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1 Introducing a Basic Psychological Performance Demand Model for Sport **and**

2 **organisations**

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6

7

Abstract

8 This study presents the development of a basic psychological performance demand
9 model (PDM) for sport, adopting a process view of performance underpinned by reversal
10 theory (Apter, 2001). Six elite coaches with extensive coaching experience at European,
11 Commonwealth, Olympic and Paralympic Games in individual (target shooting, squash
12 and canoe slalom), and team sports (soccer, men's and women's field hockey), were
13 interviewed. Their interview statements were analysed using a combination of deductive
14 and inductive analysis procedures for qualitative data. In conjunction with the
15 interviewer, coaches developed PDMs for their specific sports. Analysis of interview data
16 and coaches' specific PDMs identified four main cross-sport themes or fundamental
17 psychological capabilities required for meeting performance demands. These were:
18 *Mastery motivation, Decision making, Execution, and Teamship*. The PDM offers a
19 starting framework for a new basic performance model that is novel and pragmatic with
20 potential applicability across sports **and organisations**. The model is useful in its
21 existing form, but needs further testing, extended practical application and reflection by
22 coaches, athletes, and sport psychologists. It has potential for use in other coaching
23 contexts beyond sport, such as business, leadership development, education, and health.
24 *Keywords:* performance demand model, elite coaches, elite athletes, reversal theory,
25 psychological preparation

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36 **Introducing a basic psychological performance demand model for sport**

37 **Practice Points**

38 This manuscript is aimed at **sports and executive coaches** who wish to improve their
39 coaching and athlete or client performance. It introduces a basic Performance Demand
40 Model (PDM) which is process-oriented and underpinned by a psychological theory,
41 reversal theory. Four main cross-**domain** themes or fundamental psychological
42 capabilities required for meeting performance demands are presented. These are: *Mastery*
43 *motivation, Decision making, Execution, and Teamship*. The PDM offers a starting
44 framework for a new basic performance model that is novel and pragmatic with potential
45 applicability across different **domains** and provides:

- 46 • a model for improved **coaching practice and client performance**.
- 47 • a better understanding of the dynamic processes involved in elite athletic
48 competition.
- 49 • a means of helping **clients** respond with a range of mental performance states as
50 required.

- 51 • an improved way for **clients** to adapt to and cope with challenges in competition
52 and training.

53 **Introduction**

54 In a recent editorial, Iordanou (2018) argued that studies in sports coaching could
55 make a useful contribution to coaching in business, leadership development, education,
56 and health. She saw a connection between sports coaches' efforts to improve performance
57 and executive coaching where the improvement of certain aspects of the client's personal
58 and professional behaviour are at focus. She also emphasised the importance of
59 psychology in performance and the coaching process: ' . . . the psychological essence of
60 performance is deemed paramount to continuous improvement and development (both
61 personal and professional) in both sports and other types of coaching' Iordanou (2018, p.
62 1). We support her arguments and McCarry's (2016) view that the fast-paced and
63 competitive environments in elite sports are rigorous laboratories for effective coaching.
64 This study presents the development of a basic psychological performance demand
65 model (PDM) underpinned by a process view of performance in sport and supported by
66 concepts from reversal theory (Apter, 2001) **with implications for executive coaching**
67 **in organisational contexts.**

68 Competitive sport comes in many different forms, but all involve a dynamic
69 process comprising a series of interrelated phases. The pre-event phase is the time
70 leading up to actual competition, the performance phase refers to the time spent in
71 competition, and the post-event phase is the time post-competition until the athlete
72 returns to non-competitive roles and contexts. The demand, duration, degree of overlap
73 and athlete control over initiation and termination of each phase varies between sports

74 (e.g., compare a 100m sprint with a golf round or a cricket match lasting several days).
75 To be successful, an athlete must be capable of coping both with the different demands of
76 each phase and the demands of moving between these phases. Thus, sport performance is
77 best conceptualised, not as a single challenge requiring an ideal performance state, but as
78 a dynamic process that requires athletes to adapt to a series of challenges and respond
79 with a range of mental performance states. Managing and coping with change in
80 psychological state therefore seems critical to successful sport performance, a proposal
81 that garners support from prior research that has highlighted the transitions athletes
82 experience, the changing psychological demands of these transitions and how they can
83 influence the athlete's psychological state and behaviour (e.g., Males, Kerr, Thatcher, &
84 Bellew, 2006; Thomas, Hanton, & Maynard, 2007).

85 **Likewise, performance in an organisational setting can be usefully**
86 **considered as a process. For example, a manager typically attends to a wide range of**
87 **challenges in an average day, ranging from a one to one performance review with a**
88 **team member, to leading a team meeting, to presenting to clients or investors, or**
89 **attending to individual tasks. Each of these 'events' requires preparation,**
90 **performance and review, although the reality of organisational life means that the**
91 **events and phases often blur into one. The mental approach required to manage a**
92 **difficult conversation may not lend itself to a sales meeting with an important client,**
93 **so there may well be a performance cost to the manager and the others involved.**

94 Thus, psychological models of sport performance intended to be of practical use
95 in supporting athletes **and business leaders**, need to be process-based to account for the

96 dynamic nature of competitive sport. In addition, based on suggestions by Pocwardowski,
97 Sherman, and Ravizza (2004), we propose a number of criteria that need to be fulfilled if
98 a psychological performance model is to be of practical use. These are as follows, the
99 model: (1) includes reference to behavioural, cognitive and affective domains; (2)
100 accommodates different sporting contexts; (3) accounts for relationships and team
101 interaction; (4) considers the role of individual differences; (5) has applicability across
102 training, competition and recovery phases; (6) provides a framework to guide
103 performance enhancement interventions, and (7) has a coherent theoretical underpinning
104 that allows for empirical testing. We believe that a gap exists for a basic model that meets
105 these effectiveness criteria, that is underpinned by a process approach and that accounts
106 for the dynamic nature of sport competition. Our aim in this study is to propose such a
107 model using a psychological theory, reversal theory (e.g., Apter, 2001), as a framework
108 providing structure and meaning to this process foundation. Our rationale for employing
109 reversal theory stems from its approach to motivation, emotion and personality and the
110 basic premise that people's motivations and emotions are inherently inconsistent, but
111 there is a pattern to this inconsistency.

112 Briefly, the theory posits a framework of eight pairs of opposing motivational
113 states, each of which represents a fundamental psychological motive or value. These are
114 as follows. Pair one: in the serious *telic* state an individual prefers activities that are
115 perceived to be significant and have meaning beyond their immediate fulfilment. Low
116 arousal is preferred in this state, as high arousal induces anxiety. In the playful *paratelic*
117 state an individual enjoys activities that are spontaneous and fun, preferring high arousal

118 experienced as excitement. Pair two: in the *conformist* state an individual values
119 belonging, wanting to meet prevailing norms and social expectations. In the *negativistic*
120 state an individual desires freedom and autonomy; reacts against expectations being
121 rebellious. Pair three: in the *mastery* state a person values competition and seeks power,
122 control and toughness. In the sympathy state, a person values co-operation, care,
123 affection and nurture. Pair four: in the egoistic *self-oriented* state individuality is valued
124 and pleasure or displeasure result from what happens to oneself. In the altruistic *other-*
125 *oriented* state (hereafter termed 'self' and 'other' states) pleasure or displeasure depend on
126 the experience of others. Motivational states from each of the four pairs typically occur in
127 combination (Apter, 2001). State combinations lead to different emotions, dependent on
128 the degree to which motivational needs are met or not met (i.e., producing pleasant or
129 unpleasant emotions; e.g., telic-conformity - relaxation or anxiety; paratelic-conformity -
130 boredom or excitement; self-mastery - humiliation or pride). The process of reversals is
131 central to the theory and there are three types of causal factors that can trigger a reversal
132 from one state to its opposite: *frustration*, when the needs of our current state are not met;
133 changes in relevant *external events*; reversals occurring naturally over time due to
134 *satiation*. Although people all experience reversals, they also have an innate bias to
135 spending more time in one state than another in the same pair, a personality difference
136 termed *motivational dominance*.

137 Research has supported the relevance of these core elements of reversal theory
138 within competitive sport **and business**. First, the full range of motivational states has
139 been reported in sporting contexts, based on data collected with international team and

140 individual athletes in naturalistic settings and over an extended period (e.g., Kerr &
141 Males, 2010; Males, 1999; Males, Kerr, & Gerkovich, 1998). Evidence across sports and
142 competitor levels indicates that reversals occur during competition and are induced by the
143 three identified agents of reversal, with contingent events and frustration more common
144 than satiation (Hudson & Walker, 2002; Males et al., 2006, 2008). Considering this
145 research as a whole, there is no obvious, static equation that relates a specific
146 motivational state to optimal performance. This makes sense though, as demands and
147 competition contexts differ across sports, suggesting variations in the motivational states
148 associated with optimal performance across sports. **Reversal theory research in**
149 **business contexts has demonstrated its relevance in understanding both individual**
150 **motivation and organisational climate (Carter & Davies, 2004), and leadership**
151 **(Carter & Kourdi, 2003).**

152 For a performance model to be useful, evidence needs to support the link between
153 model constructs and performance outcomes. In relation to the model effectiveness
154 criteria noted above, theoretical proposals and evidence to date suggest that reversal
155 theory offers a potential framework from which to build a basic psychological
156 performance demand model (PDM), underpinned by a dynamic, process approach.
157 Therefore, the aim of the current study was to develop a PDM framed by reversal theory
158 using the expertise of elite sport coaches, and adopting a post-positivist approach with
159 qualitative methods.

160 **Method**

161 **Participants**

162 A purposive sample of 6 **sports** coaches (1 female) with at least 5 years coaching
163 experience working with international level athletes, i.e., National Team, UK Sport-
164 funded World Class Programme or equivalent were the participants. They had advanced
165 level coaching qualifications and vast coaching experience at European, Commonwealth,
166 Olympic and Paralympic Games in individual (target shooting, squash and canoe slalom),
167 and team sports (soccer, men's and women's field hockey). These are sports varying in
168 intensity, duration, skill execution and risk, the factors that differentiate the objective
169 demands of world-class performance (Schnabel, Harre, & Krug, 2008). To protect
170 anonymity, biographies are not provided. Coaches are ideal collaborators in developing
171 and validating a PDM as they have an overview of the performance environment, work
172 with numerous athletes, and can draw on varied experiences.

173 **Procedures**

174 Ethical approval for the study was obtained from a UK University and
175 participants provided informed consent prior to participation. Coaches were recruited by
176 personal approach or via their National Governing Body. To enhance data quality, prior
177 to their interview each coach received an outline of the study purpose and the interview
178 focus (Thomas et al., 2007).

179 Each coach was interviewed individually by the second author and the interviews,
180 lasting 60-80 minutes, were digitally recorded. The first phase used a phenomenological
181 interview methodology where the researcher framed the field of enquiry [that competitive
182 sport is a dynamic process and that it might be possible to develop a basic Performance
183 Demand Model (PDM) for specific sports] then asked questions to draw out the

184 participant's experience (Dale, 1996). Thus coaches were first asked to discuss if, and
185 how, they found this a meaningful and useful way of thinking about their sport. In phase
186 two, the coach was asked to identify the key stages and transitions in their sport,
187 including the duration and content of pre-event, competition and post-event phases.
188 Finally, they were asked to describe their perceptions of the ideal state of mind for a
189 competitor and the psychological and performance demands of each stage. Probing
190 questions were used throughout to help coaches elaborate on their answers and the
191 interviewer drew up the PDM on paper, for both to see, as the coach described it.
192 Coaches were encouraged to adapt and validate their PDMs as they were recorded.

193 Interview recordings were transcribed verbatim and used, with notes and the
194 preliminary PDM, to complete a draft PDM for each coach's sport. Coaches were invited
195 to amend or approve them as a form of member checking and elaboration on emerging
196 findings (Morrow, 2005). One coach requested an amendment. The interviewer also kept
197 a reflective journal, recording notes about each interview and his on-going understanding
198 of what the coaches said. In addition, he made extensive notes when the interviews were
199 completed. These records informed data analysis and facilitated bracketing, helping the
200 researcher to remain aware of imposing any biases during interviews or data
201 interpretation (Orlipp, 2008).

202 **Data analysis and trustworthiness**

203 A deductive analysis approach was used based on reversal theory constructs and
204 proposals. An interview analysis protocol was developed to ensure that interpretation was
205 consistent and theoretically robust, as employed in previous reversal theory based

206 research (e.g., Males et al., 1998). This was based on state definitions within the
207 motivational State Coding Schedule (Potocky, Cook, & O’Connell, 1993) and Eight
208 Ways of Being (Apter, 2003). The draft protocol was verified by an expert in reversal
209 theory and sport and underwent two iterations before its final version. To assist in
210 enhancing trustworthiness, three researchers with detailed understanding of reversal
211 theory independently analysed the data then discussed their analyses to triangulate these
212 and produce final interpretation (Denzin & Lincoln, 2000). Each PDM was
213 systematically reviewed, referring to transcripts and the analysis protocol, in line with
214 Males et al. (2006). Differences in interpretation were infrequent and attributable to lack
215 of contextual awareness but were resolved when greater understanding was shared by the
216 interviewer.

217 **Initial** analysis involved first reading and re-reading the interview transcripts to
218 check that the PDM captured key elements discussed by the coach during the interview,
219 and to validate or challenge the first drafts of key psychological demands and supporting
220 processes. Second, each PDM was examined and the analysis protocol used to identify
221 reversal theory states or state combinations that described the preferred psychological
222 states, and, any other reversal theory constructs such as reversals. We also identified any
223 elements in the coaches’ description *not* readily explained by reversal theory to guard
224 against bias, including perceived positive and negative indicators of each Fundamental.
225 Using the analysis protocol, we then produced commentaries to show how reversal
226 theory informed each coach’s description of the sport’s performance demands.

227 These commentaries were then inductively analysed to identify emergent themes

228 or differences across sports, based on the process outlined by Biddle, Markland,
229 Gilbourne, and Chatzisarantis (2001). The second author repeatedly read each interview
230 transcript and commentary to immerse himself in the data, whilst maintaining his
231 reflective journal. The PDMs and commentaries were grouped into pre-event,
232 competition or post-event periods to maintain the dynamic process-based approach
233 underpinning the PDM. Cross-sport themes in each period were identified, with a focus
234 on performance demands and preferred reversal theory states. The first and third authors
235 read these materials to offer new perspectives and ensure consistency with the earlier
236 analysis. This combination of deductive and inductive analysis approaches has been used
237 in previous reversal theory studies (Kerr & Houge Mackenzie, 2014). The deductive
238 analysis of individual interviews preceded the inductive analysis of common themes
239 across sports to produce a generalisable PDM framework, presented below.

240 **Results**

241 **PDM synthesis: four fundamental themes**

242 **The items from all sports were then subjected to a further inductive thematic**
243 **analysis. Individual items were grouped to form higher order themes, which in turn**
244 **were clustered to reveal four fundamental psychological themes (capabilities) and**
245 **the relevant RT constructs. Space limitations do not allow details of how all**
246 **fundamental themes were inductively analysed, however Table 1 illustrates the**
247 **process for one of the key themes.**

248 The analysis of cross-sport data revealed four fundamental psychological themes
249 (capabilities) that athletes must possess to manage their motivation and emotions to meet

250 the performance demands across pre-event, competition, and post-event phases. These
251 are: *Mastery motivation*; *Decision making*; *Execution*, and, *Teamship*. They represent the
252 core of our basic PDM, but may have varying emphases in different sports and can be
253 used to underpin sport **and context**-specific PDMs.

254 **Theme 1: mastery motivation.**

255 This component is the most important and must underpin the athlete's whole
256 approach to their sport, embodied as a positive, professional and goal-oriented attitude to
257 both training and competition. Space limitations do not allow details of how all
258 fundamental themes were inductively analysed. As an example, Table 1 illustrates how
259 we constructed the Mastery motivation theme. With Mastery motivation, athletes will
260 actively seek out and look forward to competition, seeking mastery over themselves and
261 the event. Mastery motivation primarily requires the *self-mastery* state combination to
262 underpin self-discipline, will to win and take personal responsibility. However, to sustain
263 motivation and performance there will be times when the athlete needs to reverse and
264 access the self-sympathy state combination to ensure adequate rest and recovery, and, for
265 team sport athletes to reverse to the *other-mastery* state combination to support team-
266 mates and team processes. Mastery motivation requires a dynamic inter-play between the
267 serious *telic* and playful *paratelic* states, for instance, when the athlete will simply need
268 to complete hard, repetitive training in a serious, ends-oriented telic state, interspersed
269 with regular access to the playful, spontaneous *paratelic* state to balance this *telic* focus.
270 Positive indicators of Mastery motivation include actively seeking and enjoying
271 competition and pre-competition emotions, being committed to, and disciplined in, the

272 pursuit of goals, making honest self-reflections, awareness of one's emotions, and, taking
273 personal responsibility for oneself, including, adequate preparation, nutrition, rest and
274 recovery. Negative indicators include avoiding competition in training, experiencing
275 maladaptive pre-competition emotions, excessive concern with being liked, reluctance to
276 challenge oneself, failing to prioritise training, and, potentially suffering from burnout or
277 over-training injuries. **In a business setting, mastery motivation is required to harness
278 one's own and others' energy in pursuit of goals. Constantly seeking to improve and
279 learn is consistent with a growth mindset, recognised as a key component of
280 business success (Dweck, 2016).**

281 **Theme 2: decision making.**

282 Decision making involves clearly and rationally gathering and managing
283 information to analyse competition demands, set goals and determine tactics. Often
284 mental rehearsal plays an important role in evaluating different options and feeling
285 confident in decisions made. Decision making is primarily a *telic* activity and is best
286 achieved in a calm, low arousal state but may be enhanced by conformity or negativism.
287 In situations that demand a low level of risk, the *telic-conformist* state combination will
288 be most relevant as the athlete will be content to follow established routines. In situations
289 that require innovation or a higher level of risk, the *negativistic* state is appropriate. A
290 *self-mastery* state combination is important to maintain a high degree of self-discipline
291 and confidence. Positive indicators of Decision making include actively seeking
292 feedback, honest and objective self-evaluation of performance, feeling confident and
293 equipped to make the correct tactical decision, making effective decisions, and,

294 appropriate management of risk. Negative indicators include repeating errors from one
295 event to another, making poor or rushed decisions, and inappropriate risk management.

296 **Business leaders also require the capacity to plan, analyse and choose**
297 **amongst options, both on a short-term tactical level (equivalent to an athlete and**
298 **coach preparing for a specific competition) and on a long-term strategic basis**
299 **(equivalent to an athlete and coach planning for a four-year Olympic cycle).**
300 **Balancing risk and reward is key to sound commercial judgement, and the capacity**
301 **to do this well marks out successful from unsuccessful leaders.**

302 **Theme 3: execution.**

303 During Execution the athlete must be ‘in the moment’, totally focused on the task
304 at hand, able to ignore distractions and to make fast, automatic responses under pressure.
305 The athlete needs to execute skilfully from the start of competition and throughout,
306 regardless of distractions, requiring the ability to quickly re-focus and adapt to changing
307 demands. The mastery state is key for Execution as it underpins the competitive mind-set
308 and desire to achieve; in individual sports this will be *self-mastery*, whereas in team
309 sports combinations of *self-* and *other-mastery* states are appropriate. The *paratelic* state
310 is likely to enhance the athlete’s ability to focus ‘in the moment’ and respond creatively
311 but the athlete may also experience the telic state, for example, when he or she becomes
312 aware of the score and the implications of the final outcome. At these times *self-mastery*
313 is needed to re-focus on the task and maintain an appropriate arousal level. In some
314 instances, negativism could be required to generate novel responses or tactics but
315 generally, conformity to rules and agreed tactics is most appropriate during Execution.

316 Positive indicators include sustained focus and commitment throughout an event, an
317 ability to manage arousal, and, responding well under pressure. Negative indicators
318 include superior performance in competition compared with training, concentration loss
319 during competition, particularly after an error, and, over analysis, reducing movement
320 fluidity.

321 **Execution in a business setting is the ability to deal with intense and high**
322 **pressure situations. These may range from an important client pitch, speaking to a**
323 **large group in a ‘town hall’ event, or responding to an urgent product recall. On a**
324 **more mundane basis, execution underpins the capacity to be present and to focus on**
325 **the task at hand, whether this is analysing a spreadsheet or engaging in dialogue**
326 **with a team member, without mentally ‘checking out.’**

327 **Theme 4: teamship.**

328 Teamship refers to athletes’ ability to build and maintain relationships, offer and
329 receive support and feedback from team-mates, and contribute to an effective team
330 environment. It includes the ability to be honest with oneself and others, and requires
331 access to other-mastery to enable the athlete to prioritise team over individual needs, to
332 identify with the team more than their own performance, and to enable others to be
333 powerful. *Other-sympathy* is necessary to build strong relationships, look after team-
334 mates, and co-operate with others to achieve and encourage team spirit and emotional
335 support. Reversals to the *self-sympathy* state combination are required so that the athlete
336 can receive support and care from others. Positive indicators of teamship are support and
337 encouragement for team-mates, appreciating support from team-mates and coaches, and,

338 prioritising team needs when appropriate. Negative indicators include disrespect towards
339 coaches or support staff, being unwilling to receive feedback, creating or fuelling team
340 conflict, and, always prioritising own needs above those of the team.

341 **Teamship in a business setting has obvious applications to build and**
342 **maintain effective working relationships, and there are clear overlaps with the**
343 **constructs of emotional intelligence.**

344 Mastery motivation is key and is required at all stages, as is Teamship in team
345 sports. In individual sports, Teamship is only relevant pre and post-event when the
346 athlete is interacting with his or her support team. Decision making is evident across all
347 phases but most salient pre-event when planning current tactics, and, post-event when
348 reviewing and planning for future events. In contrast, Execution is likely to be most
349 salient during the competition phase where performance should be as automatic as
350 possible, but has some salience in the pre-event period during warm-up.

351 **Example of a sport specific Performance Demand Model: canoe slalom**

352 Space limitations only allow us to present an example of one PDM and
353 commentary. Our example focuses on canoe slalom, an individual sport, with verbatim
354 comments from the coach used to illustrate the model elements. Table 2 illustrates the
355 PDM in detail; numbers in parentheses below refer to specific elements, numerically
356 labelled, in Table 2. Throughout, we identify examples where the fundamental
357 capabilities underpin the sport specific performance demand.

358 *Self-mastery* underpins pre-event tasks (1, 2, 3) such as becoming familiar with
359 the particular competition environment and *telic-conformity* underpins the requirement to

360 plan ahead and “solve the problems” presented by course designers (4), illustrating the
361 need for *Mastery* and *Decision making*, respectively. The dynamic nature of canoe slalom
362 requires athletes to be highly focused on their immediate performance (4) to execute their
363 planned run (4, 17), yet they must also be highly adaptable, both to late input from the
364 coach on the start-line, for example, if a competitor’s alternative tactic proves to be faster
365 (7), and, to respond to their own error by “paddling reactively” (18). This provides an
366 example of *telic-oriented* preparation transitioning into a *paratelic-oriented* execution
367 phase, best supported by a combination of *paratelic-conformity* and *self-mastery*
368 (illustrating the need for Mastery and Execution).

369 There was also an element of *telic-negativism* inherent in his requirement that
370 paddlers be “fearless” and willing to take risks rather than “defend a position” (16). This
371 is an unusual motivational state combination not yet encountered in other sports. It is
372 *negativistic* because the paddler is expected to be innovative and bold, and *telic* because
373 this behaviour is motivated by a pursuit of important objectives (Execution). *Self-mastery*
374 is explicit in several of the identified demands, such as the requirement to deliver the best
375 possible performance (14) and to remain confident and focused on strengths (15). *Self-*
376 *mastery* continues in the post-event period, when the paddler is expected to manage his
377 or her own emotional response (21) before moving to a state of *telic-conformity*,
378 described by this particular coach as “logic mode”, to reflect and analyse the performance
379 and use this to inform the next round of training (Decision making; 22).

380 The performance model described by this coach requires a high level of motivational
381 fluidity, as the athlete must be able to adapt quickly to changed circumstances, yet remain

382 resilient. At the same time the coach encourages a consistent, process-oriented approach
383 to both training and competition “in training or racing the fundamentals are the same –
384 water and poles” which suggests that the primary emphasis is on helping the athlete
385 maintain a stable *self-mastery* state. In sum, results from this initial phase support our
386 proposition that a process based, reversal theory framed PDM helps conceptualise the
387 psychological demands of sport performance with potential to develop sport specific
388 models for a range of sports.

389 **Discussion**

390 Our aim was to develop and initially validate a psychological performance model
391 that offered a generic framework, adaptable to the dynamic processes and transitions
392 involved in a range of sports, and, which met our criteria for pragmatic effectiveness. The
393 model was developed based on evidence from sports varying in intensity, duration, skill
394 execution and risk, the factors that differentiate the objective demands of world-class
395 performance (Schnabel, Harre, & Krug, 2008). To illustrate, target shooting involves low
396 physical intensity, in a controlled, low risk environment, without direct interaction with
397 others, and has a relatively simple (but not easy) skill component. In contrast, rugby
398 sevens is a high intensity team sport that involves a range of dynamic skills, with a high
399 degree of antagonistic physical interaction (Kerr & Svebak, 1994).

400 In relation to our first effectiveness criterion, the example PDM refers to
401 emotional processing in the post-event phase, controlling cognitions during competition
402 and implementing systematic training behaviours in the pre-event phase. The second
403 criterion is met as the model was supported by coaches from a range of sports,

404 demonstrating its general applicability, albeit with some sport specific modifications.
405 Criterion three was supported by the relevance of the fundamental psychological element
406 of Teamship, somewhat unexpectedly for some coaches in individual sports. Criterion
407 four refers to a need to account for individual differences. We did not directly measure
408 these in terms of dominance, as these would be conceptualised in reversal theory, but the
409 potential for the model to account for individual difference factors was suggested by the
410 insight offered into coaches' experienced gender differences. The model accommodated
411 the fifth criterion as coaches in both study Phases endorsed the model's process based
412 framework and the shifting emphasis of the Fundamentals across different phases. We
413 did not test criterion six robustly as this should be the aim of future work following the
414 development and initial validation of the framework. The model's reversal theory
415 underpinning satisfied the final criterion, providing added meaning to coaches'
416 interpretation of the PDM and Fundamentals, and importantly, facilitating novel insight
417 for vastly experienced coaches. The Fundamentals resonate with previous reversal theory
418 explorations of motivational states in sport (e.g., Kerr & Houge Mackenzie, 2014; Males
419 et al., 1998). The fact that the PDM finds support from previous research helps to further
420 our claims for its validity (see also Males, Hudson, & Kerr, 2018). More importantly
421 though, our study makes a novel contribution to understanding psychological
422 performance demands by offering an integrated framework that adds greater meaning to
423 motivational states experienced by sports performers.

424 Regarding the practical utility of the PDM, coaches in this study reported that the
425 accompanying materials provided enough detail without being too narrowly defined and

426 each coach adapted the core materials somewhat differently to use in their specific
427 context. There were, inevitably, some challenges to our assumptions, proposals and
428 conceptualisations and some suggested modifications of future iterations of the model.
429 For example, whilst all the coaches endorsed 'Teamship' as a fundamental component of
430 successful performance they felt a different term, such as 'Teamwork' would be more
431 familiar to and accepted by athletes and coaches. Some modifications were identified that
432 related more to the materials supporting the implementation of the model.

433 The results suggest that the PDM helped athletes and coaches to develop a shared
434 understanding of the specific mental and physical requirements of a sport. It is based on
435 an assumption drawn from evolutionary psychology that athletes are creative and
436 adaptable, and that they will naturally learn more quickly when the nature of the
437 presenting challenges is clearly known (Balish, Eys, & Schulte-Hostedde, 2013). The
438 PDM explicitly maps temporal changes in performance demands to help the athlete
439 prepare for the total competitive experience, and, with some modification, it can be
440 applied to the demands of the training environment. By integrating the Fundamentals at
441 the different stages of performance, the PDM gives athletes and coaches a clear
442 description of the required capabilities for successful performance. We therefore suggest
443 that the PDM offers a starting framework for a new basic performance model that is
444 useful in its existing form but that could be further developed following more extended
445 application and reflections on this by athletes, coaches and sport psychologists. Readers
446 are directed to Author, Author & Author (2018) for a further test of the PDM's validity.

447 **We also see immediate application of the PDM for executive coaches and**

448 **their clients. In a corporate context a ‘performance’ might be an important meeting,**
449 **a conference presentation, or even a busy working day. In each case a business**
450 **leader, just like an athlete, can develop the psychological skills to successfully**
451 **transition between the different stages of preparation, performance and review. In a**
452 **fast-paced business context such transitions are often given scant attention, with**
453 **executives moving from meeting to meeting with little time to take stock and**
454 **prepare for each new challenge. In applying the PDM principles, an executive coach**
455 **would first help a client understand the specific demands of a chosen performance,**
456 **then identify when and how to prepare, perform and review. A greater**
457 **understanding of the performance context will invite many executives to change**
458 **how they manage time priorities so that they create the space for planning and**
459 **reflection.**

460 **Reversal theory has been used to underpin leadership interventions and has**
461 **strong face validity for managers (Carter & Davies, 2004) and we believe the four**
462 **psychological fundamentals we have identified are also valid in a corporate setting.**
463 **Revisiting each in turn: business leaders need to set goals that harness their own**
464 **and others’ energy (mastery motivation), develop the capacity to strategize and plan**
465 **(decision making), act purposively under pressure (execution) and communicate**
466 **clearly to build strong relationships (teamship).** Taken together, the capacity to act,
467 relate and think in pursuit of meaningful goals provides a simple, yet comprehensive
468 framework for mapping the psychological demands of business leadership. An executive
469 coach or leadership consultant could also use an existing competency framework within a

470 PDM, where this offers greater congruency with an organisation's existing ways of
471 working.

472 Conclusion

473 This paper has described an innovative study from the world of high-
474 performance sport that has drawn on the practical insights of highly experienced
475 and successful sport coaches to create a framework that can support performance in
476 any context. We have shown the parallels between sport performance and effective
477 leadership; both are usefully considered as a dynamic process, both require the
478 athlete / leader to effectively meet different and changing psychological demands
479 over the duration of their ‘event’, and both can benefit from the input of a skilled
480 coach. Future research is needed to explore the benefits and limitations of using a
481 PDM in both sport and business settings. Key questions include: Does the business
482 context, or other sports not yet examined, require additional psychological
483 fundamentals beyond those identified in this study? What are the types of
484 managerial and leadership roles and cultures where this approach has most
485 resonance? Where does it resonate least? How might the language we have used
486 need to be adapted for a business setting or different sports? We look forward to
487 exploring these questions and welcome others also applying and testing the
488 frameworks we have presented in this paper.

489

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Table 1

Inductive thematic analysis underpinning Psychological Fundamental, Mastery motivation (TS: target shooting; SQ: squash; CS: canoe hockey; S: soccer; MH: men's field hockey; RT: reversal theory)

Raw data	Theme	Relevant F construct
Set realistic goals and targets (TS, SQ, CS)	Goal-oriented	Telic-confor Self-maste
Quality training and preparation, knowing they have trained hard (SQ, CS, TS, WH, S, MH) Process own emotional response and refocus on next competition (TS, WH) Players need to cool down, attend to physical recovery and eat (S, MH)	Self-disciplined	Telic-self-maste reversal to s sympathy
Develop right emotional state (S) Maintain emotional and physical intensity and will to win (WH) Manage own emotional state to remain focused and confident (TS, SQ, MH, S, WH)	Possess emotional self control	Self-master support self dis and competi attitude
Motivated to deliver best possible performance this moment in time (CS) Confident and positive attitude (CS, SQ, MH) Stay strong, win their bouts against opponents (S) Fight when the chips are down (S) Respond positively in big game environments (WH) Feel confident and believe they have the skill to beat the other side (WH)	Mastery motivation Will to win	Self-maste Access to par state to enjoy arousal
Take responsibility for own and team's performance on the pitch (MH) Self-sufficiency (TS) Take ownership of the whole process (CS) Self-reliance (MH)	Take personal responsibility	Self and oth mastery

Table 2
Canoe slalom performance demand model

Pre-event	Competition	Post-event
<p>Preparation for a specific event sits within annual and multi-year cycles</p> <p><i>Key Tasks and Psychological Demands</i></p> <ol style="list-style-type: none"> 1. Be familiar with the general race environment and feel confident. 2. Feel confident in knowledge and experience of key technical challenges on the course, developed through quality preparation. 3. Assess the specific technical challenges inherent in the course design for race itself. 4. Develop a plan to ‘solve the problems’ posed by the course designers. This requires decision making in a chaotic and dynamic environment. 5. Be fearless and willing to take risks without ‘defending a position’. 6. Self-aware – about personal responses to challenging situations. 7. Remain open to late information from coaches about the course and be able to integrate into race plan. <p><i>Supporting Processes</i></p> <p>Familiarity with competitive environment and venues is built over time via repeated visits, training & competition.</p> <ol style="list-style-type: none"> 9. Systematic training sessions to develop experience and technique to deal with all possible gate and water combinations. 10. Observation of self (via video) or other competitors to develop and analyse options 11. Evidence and feedback from coach, based on the stopwatch. 12. Seasonal goals are based on benchmarking against external standards. 	<p>Execution phase – between the start line and finish line</p> <p><i>Key Tasks and Psychological Demands</i></p> <p>Focus is on the here and now; the next step, the next stroke not on the outcome.</p> <p>Motivated to deliver best possible performance at this moment in time.</p> <p>Confident and positive attitude, focused on strengths not weaknesses.</p> <p>Be fearless and willing to take risks without ‘defending a position’.</p> <p>Maintain a steady emotional state; trust that they have the tools (technical skills and race plan) to answer the challenges that have been set.</p> <p>Be adaptable to move to alternative tactics (“plan B, C or D”) and ‘paddle reactively’ when necessary</p> <p><i>Supporting Processes</i></p> <p>Racing is seen as a fluid continuation of training, so that coming onto the start line is simply the next phase in an on-going cycle of preparation, performance, reflection and learning.</p> <p>Whether in training or racing the fundamentals are the same – water and poles.</p>	<p>Post-race review feeds straight into preparation for the next race</p> <p><i>Key Tasks and Psychological Demands</i></p> <ul style="list-style-type: none"> • Process immediate emotional response to the outcome, whether good or bad, without coach input. This varies a lot between individuals and the context – some display a lot of emotion and others don’t. Same for coaches – need to manage own emotional response before moving to analysis. This can be harder when the outcome doesn’t reflect the athlete’s potential. • Move to ‘logic mode’ and ask “why?” in order to reflect on and understand performance, and identify learning to take into next event. <p><i>Supporting Processes</i></p> <ul style="list-style-type: none"> • Coaches watch the performance and provide video and split-time feedback.

