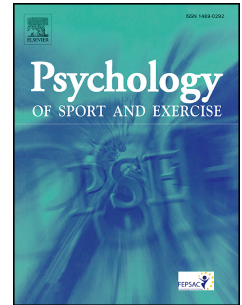


Journal Pre-proof

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PII: S1469-0292(24)00133-X

DOI: <https://doi.org/10.1016/j.psychsport.2024.102722>

Reference: PSYSPO 102722

To appear in: *Psychology of Sport & Exercise*

Received Date: 23 January 2024

Revised Date: 19 July 2024

Accepted Date: 23 August 2024

Please cite this article as: Ramsey, H., Miller-Dicks, M., Reddy, V., Hope, L., Decision-Making in Action: How International-Level Professional Football Players Gain an Advantage, *Psychology of Sport & Exercise*, <https://doi.org/10.1016/j.psychsport.2024.102722>.

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Running Head: How Players Gain an Advantage

Decision-Making in Action: How International-Level Professional Football Players Gain an
Advantage

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Decision-Making in Action: How International-Level Professional Football Players

Gain an Advantage

Abstract

Understanding how both visual and contextual in-game information influences player's attempts to gain an advantage over their opponent is key to understanding skilled decision-making in fast-ball sports. In the present study, we conducted semi-structured interviews with 15 male professional football players to explore their reported behaviours and perspectives on their in-game decision-making and the ways in which they adapt to gain an advantage over their opponent. Professional players who have competed internationally at either Under 17, Under 19, Under 21, or senior level took part in semi-structured interviews. The data were analysed using *reflexive* thematic analysis (Braun et al., 2016; Braun & Clarke, 2019) which generated four higher-order themes about players reported behaviours and perspectives on their decision-making and ways of gaining an advantage: (i) being "unpredictable"; (ii) option generation and invitation, comprising two sub-themes: (iia) generating and realising options in action; and (iib) act on what invites you in the moment; (iii) anticipation and awareness; and (iv) dictating and controlling the game. A key finding was that players attempts to gain an advantage were largely grounded in the aim of 'being unpredictable' through the use of deception and disguise, as well as deliberate manipulation of action sequences in order to make their actions 'hard to read'. A further important finding was that players do not always seek a universal *optimal* decision, as their individual action capabilities influence their available options. These findings have important implications for the assessment of decision-making performance in future empirical research.

Keywords

Decision-making; anticipation; deception; interaction; visual exploratory activity; expertise

25 Decision-making, as expressed in the form of actions, is argued to be the most crucial
26 skill in successful sporting performance (Araújo et al., 2019; Travassos et al., 2013). Early
27 decision-making research used video-based designs whereby participants view footage of
28 game situations, such as association football game play (Vaeyens et al., 2007). For a variety
29 of game situations, the onward play is occluded and participants respond by indicating the
30 action they would perform (e.g., pass, dribble, shoot), either verbally (e.g., Johnson & Raab,
31 2003), in written responses (Ward et al., 2013), via button press (Kinrade et al., 2015), or via
32 a simplified full-body response (Dicks, Button, et al., 2010). Researchers have recently
33 investigated whether general decision-making skills may underpin sport specific decision-
34 making (Cao et al., 2024), whilst a growing body of research has used *in situ* experimental
35 methods, with emphasis on ensuring that participants can perform representative actions in
36 relation to an opponent in real-time (van Maarseveen, Savelsbergh, et al., 2018). In both
37 video and *in situ* designs, participant decisions are typically assessed by an expert panel
38 consisting of the research team and qualified coaches (Pocock et al., 2019), with the
39 assumption that players attempt to perform a universal *optimal* decision in all situations
40 regardless of individual player abilities (Dicks et al., 2019) or the wider game context (Levi
41 & Jackson, 2018).

42 A critique emerging from experimental research on decision-making is that the
43 behaviours of expert performers during video-based designs do not reflect behaviours
44 observed during *in situ* studies (Travassos et al., 2013). For example, van Maarseveen and
45 colleagues (2018) found that measures of anticipation and decision-making of skilled football
46 players during video-based tests of small-sided games did not predict their performance
47 during more representative *in situ* small-sided games. Additionally, the players gaze
48 behaviour differed markedly between the two performance settings. Examination of the
49 differences between video-based and *in situ* research designs have commonly been motivated

50 by Gibson's (1979) ecological account of skilled action in competitive sport settings (van der
51 Kamp et al., 2008; Dicks et al., 2019). This ecological perspective asserts that a person's
52 actions are visually guided by the perception of *affordances* (Gibson, 1979), which are
53 opportunities for action offered to a performer by their immediate environment, and these
54 opportunities are relative to their individual ability (Fajen et al., 2009). Rietveld and
55 colleagues (Bruineberg & Rietveld, 2014; Rietveld & Kiverstein, 2014) refer to the
56 affordances available to an individual performer in a given situation as the *field of*
57 *affordances*. This field consists of affordances that suit the momentary situation and are
58 within the boundaries of the participants' action capabilities. Affordances in an individual's
59 field are said to invite behaviour to a varying degree (Withagen et al., 2017), with more
60 skilled performers being invited by more *appropriate* options for their capabilities through
61 being calibrated to their action boundaries (Fajen et al., 2009; Rietveld et al., 2018; Rietveld
62 & Kiverstein, 2014). Decision-making studies can often reflect relatively simple options to
63 choose between (e.g., a short pass to the left) (Vítor de Assis et al., 2020). However, in many
64 on field scenarios players will have more technically challenging affordances available such
65 as a through ball, a 50 yard diagonal pass, or the option to shoot from range. Research has
66 shown that shooting from range for a player with a skilled long range shooting ability may be
67 the better option for such a player, whereas a progressive pass may be the better decision for
68 another player with a lesser shooting ability in the exact same position on the pitch (Van Roy
69 et al., 2021), emphasising how the *optimal* decision is also related to the player's technical
70 action capabilities beyond the situation itself.

71 Gibson (1979) asserted that perception of affordances is an active process involving
72 the mobile body. Performers are known to actively explore their environment with eye, head
73 and body movements to pick up information to guide the perception of affordances
74 (McGuckian et al., 2019). Elite football players have been found to demonstrate a higher

75 frequency of visual exploratory activity prior to receiving the ball, which has been associated
76 with increased forward passes and increased pass success (Jordet et al., 2013). Such data
77 provide understanding of how performers visually explore their environment but not
78 specifically what information is attended to (van Maarseveen, Savelsbergh, et al., 2018). It is
79 therefore unknown whether all performers likely search for the same universal affordance –
80 as typically assumed by studies that test whether all skilled players converge on the same
81 correct decision (e.g., Vaeyens et al., 2007) – or whether they are exploring their environment
82 to be responsive to opportunities that may unfold.

83 Contemporary accounts of Gibson's (1979) ecological approach have proposed that
84 there are multiple affordances simultaneously available to an individual in any given situation
85 (Bruineberg & Rietveld, 2014; Rietveld & Kiverstein, 2014). Consider a football midfield
86 player in possession of the ball; they may have multiple pass options available to them in
87 each moment (McGuckian et al., 2019). Rietveld and colleagues (Bruineberg & Rietveld,
88 2014; Rietveld et al., 2018; Rietveld & Kiverstein, 2014) framed skilled action in such
89 settings as a selective responsiveness to the available affordances. This skilled responsiveness
90 requires exploitation of information across multiple timescales (Rietveld & Kiverstein, 2014),
91 bringing the use of contextual information into an ecological account of skilled behaviour in
92 sport. Drawing on evidence in the anticipation literature, Ramsey et al. (2022) recently
93 highlighted that this facet of expertise in sport is regulated by the active perception of two
94 primary forms of information: (i) information from opponents' *kinematics*; and (ii) *contextual*
95 information over longer timescales. Use of information from kinematics is exemplified by a
96 goalkeeper anticipating kick direction from the movements of the opponent during a penalty
97 kick (Dicks, Davids, et al., 2010). Contextual information reflects the circumstances
98 preceding and surrounding an interaction (Murphy et al., 2019), such as an opponent's
99 behavioural pattern generated over a sequence of events (Navia et al., 2013). Esteves et al.

100 (2011) found that basketball defenders can actively interact with their opponent to influence
101 the attacker's action, shaping their opponent's attacking decision. How defenders might
102 actively interact to influence their attacker and make their actions more predictable has yet to
103 be explored (Ramsey et al., 2022).

104 In order to disrupt their opponents' ability to successfully anticipate, performers make
105 their actions hard to read by using deception to convey a false intention and misdirect their
106 opponent (Jackson et al., 2006), or disguising their action by concealing useful kinematic
107 information (Rowe et al., 2009). Deception has recently been framed as the act of offering a
108 *misleading affordance*, to invite a defender to anticipate the initially conveyed intention,
109 before the attacker later adapts their action to evade the defender and gain an advantage (see
110 Ramsey et al., 2022). Given that non-deceptive actions are accurately anticipated by all skill
111 levels (Jackson et al., 2020), the ability to mislead an opponent from the intended action is
112 likely a key part of successful decision-making. However, the majority of this research has
113 been conducted with video-based designs that do not represent the performance environment
114 (Dicks et al., 2019; Zheng et al., 2023). The limited *in situ* research on deception in football
115 that maintains real-time perception-action in response to an opponent has only considered a
116 small sub-set of football situations, including the penalty kick (e.g., Zheng et al., 2022) and 1
117 v 1 attacker defender scenarios (Wilson et al., 2023), likely because these situations offer
118 greater experimental control (for a review see Gldenpenning et al., 2017). But due to the
119 antagonistic nature of fast-ball sports, the intent to gain an advantage over an opponent with
120 deception, for example, is likely replete across the entire spectrum of both attacking and
121 defensive actions (Kimmel & Rogler, 2018; Krabben et al., 2019). Yet a broad investigation
122 into the various ways in which expert football players attempt to gain an advantage over an
123 opponent when attacking and defending is absent from the literature. These typical
124 approaches leave a gap in knowledge about how players adapt their actions and generate

125 affordances across a variety of in-game scenarios to set up situations in order to evade their
126 opponent and gain an advantage.

127 **Qualitative Investigation for Understanding Skilled Perception-Action in Sport**

128 Sports expertise researchers have recently acknowledged the value of qualitative
129 methods for furthering understanding about expert decision-making (e.g., Gleeson & Kelly,
130 2020; Levi & Jackson, 2018; Schläppi-Lienhard & Hossner, 2015) and how performers
131 exploit several information sources to guide their actions (e.g., Levi & Jackson, 2018; Vernon
132 et al., 2018). For example, Vernon et al. (2018) described various kinematic and contextual
133 information sources that expert tennis players reported using to guide their return of an
134 opponent's serve. Interviews with experts revealed novel insights into the temporal
135 integration of contextual and kinematic information, identifying how the players set their
136 starting position based on expectations of an opponent's likely serve, and use their
137 expectation to adjust what kinematic information they exploit to guide their anticipation. In a
138 similar vein, Levi and Jackson (2018) identified, through the use of interviews, different
139 contextual sources of information skilled football players use to guide their decision-making
140 during competitive games.

141 Existing qualitative research has identified various information sources performers
142 report using to guide their actions (Gleeson & Kelly, 2020; Levi & Jackson, 2018). However,
143 the manner with which performers manipulate the information available to an opponent and
144 adapt their behaviour in order to gain an advantage has not been studied (Ramsey et al.,
145 2022). Research in tennis has highlighted that expert performers attempt to position
146 themselves to discourage an opponent from performing their favoured serve (Vernon et al.,
147 2018). Therefore, it is likely that skilled decision-making in football goes beyond aiming to
148 act on a single purported optimal option for the given situation (Dicks & Upton, 2017).

149 Rather, players likely manipulate their actions and even set up situations in order to deceive
150 their opponent and mislead them from their true intention (Jackson et al., 2020). Further
151 qualitative inquiry into how expert football players manipulate their actions to gain an
152 advantage over an opponent is needed to provide novel insight into expert decision-making
153 behaviour in dynamic sport situations.

154 **Study Objectives**

155 The present study used semi-structured interviews to conduct an exploratory
156 investigation into international-level male professional football players' reported behaviours
157 and perspectives on their in-game decision-making and the ways in which they adapt to gain
158 an advantage over their opponent(s). Importantly, this study sought to extend existing
159 research on how players make their actions challenging for an opponent to anticipate, such as
160 with disguise and deception. This investigation will provide new insights into the various
161 methods and situations (both offensive and defensive) in which players attempt to gain an
162 advantage over their opponents. These insights will help to appraise to what extent
163 assumptions embedded within the experimental literature reflect the perspectives and
164 reported behaviours of international-level professional football players.

165 **Methods**

166 **Research Design**

167 The present study was underpinned by ontological relativism and supported by a
168 social constructionist epistemology. A relativist ontology reflects the position that there is no
169 single 'truth' to the behaviours of people within the world (Burr & Dick, 2017). A social
170 constructionist perspective argues that knowledge and behaviour is socially and culturally
171 situated rather than natural features of the world that are directly quantifiable (Burr & Dick,
172 2017; Gergen, 2015). Embracing social constructionism means accepting that there are

173 multiple co-existing perspectives on any given event. In the case of decision-making in
174 football, we accept that what players value as a ‘good decision’ will be heavily influenced by
175 the current social normative styles of play within the highest calibre European football
176 leagues. Our philosophical stance aligns with Rietveld and colleagues (Rietveld & Kiverstein,
177 2014; Bruineberg & Rietveld, 2014; Rietveld et al., 2018) contemporary ecological account
178 of skilled behaviour which considers that the intentions and behaviours of people are situated
179 within a form of life, meaning that they are related to the spectrum of possible behaviours in
180 current social-cultural practices. In other words, their theoretical approach considers that the
181 skilled actions of sports people are reflective of their team and country’s normative style of
182 play, which may differ depending on their cultural norms. These philosophical underpinnings
183 support the exploration of perspectives from a diverse group of players with different
184 footballing backgrounds through learning the game embedded within academies throughout
185 Europe. Furthermore, we acknowledge that the concepts further probed by the lead researcher
186 would relate to those areas that were deemed theoretically and conceptually relevant, and as a
187 result the data generated may vary depending on the interviewer (Braun & Clarke, 2021b).
188 To promote transparency about our research materials and process, we have made several
189 additional resources available in supplementary material (SM) which we have referred the
190 reader to throughout the methods section (i.e., SMx refers to the relevant numbered
191 supplemental material).

192 **Interviewees**

193 Interviewees were purposefully sampled through the authors (*HR* and *MMD*)
194 connections with coaches at clubs within the English Football League (EFL). The inclusion
195 criteria were that participants must currently be under contract at a club within the EFL. Data
196 collection was terminated when we acknowledged that it was unlikely we would recruit
197 further participants with the same high skill and experience level. The sample comprised of

198 fifteen current professional footballer players, all of whom have represented their national
 199 team at either Under 17, Under 19, Under 21, or senior level (see Table 1). Players were aged
 200 between 18 and 29 years ($M = 20.8$ years, $SD = 3.2$ years) at the time of the interviews. The
 201 sample consisted of players with a range of primary positions and nationalities, with 14
 202 representing various nations within the UEFA confederation and one representing a nation
 203 within the CONCACAF federation. To ensure anonymity, specific details on each player's
 204 playing history, such as club and international appearances are not described. However, the
 205 interviewees highest international playing level and expertise classification derived from
 206 Swann et al. (2015) are detailed to emphasise the expertise level of this sample (see Table 1).
 207 To minimise the likelihood that a player could be identified, pseudonyms have not been used
 208 and instead each participant is referred to by their participant number. Favourable ethical
 209 approval was granted by the *University of Portsmouth* Faculty of Science ethics committee
 210 and all participants provided informed consent prior to the interview.

211 **Table 1**

212 *Interviewee Characteristics and Expertise Level at the Time of Interview*

Interviewee Number	Age	Primary Position	Highest Playing Level in Career to date (Club)	Highest Playing Level in Career to date (International)	Expertise Classification - Swann et al. (2015)
P1	18	Centre Forward	Championship	National Team U19	Competitive Elite
P2	18	Centre Defender	Championship	National Team U17	Competitive Elite
P3	19	Centre Defender	Championship	National Team U21	Competitive Elite
P4	22	Winger	Championship	National Team	Successful Elite
P5	18	Centre Midfielder	Championship	National Team U21	Successful Elite
P6	19	Winger	Championship	National Team U19	Competitive Elite
P7	18	Centre Midfielder	Championship	National Team U19	Competitive Elite
P8	20	Right Full Back	Championship	National Team U21	Competitive Elite
P9	22	Centre Midfielder	Premier League	National Team	Successful Elite
P10	29	Centre Defender	Premier League	National Team	World-Class Elite

P11	26	Centre Midfielder	Premier League	National Team	World-Class Elite
P12	19	Attacking Midfielder	Premier League	National Team U21	Successful Elite
P13	21	Right Full/Wing Back	Premier League	National Team U21	Successful Elite
P14	21	Centre Defender	Premier League	National Team U21	Successful Elite
P15	22	Centre Midfielder	Premier League	National Team U21	Successful Elite

213

214 **Data Collection and Interview Guide**

215 Semi-structured interviews were used to facilitate a discussion of the players’
216 personal experience and elaborate on concepts of perceived importance using open-ended
217 questions (Sparkes & Smith, 2014). The interview guide was modified following pilot
218 interviews with two university level football players with 15- and 16-years competitive
219 playing experience (one had played for a professional football academy in the UK), to ensure
220 the questions were phrased appropriately. The interview guide (see SM1) was influenced by
221 our theoretical views, with a specific focus on what players *do*, and *how* they gain an
222 advantage. The final interview guide is available as supplementary material demonstrating
223 openness and transparency about our questions of interest (Tuval-Mashiach, 2017). The
224 interviews began by asking the players about their main playing position before asking
225 questions about; (1) their individual game, such as their role in order to provide a reference
226 point to frame the following questions; (2) their views on what ‘good’ decision-making is, (3)
227 as well as what in-game factors influence their decision-making, (4) their reported behaviours
228 on how they try to get an advantage over their opponent, and (5) the factors that influence
229 these behaviours. The question order varied between participants, depending on how they
230 answered the questions, in order to maintain the flow of the discussion and produce natural
231 insights into their perspectives (Braun & Clarke, 2013).

232 The first eight interviews were conducted face-to-face by the lead researcher in a
233 quiet room at their club’s training ground. The remaining seven interviews were conducted

234 online via video-call as face-to-face interviews were prohibited during the Covid-19
235 pandemic. In both sets of interviews, a standardised approach was used to begin the
236 discussion and to develop rapport with the participant, including a standard brief which
237 summarised the aims of the project and the researcher's background (including experience of
238 strength and conditioning coaching within a professional football club academy), before
239 offering the opportunity to ask questions (DiCicco-Bloom & Crabtree, 2006). There were no
240 discernible differences in terms of the content or flow of the discussion between the two
241 interview modalities. Interview duration lasted for an average of 67 minutes ($SD = 24$ mins;
242 shortest duration = 42 mins; longest duration = 108 mins).

243 **Data Analysis**

244 Data analysis was conducted using *reflexive* thematic analysis (Braun et al., 2016;
245 Braun & Clarke, 2019) in order to generate knowledge through seeking patterns of shared
246 meaning across the dataset. This method was chosen because it is useful for seeking shared
247 meaning from the views and perspectives and reported behaviours within a group (Braun et
248 al., 2016), which was the primary aim of our research. The first phase involved becoming
249 'intimately familiar' (p. 200) with the dataset through transcription, multiple analytical
250 readings, highlighting key quotes and commenting on initial observations which address the
251 main research questions. Transcription was initially conducted using otter.ai following
252 completion of all interviews, before the lead author reviewed each audio recording and edited
253 the transcription until the content was clearly represented. At this stage, the research team
254 met and discussed the transcripts to become intimately familiar with the data generated.
255 Phase two involved the process of systematic data coding by the lead author whereby
256 players' reported behaviours, and perspectives were coded throughout the entire dataset and
257 then collated. A combination of inductive and deductive approaches to coding were applied.
258 Inductive codes utilised some phrasing directly from the data such as 'I just try to use my

259 strengths' developing the code *play to our strengths*. Whereas latent code names were
260 deduced from data relating to existing research and theoretical concepts, such as the code
261 *deceptive actions* relating to 'show that you will take a touch the one way and then quickly
262 change the other way'. Coding was collated in an Excel spreadsheet, where the quote and
263 generated code were collated, and each new relevant quote that related to the same code was
264 added throughout the coding process. Codes were finalised through improving code names,
265 removing codes irrelevant to the research question, and merging similar codes (Braun et al.,
266 2016). This process produced 74 codes that richly and thoroughly captured analytically
267 relevant aspects of the data set. The final codes with quotes that generated them, as well as
268 the codes that were removed from the analysis, are available in supplementary material to
269 demonstrate transparency about the outcome of the coding process (see SM2).

270 In phases three and four, the relevant codes that shared similar concepts were
271 clustered together to form distinct themes. This analysis involved a recursive process of
272 revising themes and referring back to the codes in order to generate appropriate final themes
273 (Braun et al., 2016; Braun & Clarke, 2019). Theme development also involved deductive
274 coding whereby contemporary ecological approaches to skilled behaviour (Ramsey et al.,
275 2022; Rietveld & Kiverstein, 2014; Withagen et al., 2017) acted as an interpretive lens to
276 make sense of the data. Theme development was deemed sufficiently complete when each
277 theme had a central organising concept that expressed a shared meaning with which the codes
278 cohered around (Braun et al., 2016). Phase five involved refining the detailed features of each
279 theme including finalising clear theme definitions (see SM3) and suitable names. The final
280 analysis comprised a combination of latent themes with a central organising concept deduced
281 from the shared meaning of the codes, as well as more semantic themes that were grounded
282 in more obvious meaning of the data. Data extracts were selected from across the dataset
283 demonstrating the depth of the central organising concept of each theme. An overview of the

284 connections between themes is available in SM4, and tables containing the codes clustered
285 within each theme are displayed in SM5.

286 **Research Quality and Rigour**

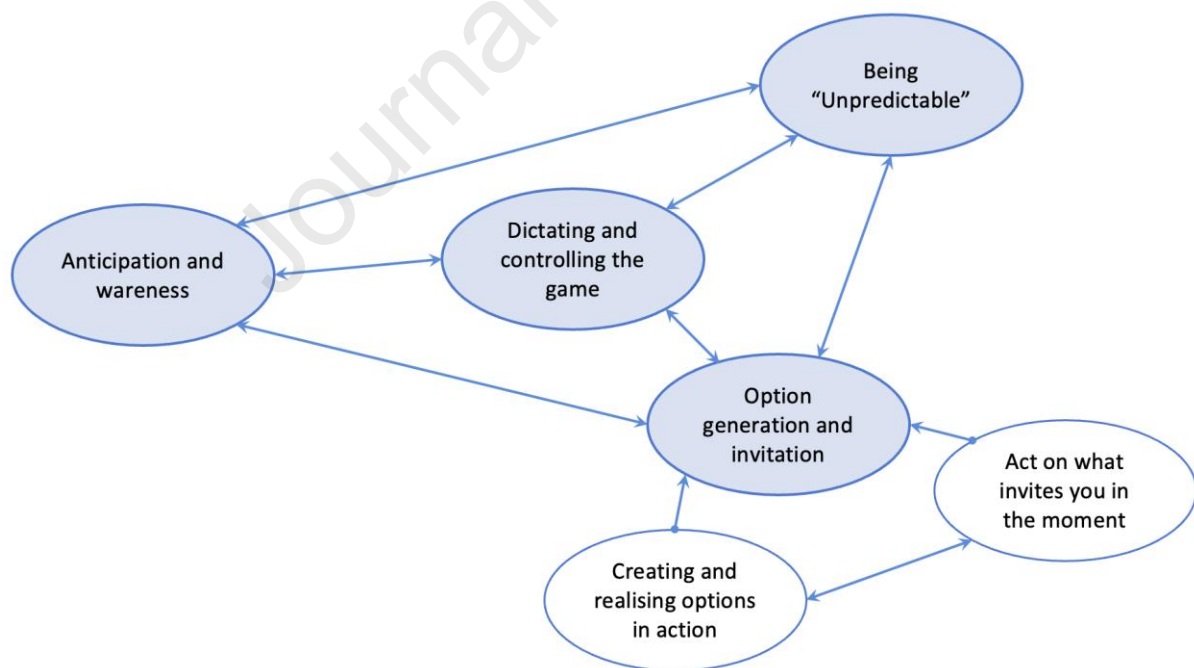
287 Research quality and rigour was ensured throughout the project to generate a coherent
288 analysis that appropriately captured insights about our primary research question (Smith &
289 McGannon, 2018). We ensured appropriate *utility* of the method (Levitt et al., 2017), which
290 was demonstrated by using reflexive thematic analysis to achieve the central aim of
291 identifying patterns of shared meaning from the player's perspectives (Braun et al., 2016;
292 Braun & Clarke, 2021a). Additionally, the authors acknowledge that codes and themes do not
293 just 'emerge' (p. 200) but are formed through the intersection of the researchers' theoretical
294 assumptions, discipline specific knowledge, research skills, and experience (Braun et al.,
295 2016; Braun & Clarke, 2023). As such, the work was motivated by contemporary ecological
296 approaches to skilled behaviour (Ramsey et al., 2022; Rietveld & Kiverstein, 2014; Withagen
297 et al., 2017), which influenced the research through shaping the open-ended interview
298 questions and throughout the analysis process leading to some deductive coding and
299 deductive theme generation (where appropriate). By being open and transparent about the
300 influence of prior knowledge on the construction of the arguments in this paper and a detailed
301 account of our analytic process, we have attempted to demonstrate rigour and engage in
302 reflexivity (Braun & Clarke, 2021b; Trainor & Bundon, 2021). To further promote reflexivity
303 of the lead author's analysis, the remaining research team acted as 'critical friends' to
304 challenge the initial interpretations, and engage in dialogue to explore alternative
305 explanations for the data (Cowan & Taylor, 2016). This process enhanced rigour through
306 using critical dialogue to advance the construction of coherent and theoretically sound
307 arguments (Smith & McGannon, 2018).

308 Results and Discussion

309 Four higher-order themes representing patterns across the dataset were generated
 310 from the reflexive thematic analysis: (i) being ‘unpredictable’; (ii) option generation and
 311 invitation, containing two sub-themes: (iia) generating and realising options in action; and
 312 (iib) act on what invites you in the moment; (iii) anticipation and awareness; and (iv)
 313 dictating and controlling the game. A thematic map of the themes illustrating the
 314 relationships, boundaries, and interconnections between them is presented Figure 1 (Braun et
 315 al., 2016). The following section details the themes combining a selection of compelling
 316 extracts with an analytic discussion of the related literature and theoretical considerations
 317 (Braun et al., 2016). Implications for future research are embedded throughout.

318 Figure 1

319 *Thematic Map of Themes Generated from the Interviews*



320

321 *Note.* The map consists of a two-tier theme hierarchy: four higher-order themes (light blue
 322 ovals) and two sub-themes (white ovals). Distance between themes is not reflective of
 323 conceptual closeness of the themes.

324 Being 'Unpredictable'

325 One topic discussed across the interviews was that players' attempts to gain an
326 advantage over their opponent were grounded in the aim of being 'unpredictable', through
327 coordinating actions that are hard to read. Three players explicitly stated the need to be
328 'unpredictable': 'I just try to be unpredictable ... like do stuff or move so it's not expected'
329 (P1); 'I try to vary the decisions I make ... and just in general try to be unpredictable' (P5);
330 and 'just being able to do different things in your game and try to yeah, second guess your
331 opponent, make it unpredictable I think' (P15). Participants regularly cited strategies for
332 being unpredictable that primarily relate to two existing concepts widely studied within the
333 literature: disguised and deceptive actions.

334 Disguise involves coordinating one's action to conceal or suppress veridical
335 information displayed by body movements until as late as possible (Ramsey et al., 2022). The
336 following extract highlights the use of this action type to gain an advantage:

337 I try and dribble with both feet ... if you dribble with two feet it plays a trick on
338 the mind of the defender automatically, it doesn't give enough time to say oh
339 where is he going to go so if you keep dribbling with two feet you are still going
340 in a straight line but just that confuses the defender (P4).

341 Dribbling with two feet reflects a skilled responsiveness to multiple affordances
342 (Bruineberg & Rietveld, 2014; Rietveld & Kiverstein, 2014) with an ability for the player to
343 take the ball in either direction past their opposing defender, disguising their action.
344 Consequently, the opposing defender may not have sufficient time to move and intercept the
345 ball (Dicks, Davids, et al., 2010; Zheng et al., 2021). This finding highlights the effectiveness
346 of disguise for gaining an advantage (Ramsey et al., 2022), especially because research
347 suggests non-disguised actions are intercepted well above chance level for both lesser-skilled
348 and skilled performers (Jackson et al., 2018; Ripoll et al., 1995). However, few attempts have

349 been made to examine the effectiveness of disguise against non-deceptive actions to
350 determine if they are actually effective in causing the opponent to anticipate too late, and act
351 outside of their action boundary (Dicks, Davids, et al., 2010; Ramsey et al., 2022).

352 Deceptive actions were also utilised to gain an advantage, which has been
353 conceptualised as the ability to convey a false intention, offering a misleading affordance to
354 an opponent (Ramsey et al., 2022). There were several examples of this behaviour throughout
355 the dataset, for example:

356 Trying to like not show where I am passing maybe, like for example, looking at
357 you (pointing directly forward) and then passing, like to the right of me, so yeah
358 trying to, like hide the pass (P5).

359 In this example, the player describes how they aim to make it appear as if they are
360 going to pass one way by 'looking at you' but then actually pass 'to the right' which they
361 believe acts as a way to 'hide the pass'. In an alternative in-game situation, P15 described the
362 use of deception when dribbling:

363 Trying even when I'm dribbling, when I feint ... I want them to think I'm going
364 this way, but I want to go that way, do you know what I mean? So, I think yeah,
365 when I'm dribbling, I'm dropping my shoulder or you're, you're doing a stepover
366 like you're disguising something like you're tryna basically trick them (opponent)
367 into thinking that you're doing this but you're actually doing that (P15).

368 These data extracts support the growing body of literature on deception by showing
369 that it is a tool that players employ on-field in order to gain an advantage over their opponent
370 (Jackson & Cañal-Bruland, 2019). The data also corroborates the finding in the literature that
371 disguise, and deception are effective in decreasing an opponent's anticipation accuracy. This
372 is shown as the players highlighted within their examples that disguise and deception ensure
373 it is challenging for the opponent 'to know what they are going to do' (P6) because the
374 opponent 'will react on the first thing, but after he will not react for the second' (P6).

375 Players also discussed attempts to perform actions that were unpredictable through
376 manipulating the sequence that they performed their actions, with the aim of encouraging
377 their opponent to anticipate the same action again and be misled from their actual intention:

378 Sometimes I know if I have played him three times in a row then he might know
379 what I am going to do so then I am going to change it ... I can make him think
380 that I'm going to do it again, so maybe take the ball up on one side and then when
381 I see he starts pressing turn it over quickly or switch the ball (P3).

382 In a seminal study, Gray (2002) found that both the temporal and spatial errors of
383 baseball batters' swings significantly increased when facing a fast-ball that was preceded by
384 three consecutive slow-balls compared to three consecutive fast-balls. This result highlighted
385 that batters' anticipation responses in the study of Gray (2002) were susceptible to the
386 manipulation of sequences (see also Güldenpenning et al., 2023). Research examining the use
387 of contextual information in sport has tended to focus on understanding the anticipator's
388 perspective and thus, not explored whether players actively manipulate sequences to gain an
389 advantage. A novel finding in the current study is that the data extracts demonstrate that
390 professional football players are aware of, and actively manipulate their action sequences as
391 well the control of their action to enhance their ability to deceive an opponent, inviting them
392 into a misdirected anticipation in order to gain an advantage (Ramsey et al., 2022). The
393 extract from P3 demonstrates how sequence manipulation can be combined with a deceptive
394 action to maximise the invitation to anticipate the initially conveyed action (i.e., the
395 misleading affordance), as he describes 'taking the ball up on one side' to 'make him think
396 that I am going to do it again'. Combining information on multiple timescales to guide skilled
397 behaviour has vital implications for the current study of decision-making in sport where
398 existing research has exclusively assessed each of a performers actions in isolation (e.g.,
399 Pocock et al., 2019). However, the current study demonstrates that experts are not simply
400 attempting to perform the best action in every moment, but that they set up situations over a

401 series of actions in attempt to generate a better attack for their team, reflected in P13's
402 statement 'you may be trying to like gain that one situation where you can get on top'. Future
403 research must therefore consider the skilled attunement to, and manipulation of, information
404 on longer timescales when assessing decision-making.

405 **Option Generation and Invitation**

406 Players discussed how they realise the options available to them in a given situation
407 as well as highlighting how they often influence their opponent's behaviour to *generate*
408 options. With regards to acting on an available option, players regularly highlighted the need
409 to 'stay in the moment' (P1, P10) and 'don't think too much about it, just do it' (P11), which
410 others referred to as relying on their 'instinct' (P3, P8). Therefore, two distinct sub-themes
411 were formed to represent these two interrelated aspects of decision-making: (i) generating
412 and realising options; and (ii) act on what invites you in the moment. However, it is
413 important to highlight that consistent with perspectives in the literature (see van Maarseveen,
414 Savelsbergh, et al., 2018; Dicks et al., 2019), the perceptual and motor components of
415 decision-making were conceptualised as being interlinked:

416 Sometimes it also just comes with things I'm doing... like, if I make a decision to
417 keep the ball, the options will just come through or come as long as I'm making
418 the touch, then will come more options on the ball (P1).

419 The player is describing how acting by 'making the touch' generates options,
420 highlighting that decision-making is not merely the process of successive, first perceive and
421 then act. Rather, the execution of actions, such as taking a touch on the ball – as other players
422 move – generates options (i.e., affordances) which can then be exploited (Dicks et al., 2019).

423 ***Sub-Theme: Generating and Realising Options in Action***

424 Players highlighted that ‘many different opportunities’ (P6) are available at any one
425 moment, and that ‘different decisions will close and open’ (P7) emphasising the transient
426 nature of decision-making in sport (Araújo et al., 2019). For example, players offered insights
427 into how their actions can draw opponents out of their team shape, which generated options:

428 People want to double up on me and that maybe puts... like, when I get the ball
429 there's like more than one player around me, so sometimes just play it one
430 [touch]. That means, if there's two people on me, or three people on me, that
431 means someone's free, so I have to play one touch sometimes or two touch, or
432 maybe entice them in... so maybe take... maybe have my first touch in my feet to
433 make sure they think that he can get close to me, the closer they get the more
434 space opens up, so I can play in behind or someone else is going to be free (P15).

435 This player describes how he attempts to ‘entice’ the opposition closer to him on the
436 pitch so space will ‘open up’ for his teammates, which generates new options. This data
437 emphasises that the opportunities available to a player are not necessarily waiting to be
438 exploited, rather players’ have an active role in generating their available affordances. This
439 novel viewpoint has important implications for the predominant empirical approach for
440 investigating decision-making expertise in sport. Screen-based studies (Roca et al., 2018),
441 including modern virtual reality designs (Musculus et al., 2021), use an option generation
442 paradigm (Johnson & Raab, 2003) that requires participants to verbalise the possible actions
443 they could perform based on the configuration of players at a single moment in time. This
444 paradigm examines the cognitive process that underpin skilled option generation whereby
445 participants select the best option from those cognitively generated. Participants in the current
446 study emphasised that option generation is also an embedded process, which involves
447 interacting with their environment to influence the actions of others in order to generate new
448 options to act on (affordances). We refer to this idea as *affordance generation* which aligns
449 with contemporary ecological accounts of creativity (Withagen & van der Kamp, 2018; Orth
450 et al., 2017). The current data indicate that players attend to information, such as the relative

451 movements of players on the pitch, which invites (and repels) certain actions (Ramsey et al.,
452 2022). As the player performs actions on the ball, their teammates and opponents move in
453 response, which in turn creates new information and opens affordances to be acted on
454 (Withagen, 2023). Therefore, future research examining players active role in option creation
455 is necessary to further develop understanding on affordance generation in action within
456 experts' decision-making.

457 ***Sub-Theme: Act on What Invites You in the Moment***

458 An evident pattern from the interviews was the need to remain 'in the moment', to
459 'play what you see', and to rely on 'instinct'. These insights can be seen to reflect how
460 certain available options to a performer invite them to act (Withagen et al., 2017; Withagen et
461 al., 2012):

462 You have to play what you see because I can't sit here and tell you I am gonna go
463 today and shoot on my right leg, that might not come... so I need to be prepared
464 to shoot with my left leg and that is a big thing ... because you can't talk the
465 game... I have seen when we have talked, this is what we are going to do and
466 circumstances change so you need to play what you see (P4).

467 Other participants expressed similar sentiments. For example, one player emphasised
468 that 'on the pitch you have to feel it, you can shoot you have a good chance to shoot yes so I
469 would say it is many aspects of everything you need to feel it' (P6). This perspective was
470 echoed by P12 who stated, 'I think it's connected with the feeling, I would say mostly you
471 know, like, yeah, I think feeling... feeling the... the... situation'. These data extracts suggest
472 that players are not simply imposing their actions onto the situation, but rather they feel
473 drawn to act on certain options in the moment. This concept of the environment inviting
474 action aligns with contemporary theorising that affordances with an individual's field invite
475 behaviour, with concurrent options inviting the player's action to different degrees (Rietveld
476 & Kiverstein, 2014; Withagen et al., 2017). The players comments suggest which options

477 invite a player in a given situation may differ from individual to individual as P4 stated ‘your
478 good decision could be right for you; my good decision could be right for myself ... it
479 depends how you see it’. P6 provided an analogous comment, ‘if we will go in the same
480 situation, I will feel the decision making that mine is good but if you will go there in the same
481 situation, you will have maybe the different one and you will think this is the good one as
482 well’. These two player perspectives contrast the common approach in the decision-making
483 literature where researchers seek to evaluate player performance against a universal *optimal*
484 option that is most appropriate for all individuals in a given situation, rather than seeking to
485 examine the varying options that are appropriate for each player given their unique abilities
486 (Dicks, Davids, et al., 2010).

487 In further support of the suggestion that universal optimal decisions may not be
488 reflective of expert football, several players suggested that their decision-making and ways of
489 gaining an advantage were guided by awareness of their action capabilities. A player’s action
490 capabilities reflect the boundary that sets the actions that the performer is capable of and
491 incapable of (Dicks et al., 2019; Fajen et al., 2009). The players demonstrated an awareness
492 of their capabilities:

493 There’re certain things I’m not going to do, like... so you know, like for example,
494 I’m not the best... I’m not the best shooter. I haven’t got a great long shot. So
495 when I’m in that position, because of that reason, I’ll rather pass it to maybe my
496 striker or my winger, than take on the shot ... going back but before when you
497 were asking about decision-making that’s... it’s... little things like that, that show
498 that a player has good decision-making, because he knows that’s not one of his
499 strengths (P9).

500 These perspectives support previous research (van Maarseveen, Savelsbergh, et al.,
501 2018) contending that players’ decision-making is guided by their abilities to successfully act
502 on the given options. For example, in a 3-v-3 basketball decision-making task, it was

503 observed that skilled players action tendencies were found to vary in the same situation when
504 performing with their dominant hand compared to their non-dominant hand (van Maarseveen,
505 Savelsbergh, et al., 2018). As such, the current study provides novel data which support the
506 contemporary ecological approach that expert decision-making is guided by an ability to
507 consistently perform actions that are within their action capabilities and therefore, within
508 their field of affordances, in order to reliably achieve successful outcomes (Rietveld et al.,
509 2018; Rietveld & Kiverstein, 2014). This finding supports research using an option
510 generation paradigm that has shown the first option players verbally generate is often the best
511 rated available option in that scenario (Klatt et al., 2019), likely reflecting the option that
512 most strongly invites their action. Furthermore, the finding that experts are drawn to act on
513 what they “feel in the pitch” supports intuitive decision-making research which emphasises
514 that too much deliberation can lead to reinvestment, and subsequently reduced performance,
515 particularly under pressure (Laborde et al., 2015). Performers well calibrated to their abilities
516 may limit the amount they deliberate over their action and minimise reinvestment.

517 Furthermore, the extent to which players’ search for the best possible action is
518 challenged by the current data as several players highlighted the importance for ‘good
519 enough’ options:

520 I think just to pick the right choice because there is always so many different
521 things that you could do when you get the ball, so I think the hardest one is to
522 consistently do the right thing and of course there is not just one right thing but
523 maybe just the least-worst thing, I would say (P5).

524 This insight was shared by P14 who said, ‘I would say good decision-making is to
525 keep it as simple as possible, but it should still be effective and benefit the team’. These
526 findings further suggest that expert decision-making may be better characterised by the
527 ability to consistently perform *appropriate* actions rather than the widely held assumption

528 that they always seek the best available option. An important hypothesis to investigate in
529 future research is that more skilled players make better decisions because they regularly
530 perform actions that are within the boundaries of the action capabilities (Dicks et al., 2019).

531 **Anticipation and Awareness**

532 Players highlighted the importance of ‘reading your opponent’ (P8) and actively
533 engaging in visual exploratory activity to develop ‘awareness’ (P14) of the game. Several
534 player’s, particularly those with centre midfield as their dominant position, referred to their
535 use of ‘scanning’ as a feature of their decision-making:

536 It is so much more important to scan. So, if you just make the scanning right, you
537 can go from like... a yeah... like, not even a good player... a decent player, to a
538 really good player because the scanning that can make the difference between if
539 you have the quality or not. So, you know if you scan, it can make you take one
540 touch instead of three touches (P7).

541 This extract expresses the value of scanning as a factor that significantly contributes
542 towards being successful at the elite level of competition; a view shared by football coaches
543 (Eldridge et al., 2022) and researchers (McGuckian et al., 2018). The players’ use of scanning
544 aligns with existing literature (Jordet, 2005; McGuckian et al., 2019), which has emphasised
545 the importance of active information pick-up through active perception to generate
546 information on available options (van Maarseveen, Savelsbergh, et al., 2018) and to
547 prospectively control action (Jordet, 2005). Importantly, the players refer to how the
548 awareness from scanning affords the opportunity to ‘be in the right position in the right time’
549 (P12). This can be interpreted as their need to position themselves in a form of *action*
550 *readiness* (Rietveld & Kiverstein, 2014) whereby they are appropriately positioned to
551 continually pick-up information and be responsive to the dynamic field of affordances.
552 Therefore, visual exploratory activity is not only for the awareness of options but to guide the

553 control of action to ensure an openness to multiple concurrent options. That is, scanning does
554 not precede decision-making but is an integral feature of this facet of expertise.

555 Data also suggest that expert athletes are not merely acting as passive receivers when
556 defending their direct opponent in 1-v-1 situations. Instead, players actively interact with the
557 attacker to limit and influence their available options (Ramsey et al., 2022): This is
558 exemplified through a number of extracts from P3, for example:

559 I think to force my opponent to do things, err... so into situations where I know I
560 am good, err... so 1 v 1's yeah ... I think it is all about how can I turn the situation
561 into my favour, into an advantage for me (P3).

562 If it's on the side I will force him to go to the side-line and not into the pitch and I
563 will do that by turning my body outside the pitch, inviting him to go that way and
564 make it hard for him to go the other way of me (P3).

565 This player described how he actively influences his opponents to invite them into
566 certain areas of the pitch to 'turn the situation into my favour'. This has important
567 considerations for existing experimental research on anticipation, which has largely
568 considered the defender as a passive anticipator. This issue is exemplified by studies that ask
569 the defending player to start from the same controlled position and to anticipate an
570 opponent's actions that are pre-scripted (e.g., Dicks, Davids, et al., 2010). Underappreciated
571 therefore is that performers *actively* interact to influence an opponent's action, which
572 modulates the available kinematic and contextual information available (Kimmel & Rogler,
573 2018; Krabben et al., 2019). Through interacting, performers can limit their opponent's
574 available options to reduce the uncertainty about their opponent's likely action. These
575 findings suggest that the ability to successfully defend in one-versus-one situations goes
576 beyond simply exploiting the most useful information to guide their action, but is also
577 grounded in the ability to *actively interact* and influence an attacking opponent to limit their

578 field of affordances and make them more predictable (Ramsey et al., 2022). That is, the
579 ability to influence an opponent and shape their available options enhances the defender's
580 ability to anticipate their action accurately, and so should be considered a key aspect of
581 anticipation expertise.

582 **Dictating and Controlling the Game**

583 This theme was largely grounded in the clear and obvious meaning expressed by the
584 interview extracts as numerous participants specifically referred to 'dictating' and
585 'controlling' the game. A profound insight from the players was the desire to not just make
586 decisions that positively impact the team, but that 'set the rhythm of the game' (P5). This
587 participant goes further to explain:

588 If the game has been end-to-end for like a couple of minutes I try when I get the
589 ball... I tried to keep it with a few touches and then talk and calm down the team
590 as well, like... like, if I pass it to a winger, tell him that not to go forward, not try
591 to 1 v 1 with that defender, just to keep the ball with the team for a few minutes
592 and kind of reset the situation (P5).

593 Therefore, good decision-making appears to go beyond what is currently studied
594 within the sport expertise literature, with an aim to not only make decisions that benefit the
595 team and gain an advantage, but to allow their team to control the rhythm and the flow of the
596 game such that the players can 'stick to your principles' (P13) and 'focus on your game'
597 (P12). Following early perspectives in the literature (e.g., Grehaigne et al., 1997), researchers
598 have aimed to model team dynamics and space control in team-sport settings (for a review
599 see Low et al., 2020). Future work would benefit from furthering such approaches by
600 investigating how more successful teams manage the temporal flow of the game. With the
601 increased availability of player tracking data (Forcher et al., 2022), researchers can
602 investigate how teams slow down and speed up periods of possession to destabilise the
603 opposition and create goalscoring opportunities.

604 This concept on setting the rhythm of the game further aligns with the theme on
605 option generation and how the available options are not just there waiting to be acted on but
606 are actively created by the interaction between the team in control and the opposition. Centre
607 midfielders in particular (P5, P7, P15) referred to the desire to disrupt the opposition's shape
608 to create space that they can exploit:

609 I changed the pace it might be I just play short or turn the ball from full back to
610 full back or anything like that and then soon as I see, like a chance to
611 breakthrough or anything I don't take plenty of touches I just go like straight
612 away and try to get into the space or beat the opponent (P7).

613 The player here describes controlling possession by keeping the ball within the
614 defence whilst simultaneously maintaining awareness of opportunities to 'breakthrough' and
615 to not waste time by stating 'I just go like straight away' to exploit the space and beat an
616 opponent. This also represents an awareness from the player that as they move with respect to
617 their surroundings, opportunities for action are created and others dissolve (Araújo et al.,
618 2019), relating to the sub-theme of generating and realising options.

619 Research on dictating and controlling the game is an emerging area, particularly
620 through data scientists who have investigated how teams maximise territorial control through
621 passing behaviour (Rein et al., 2017). There are conceptual and theoretical associations, for
622 example, within contemporary ecological perspectives emphasising the need for skilled
623 performers to maximise their grip on the situation, by being attuned to the opening and
624 closing of affordances and simultaneously synthesising information on multiple timescales
625 (Kimmel & Rogler, 2018; Ramsey et al., 2022). Our findings extend those of Kimmel and
626 Rogler (2018) that skilled performers aim to make decisions that support their ability to
627 maximise their grip on the unfolding game situation to dictate the game to their opponents.
628 These findings together support the value of qualitative enquiry into expert performers

629 perspectives and reported decision-making behaviours for generating knowledge that would
630 otherwise be missed (Gleeson & Kelly, 2020). Qualitative methods are particularly useful for
631 generating insight into broader, general ideas that shape performers intentions over the course
632 of the game, as reflected in the centralising concept of this theme.

633 **Conclusion**

634 Through interviews with professional football players, we generated four higher order
635 themes demonstrating patterns of shared meaning on how experts employ actions to gain an
636 advantage over their opponent. The study revealed novel insights into expert players
637 decision-making and ways of gaining an advantage, possessing important implications for
638 future research and theory. Firstly, players' attempts to gain an advantage were largely
639 grounded in the intention of being 'unpredictable'. Players reported achieving this through
640 multiple strategies including using disguised and deceptive actions, supporting existing
641 research highlighting the efficacy of these actions for evading an opponent's interception
642 attempts (Jackson & Cañal-Bruland, 2019). An interesting finding was that players reported
643 manipulating the sequence of their actions to violate an opponent's anticipation and misdirect
644 them from their actual intention, reflecting how manipulation of sequence information can be
645 used to invite an opponent into a misdirected response. This observation provides a new
646 direction for future research to explore how combining a deceptive action with sequence
647 manipulation could maximise the opportunity to deceive an opponent and gain an advantage.

648 A further important finding challenges the classic assumption within the existing
649 decision-making literature that a universal optimal decision exists for all situations. Instead,
650 players highlighted how their decision-making is influenced by their abilities to act on the
651 options available, how their intentions often reflected making good enough decisions and
652 creating the right moment to exploit their opposition and gain an advantage. This finding

653 calls for future research to better consider individuals skill-based action capabilities when
654 assessing players' decision-making (Dicks et al., 2019). An important question to investigate
655 is whether higher skilled players make better decisions because they regularly perform
656 actions that relate to their individual skill set and therefore, are within the boundaries of their
657 action capabilities.

658 A final key finding was that players actively interact with their opponent to influence
659 their available options and make their actions more predictable (Ramsey et al., 2022). This
660 finding has implications for typical experimental studies that model the players as passive
661 option selectors who merely choose one of the available options or respond to an opponent's
662 pre-determined action without the ability to influence them. Future research should
663 investigate to what extent players' ability to interact and influence an attacking opponent to
664 make their action more predictable, underpins successful anticipation performance.

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Ramsey et al., Psychology of Sport and Exercise – Highlights

- Professional football players make their actions unpredictable using deception and disguise
- Players enhance the effect of deception by also manipulating action sequences
- Skilled decision-making requires aligning actions with your technical action capabilities
- Skilled anticipation involves interacting with an opponent to make them more predictable
- Skilled decision-making involves dictating and controlling the rhythm of the game

Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

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