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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.

Introduction

54   In a recent editorial, Iordanou (2018) argued that studies in sports coaching could

make a useful contribution to coaching in business, leadership development, education,

and health. She saw a connection between sports coaches' efforts to improve performance

and executive coaching where the improvement of certain aspects of the client's personal

and professional behaviour are at focus. She also emphasised the importance of

psychology in performance and the coaching process: ' . . . the psychological essence of

performance is deemed paramount to continuous improvement and development (both

personal and professional) in both sports and other types of coaching' Iordanou (2018, p.

1). We support her arguments and McCarry's (2016) view that the fast-paced and

competitive environments in elite sports are rigorous laboratories for effective coaching.

This study presents the development of a basic psychological performance demand

model (PDM) underpinned by a process view of performance in sport and supported by

concepts from reversal theory (Apter, 2001) **with implications for executive coaching**

in organisational contexts.

Competitive sport comes in many different forms, but all involve a dynamic

process comprising a series of interrelated phases. The pre-event phase is the time

leading up to actual competition, the performance phase refers to the time spent in

competition, and the post-event phase is the time post-competition until the athlete

returns to non-competitive roles and contexts. The demand, duration, degree of overlap

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.

Conclusion

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

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

Table 2
Canoe slalom performance demand model

Pre-event	Competition	Post-event
Preparation for a specific event sits within annual and multi-year cycles	Execution phase – between the start line and finish line	Post-race review feeds straight into preparation for the next race
Key Tasks and Psychological Demands	*Key Tasks and Psychological Demands*	*Key Tasks and Psychological Demands*
1. Be familiar with the general race environment and feel confident.	Focus is on the here and now; the next step, the next stroke not on the outcome.	• 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.
2. Feel confident in knowledge and experience of key technical challenges on the course, developed through quality preparation.	Motivated to deliver best possible performance at this moment in time.	
3. Assess the specific technical challenges inherent in the course design for race itself.	Confident and positive attitude, focused on strengths not weaknesses.	
4. Develop a plan to 'solve the problems' posed by the course designers. This requires decision making in a chaotic and dynamic environment.	Be fearless and willing to take risks without 'defending a position'.	
5. Be fearless and willing to take risks without 'defending a position'.	Maintain a steady emotional state; trust that they have the tools (technical skills and race plan) to answer the challenges that have been set.	• Move to 'logic mode' and ask "why?" in order to reflect on and understand performance, and identify learning to take into next event.
6. Self-aware – about personal responses to challenging situations.	Be adaptable to move to alternative tactics ("plan B, C or D") and 'paddle reactively' when necessary	*Supporting Processes*
7. Remain open to late information from coaches about the course and be able to integrate into race plan.	*Supporting Processes*	• Coaches watch the performance and provide video and split-time feedback.
	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.	
Supporting Processes		
Familiarity with competitive environment and venues is built over time via repeated visits, training & competition.	Whether in training or racing the fundamentals are the same – water and poles.	
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.		