, and four psychology specialists. The majority of
167 participants (two caddies, three players, four coaches, and four psychology support providers)
168 were purposively sampled through the personal contacts of the lead researcher, with all
169 additional participants recruited through snowball sampling (Frost, 2011).

170 All of the players held playing rights on tours across various levels. Specifically, one
171 player held playing rights on the EuroPro Tour, one held a European Tour card, and two were

172 members of the European Seniors Tour (one of these had played on the European Tour for
173 over 20 years). To be included in the study, players were also required to have a minimum of
174 3 years' experience of playing professional golf. Players' ages ranged from 26-54 ($M = 40$,
175 $SD = 14.50$) with experience as a full-time playing professional ranging from 3-29 years (M
176 $= 11.75$, $SD = 11.70$).

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

187 **Procedure**

188 Prior to each interview, participants were sent information about the purpose of the
189 study and a copy of the interview guide. Based on our pragmatic approach (Giacobbi et al.,
190 2005) and the study's explorative nature, this guide consisted of open-ended questions that
191 elicited responses on broad areas of relevance informed by the literature and our own applied
192 experience. Specifically, these questions firstly addressed attentional focus over the course of
193 a tournament (including pretournament, pre-shot, post-shot, in between shots and holes, and
194 post-round). More specifically, example questions included: What do you/what do you want
195 your players to focus on before a tournament, a round, and a shot? What do you/what do you

2196 want your players to focus on after a shot? Is there a preferred sequence or series of steps? Is
2197 there a rhythm to this per shot, hole, or round? What support do you get/give during a
2198 tournament and round? The interview then secondly sought to identify if and how players
2199 prepared for required shifts in attention, strategies employed while playing to effectively shift
2200 attention, and the variability of attentional focus (e.g., any differences in what players
2201 focused on when playing well versus poorly). Here, example questions included: Do you
2202 train or practice for shifts in attention or focus and refocus? If so, how? What strategies do
2203 you employ or suggest to shift attention correctly whilst playing? Do these processes vary? If
2204 so, when and how? Built around these core questions, follow-up probes and prompts were
2205 also developed to clarify and elaborate on key points and to support consistency across
2206 participants in terms of topics covered (Patton, 2002). However, these probes were different
2207 between participant role reflecting their differing expertise and inputs. Pilot interviews were
2208 carried out with one PGA professional (a full-time player) and one PGA coach to assess the
2209 content, clarity, and coherence of the interview guide (no changes were made from this
2210 process). All interviews with the main participants were then conducted by the first author at
2211 a convenient place and time (in most cases, the facility where each participant worked) and
2212 lasted between 30 and 60 minutes ($M = 41$, $SD = 8.20$). Ethical approval was granted from
2213 our institution's ethics committee, confidentiality assured, and informed consent given by all
2214 participants.

2215 **Data Analysis**

2216 Given the lack of prior research in our focal area, an inductive content analysis was
2217 deemed appropriate (Côté, Salmela, Baria, & Russell, 1993). Led by the first author, this
2218 analysis followed three key phases: preparation, organizing, and reporting. In the preparation
2219 stage, interviews were transcribed ad verbatim then emailed to each participant to ensure that

220 the answers given at interview accurately and fairly represented their views; no changes were
221 requested through this process (Sparkes & Smith, 2009). Following this, the first author read
222 each transcript several times to optimize familiarity and understanding (Côté et al., 1993). In
223 the organizing phase, qualitative analysis software (QSR NVIVO 10) was used to transform
224 raw data units into thematic hierarchies. This process involved grouping data into themes
225 (named using content-characteristic words) and constantly comparing these themes and their
226 constituent data to establish distinct factors (Corbin & Strauss, 2008; Côté et al., 1993). This
227 abstraction process continued as far as possible without losing the overall meaning of themes.
228 Finally, higher order themes were generated to provide an overall account of the data.

229 **Trustworthiness**

230 As the process and outcomes of interviews are shaped by the level of trust and rapport
231 with participants (Sparkes & Smith, 2009), these elements were enhanced through: (a) prior
232 investigation of all interviewees' careers to convey appreciation of their history and situation,
233 including their current performance level and achievements to date; and (b) knowledge of and
234 empathy with the various roles and demands in elite golf due to the first author's experience
235 as a PGA professional coach and player in PGA events. A particularly high level of rapport
236 was evident with six participants, with these individuals remaining to discuss contemporary
237 issues in golf after the formal interview was finished. Subsequently, four of the participants
238 contacted the lead researcher for feedback on the overall results of the study.

239 Trustworthiness of the analytical process was also addressed. Specifically, constant
240 comparison (Corbin & Strauss, 2008) ensured that interpretations of the data were continually
241 re-evaluated and reasserted. Further, the second author reviewed meaning units coded by the
242 first author from an early interview and then assessed the labels given to meaning units from
243 roughly 10% of all other interviews, including their fit with the overall thematic structure. In

244 the few cases of different views, reflective and critical discussion took place until agreement
245 was reached. To aid the first and second authors' awareness of their interacting assumptions
246 and a full critique of developing themes, the third author was also a *critical friend* throughout
247 (Faulkner & Sparkes, 1999). Finally, each participant was asked to check their transcribed
248 interview (as per the Data Analysis section) followed by phone calls and emails to discuss
249 our interpretation of their quotes used in this report. This process revolved around gaining
250 assurance over our accuracy, balance, fairness, and respect (Sparkes & Smith, 2009).

251

Results

252 The aims of this study were to: (a) identify what constitutes effective planning at the
253 macro-level (i.e., pre-round) in elite golf and how this impacts on golfers' attention at the
254 macro- and meso-levels of performance (i.e., the time in between shots, including the pre²-
255 shot routine); (b) explore what elite golfers are and potentially should be focusing their
256 attention on at the meso-level of their performance; and (c) explore if and how SMMs
257 between the player and their support team influenced golfers' attention and thinking at
258 macro- and meso-levels. Table 1 shows the processes and actions of players and their
259 support teams at both macro- and meso-levels, as well as their perceived impact on the focus
260 and nature of player attention. While not a primary focus of this study, Table 1 also details
261 the perceived impact of macro- and meso-level processes and actions on other reported
262 psychological factors.

263

264 Due to the limitations of space, it is not possible to provide supporting quotes for all
265 of the identified themes in Table 1. As such, we now focus on a combination of themes that
266 address the study's aims, were considered to have the broadest impact on players' attention
267 (as indicated by superscript numbers in Table 1), and which tap into areas underdeveloped in
the literature. Reflecting the order of events at a golf event and aims of this study, identified

268 macro-level processes and actions are presented first. This is then followed by key meso-
269 level processes and actions before evidence on the impact of SMMs. Quotes from players are
270 denoted by “PL”, coaches by “CO”, caddies by “CA”, and psychology support providers by
271 “PS”.

272 **Macro-level Processes and Actions**

273 Five key themes were found in relation to macro-level (i.e., pre-round) processes and
274 actions that were perceived to positively impact on player attention. These were: *preparation*
275 *of course strategy, development/refinement/rehearsal of meso-level routines, support team*
276 *carrying out off-course tasks for player, consistent preparation routines, and support team*
277 *reinforcement of player abilities and approach*. While the latter four of these themes were
278 clearly important, such approaches are relatively self-explanatory and confirm findings from
279 previous research across other sports. Based upon its perceived scale of impact during
280 competition (or at the meso-level) and the frequency on which it was discussed, we therefore
281 focus primarily on *preparation of course strategy*.

282 Indeed, all participants noted the role that thorough preparation of course strategy had
283 in shaping the focus and nature of player attention during competition. Unsurprisingly, team
284 members had varying inputs on the preparation of course strategy based on the player’s needs
285 and team dynamics. For example, often the coach, caddie, and psychology specialist were all
286 involved in this process, whereas sometimes this was carried out by the player and caddie, or
287 just the player. Despite the different contributions from team members, there was consensus
288 that a key job ahead of an event was to prepare the strategy that would be focused on during
289 play; thus giving the golfer a more holistic focus during their pre²-shot routine:

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

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

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

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

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

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

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

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

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

339 driver, 3 wood, and a wedge” (PL2). CO4 also felt that ecologically-valid practice was vital,
340 including hitting in different directions on the range to simulate different wind conditions.

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

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

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

361 If there is no wind [then] certain bunkers might be in play so you hit a two iron; if it is
362 down wind you can knock it over them with driver, or into the wind you can’t reach

363 with driver . . . I had got a feel for the course off the tee [so] I was quite comfortable
364 [in the event] with how I was going to play [each shot].

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

368 **Meso-level Processes and Actions**

369 Addressing the second aim of this study, three themes were found in relation to what
370 players are or should be focusing on at the meso-level of performance (i.e., the time between
371 shots and holes, including the lead up to a pre-shot routine). These were a *post-shot routine*,
372 *pre²-shot routine*, and *the caddie contributing to meso-level planning processes*.

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

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

386 Sometimes he will hit a shot that might end up really well but he will say “I took a
387 little bit [of distance] off that” [It will have been a] club that we have talked
388 about and agreed but inside his head he has thought “I will take a little bit [of
389 distance] off it” Wherever the ball has ended up we will discuss [the shot].
390 Unsurprisingly, a similar process was described after poor shots; for example, PL2 reported
391 that “we might have a little chat about it; say if . . . it was probably the wrong club to hit”.
392 For some players, but certainly not all, identifying the reasons for a poor shot led to rehearsal
393 of a corrected swing; although all agreed that competition “was not the time to disassemble
394 the golf swing” at the expense of having “one thought or corrected feeling” (CO4).

395 After reflecting on a shot, participants commonly discussed the *confirmation/revision*
396 *of mental models* to assist in planning for subsequent shots. This included directing attention
397 towards how well the player was striking the ball, the distance the ball is travelling, or other
398 environmental factors such as how far the ball is running on the ground or the strength and
399 direction of the wind. CA4 offered an example of such alteration in work with a new player:

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

405 Once mental models had been confirmed or revised, the next element of the post-shot
406 routine was *acceptance* of the shot outcome. The purpose of this stage was to help the player
407 move on from the previous shot (whether good or bad) and keep their attention in the present.
408 As CA1 stated: “I’ve seen players two holes down the line and they are still hitting bad shots
409 because they are thinking about that [last bad] one”. Similarly, PS4 felt that acceptance was

410 vital in moving on from previous shots: “if you have hit a poor shot one of the factors I want
411 them to have is acceptance . . . if you can’t accept it you can’t move on” (PS4).

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

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

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

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

433 **Pre²-shot routine.** Following the post-shot routine, participants reported on a process

434 to return from a dissociative focus and move back into planning for the next shot (i.e., before
435 starting their pre-shot routine). Termed in this study as the *pre²-shot routine*, the first part of
436 this process was *bringing attention back to golf* at the appropriate time. There was consensus
437 that the pre²-shot routine should begin sometime before the player arrived at the ball but not
438 necessarily triggered by a rigid distance. Indeed, while some were slightly more specific than
439 others (e.g., “I would want someone to start maybe 20 yards behind the ball”: PS2), the exact
440 starting point varied in relation to factors such as player and support team preference or the
441 perceived challenge of the next shot. For example, if the ball was in the trees rather than the
442 fairway then the routine and decision making process may be started earlier. Offering some
443 general guidance, PS4 suggested that a good starting point for the pre²-shot routine may be
444 when players have split from their playing partners and informal conversation has ended; at
445 this point, players might then enter “your own little bubble, I call it a shot bubble sometimes .
446 . . . My only focus [now] is to make great decisions here and execute with commitment”.

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

458 As the final part of the pre²-shot routine, participants commonly described the value
459 of *committing to a decision*. Indeed, while the caddie had considerable influence throughout
460 the pre²-shot routine up to this point, responsibility for the shot in this finally stage shifted
461 entirely to the player. Accordingly, the caddie's role was felt to become one of optimizing the
462 player's confidence, even if they did not entirely agree with their decision: "he's the boss . . .
463 [and will make all every final call] "unless it was suicidal" (CA3)

464 **Caddie contributing to meso-level processes.** The third aim of this study was to
465 identify if and how SMMs between golfer and their support team influenced attention at
466 macro- and meso-levels. As suggested by many of the quotes presented thus far, the greatest
467 impact of SMMs was found at the meso-level between players and caddies. Indeed, these
468 quotes have indicated how such SMMs contributed to players' decision making, particularly
469 in the pre²-shot routine and the reflection and reasoning part of the post-shot routine. As
470 such, we conclude the Results section by providing a description and supporting quotes for
471 the remaining themes listed under *caddie contributing to meso-level processes* in Table 1.

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

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

484 Participants also revealed how caddies helped to manage the player's attentional focus
485 and load during play by *contributing and discussing shot information* in the pre²-shot routine.
486 Underpinning this process was *caddie knowledge of the player and their game*. As suggested
487 by the earlier quote on a caddie helping a player to neutralize their attention, it was noted how
488 established team member and task mental models could help players to think more effectively
489 during meso-level phases; in sum, the caddie, to some extent, already knew what the player
490 was thinking and could thereby streamline their thinking and decision making processes:

491 I know what he is thinking If I get to the ball before him and . . . it's for instance
492 181 to a back pin with a tiny bit of [head] wind I know straight away he's going to
493 want to hit 6 iron and I know a little 6 iron going through the wind with no spin is
494 going to go over the green. Seven [iron] probably won't get [all the way] there. So I
495 will change it [i.e., the distance given to the player] from 181 to 178; it's only 3 yards
496 different but in his mind 178 is so much less than 181 and he will hit a 7 iron [to avoid
497 going over the back of the green] . . . I know the way he plays and the way he thinks.

498 **Discussion**

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

505 With regards to our first aim, McCaffrey and Orlick (1989) previously highlighted the
506 importance of pretournament planning in golf, including the development of course strategy.
507 Although space precludes detailed discussion of all of the stages involved in effective macro-
508 planning as identified in this study, the processes and actions in Table 1 extend McCaffrey
509 and Orlick's points and offer guidance on specific elements and stages of macro-planning. In
510 particular, our results outline key logistical considerations, guidance for developing, testing,
511 and tweaking course strategy, and the roles and responsibilities of team members. As well as
512 contributing to positive effects pretournament, macro-planning also had a notable impact at
513 the meso performance level; the most common being management of the player's attentional
514 focus and load in play. Indeed, by considering factors like distances, target areas, hazards,
515 slopes, and any contingencies up front, as well as practicing anticipated shots and scenarios in
516 the lead up to the event, this approach was deemed to allow players to manage their attention,
517 in part, through clear objectives and expectations. On a theoretical level, attentional control
518 theory (Eysenck, Derakshan, Santos, & Calvo, 2007) would posit that macro-level activities
519 can allow for dominance of the top-down, goal-directed attentional system instead of the
520 bottom-up, stimulus-directed system during play. In other words, effective macro-
521 preparation can provide players with a continual set of goals to work against over their whole
522 round; thus promoting a task focus and the central executive's ability to inhibit and return
523 attention from threat-related stimuli. Consistent with prior research, freeing up attentional
524 resources by managing cognitive load was felt to allow golfers, when required, to use the
525 stimulus-driven attentional system to selectively focus on important task-relevant and
526 situational factors (e.g., weather or standing in the tournament: Corbetta & Schulman, 2002;
527 Eysenck et al., 2007).

528 As well as optimizing resources for in-play thinking, effective macro-planning was
529 also felt to support appropriate focus during execution phases. More specifically, by already
530 being familiar and comfortable with adaptations to shot selection and technique *ahead* of the
531 event, the lure of consciously tweaking technique could then be limited and a more holistic
532 focus promoted throughout performance. Indeed, participants revealed that their macro-plans
533 informed many aspects of their pre²-shot routine; something which has been overlooked in
534 prior research (e.g., in the *plan* element of the *PAR* model: Kirschenbaum et al., 1998). In
535 short, consideration and adaptation of the macro-plan during shot preparation (i.e. the pre²-
536 shot routine) was deemed to help players come to a well-considered decision before entering
537 and committing to their pre-shot routine.

538 At a meso-level, our findings also shed light on what elite golfers are and potentially
539 should be focusing on in the pre²-shot routine as well as the purpose that this routine serves.
540 More specifically, an effective routine was felt to involve the golfer (with the support of the
541 caddie) bringing attention back to golf, collecting and processing task relevant information,
542 considering and adapting course strategy, and then committing to a decision ahead of entering
543 the pre-shot routine. This routine builds upon the previous player-caddy decision making
544 model put forward by Lavalley, Bruce, Gorley, and Lavalley (2002) and Aitken and Weigand
545 (2007) by providing detail on how players and caddies use pre-prepared course strategies and
546 situational factors to make a decision on the next shot and additionally highlights the
547 importance of bringing the player's attention back to golf at the start of the routine.
548 Importantly, the pre²-shot routine is conceptually and procedurally different to the pre-shot
549 routine as it relates to shot preparation (i.e., using a broader and more external focus of
550 attention to collect and interpret relevant shot information) rather than the priming of the
551 actual shot (i.e., using a narrower and internal focus of attention: Cotterill, 2010; Cotterill et

552 al., 2010). As the pre²-shot routine revolved around contextual specificity (i.e., what is the
553 *best* shot selection for the specific situation against the specific strategy for this hole), it also
554 challenges Kirschenbaum et al.'s advice for golfers to prioritize aiming at widest parts of
555 fairways and greens, playing more conservatively, taking a safety first approach, and playing
556 to a personal par.

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

571 After a *fix*, Kirschenbaum suggested that golfers should *forget* their previous shot in a
572 manner similar to the notion of *acceptance* in this study. However, our findings suggest that
573 there should first be a *confirmation/revision of mental models*. Specifically, this process was
574 deemed important for preventing a mistake being made twice and assisting in the planning of
575 subsequent shots. Finally, Kirschenbaum's 4-F model proposed that golfers should *focus*

576 positively on the next shot. This is in stark contrast to the finding in our study that players
577 should *neutralize* their attention at the end of the post-shot routine; a point that is more
578 consistent with other practitioners' accounts (Aitken & Weigand, 2007). Indeed, such
579 dissociation was felt to deliver a number of benefits, such as decreasing mental fatigue (in
580 comparison to maintaining an associative focus), helping to stay in the present (Cohn, 1991),
581 and inhibiting distractions (Friedman & Miyake, 2004). However, while it may be useful to
582 dissociate from performance after a shot, work in other sports has suggested that attentional
583 focus is fluid and influenced by factors such as anxiety, self-efficacy, and task intensity (e.g.,
584 Aitchison, Turner, Thompson, Micklewright, & Gibson, 2013; Eysenck et al., 2007;
585 Hutchinson & Tenenbaum, 2007). Thus, dissociating from performance will clearly be a
586 challenging process, especially when confidence is impaired or in particularly stressful
587 situations. Similar to adaptive pre-shot routines (Crews & Boutcher, 1986), it seems logical
588 to suggest that post-shot routines should also be capable of molding around a host of
589 expected (and unexpected) contexts.

590 In relation to the final aim of this study, the influence of SMMs on player's attention
591 at macro- and meso-levels was apparent throughout the findings. At the macro-level,
592 caddies, coaches, and psychology specialists generally all inputted to course strategy;
593 however, their exact input was mediated by shared team interaction mental models (i.e.,
594 based on a shared understanding of how they needed to work together: Cannon-Bowers et al.,
595 1993). Further, participants revealed that shared team and task models allowed team
596 members (especially the caddie) to develop a preliminary strategy before the player had even
597 arrived at a competition. Once again, this approach worked to manage the player's
598 attentional focus and load leading up to and then within their performance. During
599 performance itself, participants noted how caddies – through shared team member,

600 interaction, and task mental models – supported and influenced golfers’ thinking during the
601 pre² and post-shot routines (as well as the other time in between shots and holes). Indeed,
602 through understanding the player’s character, the way they played, and the course strategy,
603 caddies often seemed to know what to say and when to say it (Aitken & Weigand, 2007;
604 Lavallee, Bruce, & Gorley, 2004; Simpson et al., 2011). In this case, such expertise helped
605 players to focus their attention on the most appropriate things at the most appropriate time;
606 including dissociating from golf between shots and holes (Aitken & Weigand, 2007; Simpson
607 et al., 2011; Swann, Piggott, Crust, Keegan, & Hemmings, 2015).

608 While providing a number of novel insights, this study was not without its limitations.
609 For example, the acquired perceptions may have been susceptible to recall issues and self-
610 preservation. As we prioritized the development of meaningful rather than generalizable
611 findings from a representative sample, it is also possible that other approaches currently being
612 used by elite golfers were not elicited. Conversely, however, our decision to include support
613 practitioners allowed us to corroborate player accounts, broaden the pool of experience
614 (given that these individuals had worked with multiple high-level players), and better
615 consider the role of SMMs. We also ask the reader to consider other characterizing traits in
616 support of study quality (Sparkes & Smith, 2009). Specifically, methodological coherence
617 (Mayan, 2009) was aided by using our pragmatic philosophy to inform the identification of
618 practice-oriented research questions, participant selection (i.e., individuals that could provide
619 a range of views on the topic), and data analysis (i.e., a focus on the *process* of attentional
620 patterning at macro- and meso-levels of elite golf performance: Denzin & Lincoln, 2008;
621 Giacobbi et al., 2008). Specific strategies for optimizing trustworthiness within our data
622 collection and analysis were also targeted (cf. Methodology section). Finally, as pragmatic
623 study aims to develop novel and useful ways of addressing applied issues (Giacobbi et al.,

624 2005), we also ask the reader to consider the “so what?” principle (Bryant, 2009).
625 Specifically, if our results relate to tangible applied artefacts then what difference do they
626 make to practice-focused theory and consultancy itself?

627 On this vein – and while all of the themes in Table 1 are practical implications in their
628 own right – this study has stressed the value of proactively addressing macro- and meso-level
629 processes and actions to optimize attentional patterning in elite golf performance (as well as
630 other psychological factors). As suggested by coverage in this paper, preparation of course
631 strategy and structured post-shot and pre²-shot routines represent two primary targets. Our
632 findings also offer clear advice on what each of these processes might involve (e.g., a process
633 of reaction, reflection and reasoning, confirmation or revision of mental models, acceptance,
634 and neutralize for the post-shot routine). The role of an elite golfer’s support team has also
635 been emphasized, with the development and maintenance of SMMs encouraged; particularly
636 between player and caddie. Of course, the accuracy and efficacy of these recommendations
637 requires empirical validation. Indeed, a useful progression would be to explore the extent to
638 which the themes described by participants in this study are actually engaged by elite golfers
639 and their support teams before and during play; including when they are playing well and not
640 so well. Future work should also delve deeper into the mechanisms of effectively deploying
641 macro- and meso-level processes. For example, the suggestion that golfers should dissociate
642 attention from their performance between shots requires greater exploration. In addition
643 future work should also explore how SMMs in golf are developed and sustained, especially
644 given the logistical (e.g., travel) and cultural (e.g., perfectionist norms) challenges of elite
645 golf.

646 In conclusion, this study has started the process of filling gaps in our understanding of
647 what elite golfers are and potentially should be attending to outside of their pre-shot routine

648 (Davies et al., 2014). Specifically, it is clear that optimal attentional patterning was perceived
649 to be strongly influenced by macro-level preparation, meso-level routines, and support team
650 interactions. As well as generating guidance for practitioners who work in elite golf, we hope
651 that this investigation stimulates further work in an important yet understudied area.

652 **Table 1 The Processes and Actions of Players and Their Support Teams at both Macro and Meso Levels and Their Perceived Impact on**
 653 **the Focus and Nature of Player Attention**

Player and/or Support Team Processes and Actions	Impact	
	Impact on the focus and nature of player attention	Impact on other psychological factors
<p>Macro-Level</p> <ul style="list-style-type: none"> Preparation of course strategy <ul style="list-style-type: none"> Caddie arriving before the first practice round to begin preparation¹ Testing and tweaking course strategy² Preparing for course specific challenges³ Contingency strategies⁴ Support team carrying-out off-course tasks for the player⁵ Consistent preparation routine⁶ <ul style="list-style-type: none"> Mental Rehearsal⁷ Consistent arrival day⁸ Consistent volume of preparation work⁹ Support team reinforcement of player abilities and approach¹⁰ Development/refinement/rehearsal of meso-level routines¹¹ <p>Meso-Level</p> <ul style="list-style-type: none"> Post-shot Routine <ul style="list-style-type: none"> Reaction¹² Reflection and Reasoning¹³ (and Rehearsal¹⁴) Confirmation/revision of mental models¹⁵ Acceptance¹⁶ Neutralize¹⁷ Pre²-shot routine <ul style="list-style-type: none"> Bringing attention back to golf¹⁸ Collecting, receiving, and processing shot information¹⁹ Consideration (and adaptation) of the course strategy²⁰ Committing to a decision²¹ Caddie contributing to meso-level processes <ul style="list-style-type: none"> Caddie managing the performance environment²² Caddie knowledge of the player and their game²³ Caddie contributing and discussing shot information²⁴ Caddie helping the player to switch on and off from golf²⁵ 	<p>Macro-Level</p> <ul style="list-style-type: none"> Managed cognitive load⁵ 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} <p>Meso-Level</p> <ul style="list-style-type: none"> Managed cognitive load^{2 3 4 9 22 23 24 25} 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 16 25} Limited internal and external distractions^{11 17 22 25} Limited past and future thinking^{11 17 25} Unpacked reasoning behind a good/bad shot¹³ Swing thought/feeling provided to take in to the next shot¹⁴ Updated information for planning of next shot¹⁵ Attention focused on golf at the appropriate time^{17 18 25} Shot information collected systematically^{11 19 20} Relevant shot information processed^{11 19 20 24} Focused discussion with caddie^{19 20 21 24} 	<p>Macro-Level</p> <ul style="list-style-type: none"> 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} <p>Meso-Level</p> <ul style="list-style-type: none"> Minimised performance anxiety^{2 4 7 10} Regulation of emotions¹² Increased acceptance of previous shot^{13 16} Committed decision made before pre-shot routine²¹ Optimised confidence²¹

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