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1 **Running head: COUNTERFACTUALS IN ELITE SPORT**

2 **ACCEPTED by THE SPORT PSYCHOLOGIST as an Applied Research article**

3 **Title:** Exploring the Nature of Counterfactual Thinking and Their Perceived Consequences in
4 an Elite Sporting Context: An Interpretative Phenomenological Analysis.

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7 Canterbury, United Kingdom.

8

9

Abstract

10 This study explored the characteristics, contextual factors and consequences of
11 counterfactual thoughts in seven elite athletes using Interpretative Phenomenological Analysis
12 (IPA). Counterfactuals were experienced regularly with self-directed and upward
13 counterfactuals (cognitions about how things could be better) being most frequent. These
14 upward counterfactuals typically occurred following performance that was below participants'
15 goals and expectations. These thoughts were perceived by participants to have a negative affect
16 initially, and that they then led to facilitative behavioral consequences around learning and
17 development. Some elements of counterfactual thinking could be used as a useful reflective
18 tool to encourage elite athletes to problem solve and motivate cognitive, emotional and
19 behavioral change to enhance future performance.

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Introduction

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Success when defined by outcome is often determined by small margins. This is accentuated in elite sport where athletes' continual search for peak performance often means that the differences between competitors' performances are minimal. It is therefore unsurprising that imagining how a performance could have been different is a common occurrence. These thoughts about what might have been or alternatives of what has happened in the past are labelled as 'counterfactuals' (Mandel, Hilton, & Catellani, 2005). Counterfactual thinking is defined as "mental representations of alternatives to past occurrences, features and states" (Roese, Sanna, & Galinsky, 2005, p.138). Counterfactuals can be both evaluative and reflective in nature and alternatives can either be notably better or worse than actuality. Better alternatives are labelled upward counterfactuals; whereas worse alternatives are labelled as downward counterfactuals (Epstude & Roese, 2008; for reviews, see Bryne, 2016).

Research has typically shown that counterfactual thoughts are experienced in situations that are unusual and unexpected and that do not reflect previous experience (Kahneman & Miller, 1986). Counterfactuals are also generated where there is a closeness between the actual outcome and a desired outcome such as losing a match to an opponent's last minute score (Meyers-Levy & Maheswaran, 1992; Roese & Hur, 1997; Sanna & Turley, 1996; Sanna et al., 2003¹). Violation of personal expectation and norms can elicit sensations of surprise or frustration and lead to counterfactual thoughts that focus individuals' attention on what could have been done differently (Kahneman & Tversky, 1982; Mandel, 2003). In accordance with the norm theory, the primary cognitive role of counterfactuals in this sense is to facilitate the learning from mistakes or underperformance by producing achievable alternatives (Kahneman & Miller, 1986; Roese, 1994).

Recognizing the potential value of counterfactual thinking, the functional perspective (Epstude & Roese, 2008) emphasizes the usefulness and beneficial impact of counterfactuals

51 for behavior change. The functional theory suggests counterfactuals are closely related to goal
52 directed thoughts (Epstude & Roese, 2008). This approach suggests that when a goal is not
53 achieved, athletes will form alternatives about what could have been done to achieve said goal.
54 Similar to norm theory, the primary role of counterfactuals is problem solving. Specifically,
55 performance below a reference value drives intention for corrective behavior change to address
56 underperformance, forming a regulatory loop.

57 Epstude and Roese (2008) describe two mechanisms underlying the consequences of
58 counterfactuals: Contrast effects are where the factual outcome seems worse or better than the
59 alternative outcome (e.g., Roese, 1994), and causal inference effects are where counterfactuals
60 may emphasize causal links between antecedent behaviors and outcomes (Roese, 1997). This
61 led to a distinction between content-specific and content-neutral pathways regarding the goals
62 and intentions to inform behavior change.

63 In sport, previous research has sought to characterize counterfactual thinking in terms
64 of its direction, structure and content (Dray & Uphill, 2009). Following a close competitive
65 event, individuals tend to gravitate towards upward counterfactual thoughts directed at how
66 things could have turned out better compared to downward counterfactual thoughts directed at
67 how things could have turned out worse (Summerville & Roese, 2008). The structure of
68 counterfactual thoughts can differ in terms of the addition (e.g., if only I had given that pass)
69 or subtraction (e.g., if I hadn't had given that pass we would have failed; Dray & Uphill, 2009).
70 Sanna and Turley (1996) suggest that additive counterfactuals are a product of unexpected
71 failure, whereas subtractive counterfactuals are a product of success.

72 Additionally, the content or target of counterfactual thoughts refers to what is being
73 altered that results in a change of the factual outcome. This can include the environment and
74 behaviors, thoughts or emotions experienced by athletes themselves and others (Dray & Uphill,
75 2009). In relation to improving performance through behavior change, it would be

76 straightforward to say that counterfactuals focused on one's own actions as opposed to others
77 or the environment may more likely be functional and self-improving. However,
78 counterfactuals focused on others might inform one's behavior change through vicarious
79 learning (Epstude & Roese, 2008). Accordingly, individuals utilize counterfactuals to identify
80 and alter thoughts, emotions and behaviors that are atypical to expectation and norms
81 (Kahneman & Tversky, 1982) as well as goals (Markman, Gavanski, Sherman, & McMullen,
82 1995).

83 An extensive body of literature has outlined the consequences of counterfactual
84 thoughts for affect and subsequent behavior (for reviews, see Epstude & Roese, 2008; Sanna,
85 Carter, & Small, 2006; Roese & Olson, 1995). Early research around counterfactual thinking
86 tended to focus on the contrast effect of counterfactuals (e.g., Roese, 1994; Boninger, Gleicher,
87 & Strathman, 1994). This is where imagining how things could have been better is associated
88 with negative emotions (e.g., anger, frustration, guilt, worry) and imagining how things could
89 have been worse is associated with positive emotions (e.g., happy, relief, satisfaction). This led
90 to a view of downward counterfactuals serving a functional purpose to regulate emotions
91 (Markman et al., 1993; Roese, 1994). However, McMullen and Markman (2002) suggest that
92 both upward and downward counterfactual thoughts are also associated with assimilation
93 effects where upward counterfactuals can be associated with positive emotions and downward
94 counterfactuals can be associated with negative emotions. Thus, the Reflection and Evaluation
95 Model (REM: Markman & McMullen, 2003) suggests that reflective upward counterfactuals
96 (i.e., where one imagines the better alternative) lead to positive affect, whereas evaluative
97 upward counterfactuals (i.e., where one contrasts the actual – worse – reality with the better
98 alternative) lead to negative affect. This pattern is reversed for downward counterfactuals
99 where reflection is associated with negative affect and evaluation with positive affect
100 (Markman & McMullen, 2003).

101 In terms of behavioral consequences, previous research has found that upward
102 counterfactuals lead to greater intention to prepare, greater task effort and improved
103 performance as the functional perspective predicts (Markman et al., 1993; Markman,
104 McMullen, & Elizaga, 2008; Roese, 1994). Thus, counterfactuals identify key behaviors that
105 are required to improve (Epstude & Roese, 2008; Roese, 1994; Roese & Olson, 1993; 1995)
106 and this results in ~~more~~ motivation to improve (Markman & McMullen, 2003; Markman et al.,
107 2008). Sherman and McConnell (1995) summarize these consequences into three broad
108 categories: Affect regulation, preparation for the future, and feelings of controllability.

109 Besides some positive affects associated with counterfactual thinking, there might also
110 be some less helpful implications. For example, more intense and excess upward counterfactual
111 usage is associated with greater distress and depression (Davis et al., 1995; Gilbar & Hevroni,
112 2007; Lecci, Okun, & Karoly, 1994; Markman & Miller, 2006). With elite sport having so
113 much at stake (i.e., funding, sponsorship, medals) and with outcomes being determined by
114 small margins, excessive use of counterfactuals might occur and mental health issues might
115 arise.

116 Although literature points to a range of factors influencing the incidence, characteristics
117 and consequences of counterfactual thinking, understanding of *athletes'* experience and use of
118 counterfactual thinking is currently limited in several respects. First, the majority of the
119 counterfactual research demonstrating emotional, motivational and behavioral consequences
120 has primarily focused on non-sporting populations in a laboratory setting. Second, although
121 there is previous research exploring counterfactuals in Olympic athletes (e.g., Medvec, Madey,
122 & Gilovich, 1995; McGraw, Mellers, & Tetlock, 2005), studies exploring counterfactuals
123 experienced by competing elite athletes and their perceived consequences is scarce. Third,
124 vignette methodologies that use hypothetical scenarios to elicit and measure the production of
125 counterfactuals are typically employed. This method can serve to constrain the counterfactuals

126 reported and has ecological validity (Uphill & Dray, 2009). It is therefore important to explore
127 counterfactuals that are generated from real world environments and are recently experienced.

128 In sum, generating counterfactual thoughts about learning experiences has been found
129 to motivate behavioral intention and hence facilitate task performance (e.g., Chan, Caputi,
130 Jayasuriya, & Browne, 2013). As elite athletes are required to perform within a goal orientated
131 environment, how they experience and utilize counterfactuals might provide an insight into
132 their importance in enhancing and maintaining high levels of performance, and/or contributing
133 to experiences of distress. For example, counterfactuals might be integrated into reflective
134 practice processes and allow the athlete and psychologist to build an effective working alliance
135 through empathetic understanding (Dryden, 2006), or help practitioners develop interventions
136 to manage disappointment associated with a “near miss”.

137 To redress limitations in the extant literature, this study used a phenomenological
138 approach to explore elite athletes’ experiences regarding a) the nature, content and
139 characteristics, b) the contextual factors associated with counterfactual thinking, and c) the
140 consequences of counterfactuals.

141 **Methodology**

142 **Participants**

143 Seven athletes (4 male, 3 Female) were recruited to take part in the study. They
144 represent a range of different sports (Rifle Shooting, 3; Athletics, 1; Football, 1; Fencing, 1;
145 Swimming, 1) and have all competed at professional, national or international level (including
146 Woman’s Premier South, World Championships, World Cups, European Championships,
147 British Championships, Commonwealth games, and Paralympics games). In accordance with
148 Swann and colleagues (2015), participants therefore represented *competitive-elite* and
149 *successful-elite* athlete populations. Participants were aged 20 – 68 years ($M=33.29$, $SD=$
150 16.40) and were selected from a range of sports to provide and explore different contexts of

151 counterfactuals. To provide free recollections of counterfactuals, participants were also
152 required to be involved in regular training and have recently competed.

153 **Design**

154 A qualitative interview methodology was used to explore the nature of counterfactuals
155 and their perceived consequences in elite athletes. Semi-structured interviews were conducted
156 to gather participant data underpinned by a phenomenological perspective, which aims to
157 understand the athlete's personal lived experience of a phenomenon (Smith & Osborn, 2003).
158 In relation to the phenomenological approach, an Interpretative Phenomenological Analysis
159 (IPA; Smith, 1996) was used to analyze the data obtained as it "offers psychologists the
160 opportunity to learn from the insights of the experts – research participants themselves" (Reid,
161 Flowers, & Larkin, 2005, p. 20).

162 **Interview Schedule**

163 The semi-structured interview schedule was constructed to suit the use of IPA and
164 follow the guidelines set by Smith (1995) and Smith and Osborn (2003). The interviews were
165 designed to allow the interviewer to frame questions in a broad and open manner and to prompt
166 for more detail if needed. Using suggestions by Smith and Osborn (2003), the first section of
167 the interview was designed to build rapport with participants, through the discussion of their
168 history in their particular sport, their season so far and then a discussion of a recent competitive
169 event to explore the use of counterfactuals and their perceived consequences.

170 Participants were asked to recall their personal experience of counterfactuals and their
171 perceived consequences around a recent event. A general open question 'Tell me about your
172 personal experience of a recent positive/negative event that you thought could have turned out
173 differently...' was used to get a detailed outline of the event and the counterfactuals
174 experienced. From this, the interviewer used probing questions to get more details on the
175 counterfactual's type (e.g., upward or downward), content, direction (e.g., self or others),

176 structure (e.g., additive or subtractive), controllability and their perceived consequences (e.g.,
177 thoughts, behaviors and emotions). These probing questions were designed to be a ‘gentle
178 nudge from the interviewer’ (Smith & Osborn, 2003) to reduce researcher bias and avoid
179 leading the participant to a pre-determined conclusion. As most of the initial counterfactuals
180 were of an upward nature, the process was repeated to explore downward counterfactuals
181 during the specified events. A draft of the interview schedule was piloted in an interview
182 carried out with a novice squash player. This informed the final draft of the interview schedule.

183 **Procedure**

184 Following institutional ethical approval, participants were recruited opportunistically
185 via email through relevant gatekeepers and from previous professional contact. Prior to the
186 interviews, the participants were given an information sheet about the study, a copy of the
187 Institution’s Research Code of Ethics along with a consent form. The interviews took place at
188 the research institution (N=3) or another location suitable to the participant that ensured
189 comfort and anonymity (N=4). The beginning of each interview involved the participant filling
190 out a demographic sheet which allowed the interviewer to chat and build rapport with the
191 participant before recording. The interviews were then carried out and recorded using the
192 ‘Voice Memo’ App on the iPhone. Interviews lasted between 32 and 48 minutes (M= 44.39,
193 SD= 6.01) during which participants gave their personal accounts on the use of counterfactual
194 thinking and their perceived consequences.

195 **Analysis**

196 All interviews were transcribed verbatim by the first author to allow for detailed
197 analysis. Interpretive phenomenological analysis (IPA) was conducted as it takes into account
198 the idiographic nature of participants’ experiences and perspectives (Reid et al., 2005).
199 Although IPA aims to gain the unique perspective of participants through their verbalizations,
200 these are often not obvious and require a degree of interpretation from the researchers (Smith,
201 1995). To ensure interpretation was an accurate reflection of participants’ experiences as they

202 were described, the researchers utilized active listening techniques (e.g., paraphrasing,
203 summarizing) to outline their understanding and sense of the participant's perspective to which
204 the participant agreed or elaborated in more detail until an agreed understanding was reached
205 (Reid et al, 2005).

206 As recommended by Smith, Jarman, and Osborn (1999), the transcripts were read and
207 reread several times which allows for in-depth familiarization with the data before analyzing
208 themes and collating quotes. On the left margin, statements from the transcript were reworded,
209 summarized and commented upon to ensure the researcher had understood the accounts
210 provided by the participants. Using these preliminary notes, the right margin was used to
211 document themes and associations of the use of counterfactuals and their perceived
212 consequences. Counterfactuals and their themes were identified as the number of times an
213 athlete refers to any possible alternative to what happened in reality. These themes were then
214 grouped and categorized into similar constructs which were later labelled master themes. These
215 were then divided further in to subthemes. These themes were collected and analyzed using the
216 first transcript, which then informed the analysis of the subsequent transcripts. Any new themes
217 in subsequent transcripts where then added and all transcripts were then revisited with the full
218 set of master themes and subthemes.

219 **Results and Discussion**

220 Interviews with participants focused on gathering information in three key areas: The
221 content and characteristics of counterfactual thoughts they have experienced, the context
222 surrounding their elicitation and the consequences of these thoughts. Once master themes were
223 identified in the analysis, sub-themes were determined and key examples were drawn from the
224 transcripts. Data were then organized and presented in a hierarchical tree structure to
225 demonstrate the process of analysis.

226 **Content and Characteristics of Counterfactuals**

227 When discussing upward and downward counterfactuals experienced by the
228 participants, four main themes emerged: Comparing oneself to a previous self (including
229 physical and technical abilities, psychological skills, and performances), others' actions
230 (including competitors and support staff), situational demands (including environmental
231 demands, equipment, and organizational demands) and personal performance (see figure 1).
232 Although master themes were similar between both upward and downward counterfactuals,
233 themes and content did vary due the difference in their possible function.

234 **Contextual Factors Prompting Counterfactual Generation**

235 When discussing experience surrounding counterfactuals and the possible contextual
236 factors influencing them, four main themes emerged for both upward and downward
237 counterfactuals: Goals set prior to competition, their expectations going into the competition,
238 their experience (whether it was their first exposure to issue/competition or not) and personality
239 (see figure 2).

240 **Consequences of Counterfactuals**

241 When discussing participants' experienced consequences for both upward and
242 downward counterfactual thoughts, several main themes emerged: Personal growth, emotional
243 change and behavioral change (see figure 3). Personal growth refers to participant's
244 development as a person and athlete through learning, sharing and reflection to aid problem
245 solving and motivation. The emotional influence of counterfactuals included emotions directed
246 to self and others including competitors and support staff as well as regulation strategies to
247 cope with emotional demands of competition. Behavioral influences were identified by how
248 counterfactuals influence behavior change to enhance competition and training practices. Other
249 key themes include cognitive change where the participants discussed how counterfactuals
250 retrospectively influenced cognition. For example, attentional change where counterfactuals

251 led to a shift in their attention and attitude change where participants displayed favor or disfavor
252 to a person, event or object.

253 **Narrative Results**

254 To facilitate the reporting of a clear and accurate reflection of the counterfactuals
255 experienced and their perceived consequences, participants were asked to reflect on a recent
256 competitive event. During these reflections, participants demonstrated and expressed
257 generalized counterfactuals, for example: *“Things could have turned out differently had I*
258 *approached the fight somewhat differently”* (Participant 6).

259 **Content and characteristics of counterfactuals.** During these reflections, participants
260 discussed various characteristics regarding the key themes around content of counterfactuals
261 as well as when and where these counterfactuals took place. Traditionally, counterfactuals are
262 retrospective thoughts as demonstrated by participant 1: *“After the competition is the time to*
263 *look back”*, and participant 6: *“Immediately it was there, it was sort of I knew what had*
264 *happened straight away so I was able to reflect on that”*.

265 These also took place when athletes had the appropriate time and space to reflect deeply
266 on these thoughts: *“Cool down is when you relax and just work through everything then you*
267 *go back and have a chat with your coach no more than an hour after”* (Participant 7). However,
268 participant 7 reflected on how these thoughts are short lived and are forgotten when they have
269 fulfilled their purpose: *“I think about them after when I’ve done the race and I’m done when I*
270 *don’t have to think about it anymore”*.

271 One common theme regarding the generation of the counterfactuals was following poor
272 performance outcomes. In the study, this is represented by the master theme of
273 ‘underperformance’ and supports research suggesting counterfactuals are most common
274 following a negative interpretation of an event (Epstude & Roese, 2008). When asked to reflect
275 on outcomes, many counterfactuals referred to how performance could have been ‘better’, for

276 example: *“I shot 625.5 and I’d shot 626 so another point five what I had already shot, I would*
277 *have been selected to go to Poland”* (Participant 3).

278 Another common theme for both upward and downward counterfactuals was
279 comparing oneself in relation to a previous self, for example: *“I’ve noticed how my game is so*
280 *different to back then”* (Participant 5). Participants had also reflected on recently significant
281 events such as traumatic injury and how they might influence the frequency and severity of
282 counterfactuals: *“Before that accident I was a player that never gave up. If I went down, it was*
283 *straight back up”* (Participant 5). However, reflecting on a previous self might be used as a
284 coping mechanism in adverse situations:

285 *I was able to win a particular fight, I can take that experience forward [...] I would be*
286 *able to use that experience and say ‘hey come on you can do it, you can do it’ and take*
287 *that forward from there.* (Participant 6)

288 When reflecting on a particular event, participants not only generate counterfactuals
289 directed at oneself but also towards or in relation to others who directly influence their
290 performance including coaching decisions:

291 *Put me in my position and I’ll show you what I can do, don’t put me in a position I*
292 *never play in [...]. If I’m not going to get that then I’ll be selective about how much I*
293 *put myself through you know stress in terms of travel you know.* (Participant 5)

294 Counterfactuals directed towards the self in relation to others were common among
295 elite athletes. This includes comparing oneself to other competitors and the standard they are
296 competing at:

297 *Before a race er... (I) think, well have my competitors had that, have they, are they*
298 *going to be able to have the edge because they know I’ve had time out of the water so*
299 *I let that sit on my mind a little bit.* (Participant 7)

300 In addition to this, reflection on others' capabilities allows athletes to adapt their
301 behavior for strategic reasons:

302 *I always look back at my previous races and think... I always look at the winner of the*
303 *race and think where they positioned throughout and then over time it becomes*
304 *ingrained in me the winner is normally positioned here during the race. (Participant 4)*

305 In response, these counterfactuals aim to achieve cognitive and behavioral change to
306 overcome the issue or problem behaviors that leads to underperformance:

307 *I'd get better at thinking, right, I can't get scared of this or go practice the event before*
308 *so I've done it in a training session when it didn't matter and then come into a race*
309 *knowing that I was going to make it to the end and not let any thoughts or anybody*
310 *else's opinions get into my race progress or my race plan. (Participant 7)*

311 The final theme includes situational factors that were not ideal and had a perceived
312 effect on performance and outcome. Some situational factors related to others' decisions such
313 as a coaching decision based on formation and positioning:

314 *One, I didn't know what I was doing in my position anyway [so my positioning], two, I*
315 *wasn't really in it motivation wise and three I haven't got a cracking clue what is going*
316 *on with this formation right now, who's doing what? (Participant 5)*

317 However, counterfactuals directed solely at the situation can be unhelpful:

318 *I try not to blame the equipment and I try not to blame like the rifle, me stuff, my frame*
319 *because to me if you start blaming all those sorts of things that just makes you a bad*
320 *shooter all together. (Participant 3)*

321 It is evident from the analysis of the interviews that the frequency of upward
322 counterfactuals is higher than downward counterfactuals. However, the key themes are
323 relatively similar in their content outlined above. Those who perceived to over achieve in
324 reference to their expectations experienced downward counterfactual thoughts (Epstude &

325 Roese, 2008). The difference of downward counterfactuals seems to depend on the outcome
326 and significance of others (e.g., competitors) as suggested by participant 4: *“I managed to get*
327 *second so I wouldn’t have been able to do that if it wasn’t for the person behind me who was*
328 *there”* and the contextual factors associated such as the goals and expectations set prior to
329 competing, for example: *“I ended up finishing with a Bronze but I was happy with and I wasn’t.*
330 *I’d hit the score but it didn’t feel like a good shoot”* (Participant 3).

331 **Contextual factors prompting counterfactual generation.** Participants were asked
332 about their prior goals and expectations to gather contextual information linked to the
333 generation and content of counterfactuals. As Epstude and Roese (2008) suggest, mental
334 simulations such as counterfactuals are deeply connected to goals and expectations. Following
335 analysis of interviews there seemed to be a strong association between the goals they set and
336 the content and characteristics of counterfactuals. For example, thinking too much affected
337 participant 1’s perceived ability to achieve his outcome goal of attending the Paralympics: *“I*
338 *wanted to hit my MQS there [...]. But, obviously my, I was thinking about it too much and that*
339 *altered my performance as well [...] then I probably would have got selected for Paralympics”.*

340 Goals were individualized with some participants focusing more on the process of
341 performing: *“I’ve got the strength to stay up and I can keep going and keep working hard er...*
342 *that’s really the focus I kept for that game.”* (Participant 5).

343 Expectations are different to goals as they are the belief that something *will* or *should*
344 happen rather than the *desire* for something to happen. Expectations can come from what one
345 experiences in the lead up to competition: *“I was doing well in training, I thought, kept thinking*
346 *to myself ‘I’m going to hit this score the way I’m shooting’”* (Participant 1). However, most of
347 the expectations participants had prior to competition seemed to be based on previous outcome
348 and performance measures related to goals, for example: *“Well I know what my PB’s are... Er,*

349 *at the international I was just below MQS for both events which was a shame [...] I didn't do*
 350 *half as well as I thought I would"* (Participant 2).

351 As predicted, elite athletes seemingly have a high expectation of their abilities and in
 352 turn performance which means they would be more likely to experience performance that does
 353 not meet their expectations, eliciting more upward compared to downward counterfactual
 354 thoughts (Kahneman & Tversky, 1982; Epstude & Roese, 2008). From this study, expectations
 355 seem to be based on previous experience or others' (e.g., coaches, family and individuals within
 356 the organization) views on how they *should* be performing. Goals are set in the context of how
 357 an athlete *could* be performing in relation to a desired performance. These inform the
 358 generation, direction, intensity, content and characteristics of counterfactuals experienced
 359 hence the resulting master themes.

360 Another contextual theme that emerged from the analysis was an athlete's prior
 361 experience of a situation. Counterfactuals were less frequent and resulted in reduced
 362 consequences when the athlete had prior experience of the situation, as suggested by participant
 363 4: "*I'd been in that situation one hundred times before where you're looking around thinking*
 364 *these are the people I'm up against I beat them before, I've raced them before, it wasn't*
 365 *anything new"*. Whereas, upward counterfactuals were more frequent and had more impact
 366 following a situation the athlete had little to no experience with:

367 *I couldn't see where my groups were to sight in. And, anyway it completely threw me*
 368 *because I wasn't expecting it [...] everything that an experienced shooter will probably*
 369 *just take in their stride but [...] I was a virgin to these things.* (Participant 2)

370 Recent research suggests that personality dimensions such as extraversion, neuroticism
 371 and openness are related to the direction and intensity of counterfactuals (Allen, Greenlees, &
 372 Jones, 2014). When asked to describe themselves as an athlete, participant 2 stated: "*I'm quite*
 373 *analytical so I like to think back over and say right what did I do right or wrong there as well"*.

374 Although this example suggests conscientiousness may be associated with the content and
375 consequences of counterfactuals, participant 3 reflected on how a neurotic personality might
376 affect his perception of events and their associated counterfactuals: *“I’m quite down on myself
377 anyway even if I was to shoot fantastically”*. In relation to personality, he went on to explain
378 how perception of past and future seems inherent and stable: *“I can’t tell you why, I just started
379 thinking ‘ah well if I don’t hit this score then I’m not going to do well’ and all this that and the
380 other”*.

381 When discussing consequences, these contextual factors seem to influence the impact
382 of consequences associated with growth and development. Although counterfactuals are
383 mostly generated from negative outcomes, counterfactuals that elite athletes experience are
384 aligned with problem solving and the attainment of future goals, consistent with a functional
385 perspective. Along with the goals set prior to competition, another contextual influence
386 surrounding the generation of counterfactuals and the functional consequences is the athlete’s
387 previous experience of the counterfactual or more specifically lack of experience. Thus,
388 counterfactuals generated after a novel experience aid the learning and development of robust
389 behavioral and cognitive coping mechanisms to guide performance enhancement. This relates
390 to the literature suggesting counterfactual reasoning develops early in childhood as this is
391 where most of the early experiences in life occur and most of our learning takes place (Harris,
392 German, & Mills, 1996; Baillargeon, Scott, & Bian, 2016). However, prolonged exposure and
393 negative experiences where upward counterfactuals are generated can lead to negative longer
394 term emotional consequences if learning does not occur.

395 **Consequences.** In discussing the perceived consequences of counterfactuals, several
396 key themes emerged describing the emotional, behavioral and cognitive change experienced
397 by participants. However, in line with the functional perspective, there was an underlying
398 consequence of development and growth of one’s abilities that seemed most prominent

399 (Epstude & Roese, 2008; Markman et al., 1993; Markman et al., 2008; Roese, 1994), for
400 example:

401 *Looking back on a bad race, looking back on a good race I always think what made*
402 *me, what made me do that, how do I not do that again sort of thing. So, that influences*
403 *how I train which then influences how my race is going to go. (Participant 4)*

404 Once a lesson is identified, it can then inform specific changes in emotion, behavior
405 and cognition to enhance performance in training and competition, for example:

406 *I knew back then just relax and if anyone goes in front of me just let them go in front*
407 *and hang back on them, saving energy, so that race there speaks volumes for me*
408 *because it's all about learning from that and not being able to make that mistake again*
409 *and I definitely, I've definitely put that into my running and my training all the time.*
410 (Participant 4)

411 Learning seems to occur not only after but during the competition to problem solve and
412 overcome obstacles when performing. Participant 5 reported identifying what happened and
413 then using counterfactuals to change behavior:

414 *'Why did I miss that goal?' and I'll play it through my mind 'I missed it because I didn't*
415 *open up my body' or 'I missed it because I didn't think about placement or I didn't look*
416 *to where I was kicking it or kicked and didn't see myself, surroundings' so then when I*
417 *get the ball again I'm like 'focus, placement, relax'.*

418 Elite athletes seem to use their extensive network of professionals (e.g., coaches,
419 psychologists) to facilitate the learning and reflective process through collaboration following
420 competition (Ferraro, 2000). For example, sharing her counterfactuals with her coach to inform
421 future coaching decisions, participant 7 remarked:

422 *We go to coach feedback and have a chat then we go to cool down and it normally*
423 *happens in cool down so about twenty minutes after I start to think through and you*
424 *start to think about what you did and how you could do it better and what effected it.*

425 This development through learning and sharing provide motivation to improve and
426 perform (Markman & McMullen, 2003; Markman et al., 2008): *“Well, you always know you*
427 *can do better and you push yourself to do better. Well, that’s why we’re here isn’t it [and] It’s*
428 *quite exciting”* (Participant 2).

429 Along with developmental consequence, themes included counterfactuals directed
430 toward the self or others and mediation of emotional change experienced by the participants.
431 Athletes mentioned several negative emotions previously linked to counterfactuals in the
432 literature including guilt, regret and disappointment (Niedenthal, Tangney, & Gavanski, 1994;
433 Zeelenberg et al., 1998) as well as anger, frustration, sadness, happiness, gratitude, pride and
434 relief: *“The emotion I actually felt after that competition was gutted [...] ‘oh you should have*
435 *done better because I would have been going abroad’”* (Participant 2). The majority of the
436 emotional effects were self-directed, for example: *“Frustration and annoyance because you*
437 *can’t get it right”* (Participant 6). However, athletes do experience emotional effects directed
438 at others too: *“You know anger in me it’s like why am I doing this for you?”* (Participant 5).

439 When discussing emotional change experienced for upward counterfactuals,
440 participants expressed a contrast effect (e.g., Roese et al., 2005; Roese, 1994; Boninger et al.,
441 1994). Indeed, the most prominent emotion experienced was anger and frustration in the
442 aftermath of competition: *“I’d be angry with the way it was sort of, maybe defeated if I’d run*
443 *terrible in myself”* (Participant 4).

444 In contrast, downward counterfactuals resulted in more positive emotions such as
445 gratitude, *“That was pretty much looking back on it now kind of joke about it”* (Participant 4),

446 relief, *“It was more of a relief for me.”* (Participant 4), and pride, *“I was proud of myself for*
447 *not giving up”* (Participant 7).

448 Athletes also experience both positive and negative emotions close together in short
449 space of time. This suggests emotions switch back and forth rapidly based on their perception
450 of the situation (Apter, 1989; Uphill & Jones, 2007):

451 *I didn’t do what I thought I could do, I thought I was capable of, what my coach thought*
452 *I was capable of so a lot of disappointment but I was quite pleased with the way I*
453 *executed my better events and the way the race progressed.* (Participant 7)

454 Within the elite population, this study suggests emotions are short lived and fleeting.
455 However, these can be long lasting if the issue identified from counterfactuals are not resolved
456 through learning. Emotion experiences were largely self-focused, but external-focused (e.g.,
457 person or equipment) experiences were present when the social and physical environment was
458 appraised as being influential (Lambie & Marcel, 2002). Subsequent emotions in relation to
459 contextual goals around growth and development lead to an assimilation effect suggested by
460 Markman and McMullen (2003) whereby upward counterfactuals in the context of learning
461 can lead to positive emotions. This supports the Reflection and Evaluation Model (REM;
462 Markman & McMullen, 2003) that explains that reflection on an event and what could have
463 been different will lead to an assimilation consequence whereas evaluating an event through
464 thoughts on how things could have been different will yield a contrasting consequence. For
465 example, upward counterfactuals lead to more positive emotions when attention is focused on
466 the potential of future performance rather than the outcome (McMullen & Markman, 2002).

467 In discussing the emotions associated with counterfactuals, athletes outlined how the
468 emotional consequences lead to the learning of coping mechanisms aimed at regulating future
469 emotion (McMullen & Markman, 2002). For example: *“I think to myself like that, the game is*
470 *done, next game, focus, I don’t [want] to feel like that again and I don’t want to experience*

471 *those emotions*” (Participant 5). Other participants reflected on how coping mechanisms are
472 based on a reflection of previous experience or self: *“I shouldn’t have let myself be scared of*
473 *swimming, I’ve done it my entire life*” (Participant 7).

474 Part of emotion regulation is the cognitive change that comes from counterfactuals and
475 learning (Kahneman & Miller, 1986; Roese, 1994). Upward counterfactuals were found to have
476 a negative effect on thoughts when evaluated in relation to their goals and expectations. For
477 example, participant 3 stated: *“If I don’t hit the scores then I will be in that frame of mind of*
478 *thinking ‘well what’s the point’ which leads to thoughts of [...] ‘are you sure you’re this good?*
479 *You should be better...’*”. However, these negative thoughts led to the learning of further
480 coping mechanisms to overcome these thoughts:

481 *Don’t kick yourself if you don’t have a good game because of anxiety, so it’s just a lot*
482 *of self-talk, encouraging myself to keep going, keep working hard and believing you*
483 *know like how strong you [are] and so a lot of self-talk.* (Participant 5)

484 Whereas, downward counterfactuals result in positive cognitive change where it allows
485 athletes to gain perspective (Davis, Conklin, Smith, & Luce 1996) on what has happened within
486 context of the past and the environment:

487 *I made it through, I didn’t give up, not giving up was quite a, like, I give up quite easily*
488 *when I don’t want to do something so yeah not giving up was quite a prominent thing*
489 *that I thought about.* (Participant 7)

490 Counterfactuals were also found to facilitate behavior change to impact performance.
491 Upward counterfactuals regarding the physical demands of performance were found to
492 influence training behaviors to improve and develop: *“I’m going to do a bit more training on*
493 *my last six hundred meters and I’m really going to hit that harder*” (Participant 4).

494 Upward counterfactuals were also found to influence change in competitive behaviors
495 before competition, for example: “*Go through my race plan and go through my pre-race prep*
496 *instead of gossiping about things I can’t change*” (Participant 7).

497 Analysis of interviews suggested that counterfactuals have both a direct and indirect
498 influence on behavioral consequences associated with performance enhancement. In
499 accordance with the functional perspective (Epstude & Roese, 2008), elite athletes utilize
500 counterfactuals to identify and reflect on causal inferences relating to the outcome of the event
501 using the content-specific pathway which in turn influences intention to perform corresponding
502 behaviors. The content-neutral pathway accounts for the contrast and assimilation effects as it
503 explains how elite athletes utilize the intellectual information of counterfactuals to influence
504 behavior through cognitive strategies to regulate emotions and behaviors associated with
505 performance. This is reflective in the problem solving and regulation themes that correlates to
506 Epistude and Roese’s (2008) term ‘mind-set’ where athletes utilize cognitive and attentional
507 shifts to enhance performance behaviors and motivational effects to drive intention and change
508 in behavior. Athletes who think about what could have turned out differently create intentions
509 to participate in training activities that will improve future performance. In turn, this intention
510 helps athletes prepare for the future by influencing their decision making in similar subsequent
511 situations (Byrne, 2016).

512 **Conclusion**

513 This study has presented an interpretive phenomenological analysis of elite athletes’
514 personal experiences of counterfactual thoughts and their perceived consequences. The
515 analysis revealed that counterfactuals are prevalent in the sporting domain as previously found
516 (e.g., Dray & Uphill, 2009). However, the frequency of downward counterfactual thoughts was
517 far fewer than upward counterfactuals (Summerville & Roese, 2008; Allen et al., 2014). Thus,

518 the counterfactuals explored and reflected upon gave a greater representation of the content
519 and nature of upward counterfactuals than downward counterfactuals.

520 Counterfactuals regularly occur following performance that fell below athletes'
521 expectation or their predetermined goals. These thoughts may elicit negatively valenced
522 emotions (contrast effect; e.g., Roese, 1994; Boninger et al., 1994), but within the context of
523 goals lead to facilitative behavioral consequences around learning and development and hence
524 positive emotion (assimilation effect; e.g., McMullen & Markman, 2002). Thus,
525 counterfactuals seem to be a useful reflective tool to encourage elite athletes to problem solve
526 and motivate cognitive, emotional and behavioral change to enhance future performance in
527 accordance with the functional perspective (for reviews, see Epstude & Roese, 2008; Markman
528 et al., 1993; Roese, 1994).

529 Although there was a rich quality of data collected, due to its non-experimental design
530 causality cannot be determined. In addition, ambiguities are inherent in language and some
531 examples drawn from the analysis were interpreted as 'implied' counterfactuals (e.g., 'I did not
532 do what I wanted') compared to clearly stated counterfactuals (e.g., Ziegeler, 2000). Different
533 "types" of counterfactuals other than conditional "if...then..." counterfactuals have been
534 identified and are often implied through language (Byrne, 2016). Further exploration of how
535 counterfactuals are represented in athletes' language may help the identification and potential
536 modification of such thinking. It is also important to note that from a philosophical stand point,
537 a participant's view on 'facts' about an event or historical self could be questionable as this
538 would also be a subjective interpretation on reality.

539 It is acknowledged that the small sample size limits its generalizability. The study
540 aimed to gather similar numbers of both male and female athletes to ensure both populations
541 were represented. However, gaining an equal number of participants depending on type of sport
542 (e.g., individual vs team, closed vs open skills) was not a priority. In this study, one athlete

543 participated in a team sport and there was evidence that counterfactuals would be influenced
544 by contextual factors such as being part of a group. For example, a team athlete might
545 experience more counterfactuals directed at others' behaviors that influence outcome. This
546 might be seen as less controllable and might influence the consequences associated with the
547 counterfactuals experienced. Future research might aim to explore these differences and the
548 possible gender differences in the generation and experience of counterfactuals and their
549 perceived consequences regarding elite athletes.

550 In using semi-structured interviews to explore athletes' counterfactuals, it is plausible
551 that memory decay and poor reconstructive processes may have influenced participants'
552 responses (Brewer, Van Raalte, Linder, & Van Raalte 1991; Smith, Leffingwell, & Ptacek,
553 1999). Reporting on significant past events or capturing in the moment counterfactual thoughts,
554 think out loud protocols could be applied in future (Nicholls & Polman, 2008). However, both
555 think out loud and semi-structured interview protocols are researcher prompted. Alternative
556 methods such as archival methods might be used to capture self-generated counterfactuals.

557 Despite the limitations, the use of currently competing elite athletes provided
558 ecological validity to the representation of counterfactuals experienced and their perceived
559 consequences. Findings from this study could be of value for those in the applied settings
560 working with both elite athletes and less experienced athletes. Upward counterfactuals present
561 themselves when performance does not reach a certain level set by expectations or goals. It is
562 therefore important to monitor each athlete's expectations and ensure the athlete's goals are
563 flexible to alleviate negative emotional consequences that could be debilitating to performance
564 or motivation. This may be shaped by the cultural environment and their goals. Goals around
565 process and development may lead to an assimilation effect where motivation and performance
566 can be enhanced. In relation to the REM (Markman & McMullen, 2003), upward
567 counterfactual thoughts would be best used in a reflective process following an event to inform

568 goals and intention for future practice and competitive behavior change. These could also be
569 useful for significant others (e.g., coaches, physiotherapist, support staff) to inform how they
570 might deal with issues brought up by the athlete that they might influence. For example, if there
571 is conflict between two athletes then a coach might use each athlete's counterfactuals using
572 reflective practice to come up with a management strategy to overcome the issue. Also,
573 counterfactuals could be used to gain perspective on these goals and protect an athlete's self-
574 esteem following failure (McCrea, 2008). Beyond the scope of elite athletes, individuals who
575 participate in performance related activities (e.g., business, sport & exercise practitioners,
576 health services) would benefit from lessons learned from elite athletes to understand and
577 suitably utilize counterfactuals to facilitate cognitive, emotional and behavioral change to
578 enhance their practice.

579 This study taps into the experiences elite athletes have of counterfactuals. It also
580 provides an insight into how elite athletes cope with the negatives effects of counterfactuals as
581 well as utilize the positive effects of counterfactuals to improve and sustain high performance.
582 Future research on elite athletes' counterfactual thoughts using experimental and longitudinal
583 studies would be beneficial to investigate the antecedents and consequences of counterfactual
584 thinking on training and performance. The use of an elite population could be a useful source
585 for understanding high performance athletes and how they experience thoughts, emotions and
586 behaviors. By understanding how elite athletes generate, experience and reflect on
587 counterfactuals, it is hoped other athletes can utilize counterfactuals to identify causal
588 inferences and deploy accompanying changes to enhance both performance and motivation to
589 succeed making sport more fulfilling and enjoyable.

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718

Footnote

719 ¹ We would like to thank an anonymous reviewer for alerting us to the retraction of a number
720 of articles by Lawrence Sanna. To date, we are not aware of any proceedings around
721 retraction of the articles we cite.