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Managing Vulnerabilities in Practitioner Decision-Making within Sport Psychology

Services: Responding to the Evidence Base

Abstract

26
27 This position paper examines decision-making in sport psychology practitioners from a dual
28 processing perspective. Based on the work of Kahneman and Tversky, we draw upon
29 cognitive and social psychology research to explore key decision-making vulnerabilities in
30 the context of the sport psychology **practitioner**. We examine the influence of classic
31 heuristics and biases, exploring issues such as: an exclusive focus on the inside view; tunnel
32 vision; **focusing** on disposition as opposed to situation; the sport environment as a complex
33 adaptive system; formulas for success; phase transitions; and conflating skill and luck. When
34 considering how to combat such decision-making vulnerabilities, we explore a
35 ‘counterintuitive’ approach (Mauboussin, 2013) to mitigating these, and explain how sport
36 psychology practitioners can apply **such** strategies. We suggest counterweight strategies,
37 including: raising awareness of how biases and heuristics may be affecting our decision-
38 making; diversifying our perspectives; proactively seeking critical feedback from diverse
39 sources; creating useful checklists; and performing ‘pre-mortems’. Likewise, we explore
40 strategies for future research on decision-making in sport psychology practitioners.

41

42

43 Lay Summary:

44 This position paper draws on research from social, cognitive and sport psychology to explore
45 key decision-making vulnerabilities in the context of the sport psychology **practitioner**
46 ~~consultant~~. We provide evidence-based suggestions to mitigate these vulnerabilities, and
47 strategies for how **practitioners** can apply these ideas in their practice.

48

49 Implications for Practice:

- 50 • A dual-processing approach has considerable potential for highlighting, and mitigating
51 against, key decision-making vulnerabilities in sport psychology practitioners
- 52 • The systematic use of evidence-based strategies could greatly enhance decision-making
53 quality in practitioners.

54

55 Much attention has been paid in the sport psychology literature to decision-making in
56 athletes: typically in the context of optimizing immediate decisions made during competition
57 (Araújo et al., 2006). By contrast, decision-making processes in sport psychology *service*
58 *providers* (referred to throughout this paper as ‘sport psychology practitioners’) have
59 received much less attention. This type of decision-making is arguably a crucial area for
60 consideration, because the quality of the decision-process of the practitioner will likely have a
61 considerable impact upon their effectiveness: suggesting the need for the development of
62 evidence-informed decision-making guidelines. Indeed, Martindale and Collins (2013)
63 argued that sport psychology practice is essentially a series of decisions, and that the
64 development of analytical reasoning is essential for effective practice.

65 There is substantial decision-making research originating in cognitive and social
66 psychology that has direct relevance to sport psychology practice, and could be particularly
67 useful to early-career practitioners and others looking to sharpen their decision-making
68 processes. Mauboussin (2013) integrated this research into decision-making errors, heuristics
69 and cognition, and proposed a set of simple suggestions for avoiding common decision-
70 making mistakes: particularly those where intuition may lead to missteps and unanticipated
71 harms. Informed by the heuristics and biases approach (Tversky & Kahneman, 1971),
72 Mauboussin argued that humans very easily fall foul of simplified mental shortcuts
73 (heuristics) that – when they are misaligned to the situation or task – prevent us from dealing
74 effectively with the complexity of real-world decision-making. This well-supported model
75 proposes a dual processing approach, based on the notion of two decision-making systems:
76 *System 1* and *System 2*. According to Kahneman (2011), System 1 is fast, automatic and
77 effortless, using intuition to make decisions. System 2 is slow and consciously controlled,
78 using analytical decision-making.

79 As Martindale and Collins (2013) noted, both System 1 and 2 thinking are used in
80 sport psychology **practice**. Intuitive decision-making seems to work well in stable
81 environments, where conditions remain constant, feedback is clear and cause-and-effect
82 relationships are linear (Kahneman & Klein, 2009). For example, we might observe a simple
83 correspondence between mental skills use and performance in an athlete, with no apparent
84 **change** in the conditions under which they are operating, leading to an assumption of
85 causality. **Nonetheless**, we must be careful to bear in mind that such an observation is simply
86 a correlation, not necessarily causal.

87 However, sport **psychology practitioners** face many situations where intuition will
88 likely prove an unreliable guide. Intuitions do not work well in complex, changing systems
89 (Kahneman & Klein, 2009), and may therefore not be well-suited to many decisions the **sport**
90 **psychology practitioner** has to make. Intuitions work well where there is a stable relationship
91 between cues and outcomes (Klein et al., 2010). However, such stable relationships are
92 unlikely to occur in the complex, ever-changing system that comprises the athlete's world.
93 Essentially, individual clients can be seen as a complex system in themselves, nested within
94 other complex systems comprising their immediate social surroundings, including the
95 sporting team, school- or work-colleagues, friends and family (Eidelson, 1997). These groups
96 also exist within another complex system, which is the broader social context within which
97 the clients operate (sport governing bodies, society - Palla et al., 2005). Given this level of
98 complexity, the constant change in athletes' lives, **combined with** the many cognitive biases
99 (systematic errors) that affect **practitioners'** decision-making, it appears unlikely that an
100 'intuitive' approach - based on a relatively small number of heuristics and rules-of-thumb -
101 will lead to optimal decision-making by practitioners. Therefore, Mauboussin (2013)
102 advocated a 'counterintuitive' approach to decision-making: one that focuses on minimizing
103 common cognitive errors, either 'balancing out' potentially flawed heuristics or at least

104 attempting to reduce the costs they might incur. This approach fits very well with a
105 ‘fallibilist’ working philosophy (Keegan, 2016a): wherein the **practitioner recognizes** the
106 complexity of the human being, and adopts a highly critical and self-aware attitude. With a
107 *fallibilist* approach, one assumes that our knowledge or working model, is likely to be wrong
108 or flawed, in some currently unknown way, meaning the emphasis is on minimizing errors:
109 effectively trying to be ‘less wrong’ (or wrong in a less harmful way). This recognition of
110 vulnerability has become a core philosophical assumption in the psychological service-
111 delivery of the first two authors – both registered practicing psychologists – who have found
112 this approach to promote ethical and effective practice.

113 The research question we will attempt to explore, through this position paper,
114 involves mapping out the conceptual landscape to begin considering: “How might the
115 decision-making of sport psychology practitioners be improved by incorporating lessons from
116 the dual-processing approach?”. We describe an evidence-informed approach to this topic,
117 that was developed in the field of behavioral finance, but that has potential to be very useful
118 to sport psychology practitioners. To drive this process, we review Mauboussin’s (2013)
119 response to the research-base in decision-making: with the aims of both supporting
120 practitioners, and stimulating research to test the practical suggestions in a sport psychology
121 context. First, we explore key decision-making vulnerabilities, contextualize them using
122 sporting examples, and suggest potential applications for the sport psychology practitioner.
123 Subsequently, we then describe and illustrate strategies that reflect current evidence for how
124 to mitigate and avoid the potential pitfalls of permitting unconstrained heuristics and biases in
125 our practice.

126 **Mistake #1: This Time it’s Different**

127 **Sport psychology practitioners should be wary of placing too much weight on ‘this**
128 **time it’s different’ thinking, an issue that has been exemplified in recent years, with policy**

129 decisions regarding how to manage a pandemic – for example – often overlooking or
130 dismissing what has been successful (or not) in other countries. Kahneman and Tversky
131 (1977, 1979) distinguished between the ‘inside view’ and the ‘outside view’. The inside view
132 deals with a problem by using information that is close-at-hand, such as anecdotal evidence
133 (often our own, limited experiences). This is the approach that most people use when trying
134 to predict the future. For example, consider a high-level professional athlete client who is
135 nearing the end of their competitive athletic career, and is struggling to maintain their
136 performance level. From the ‘inside view’, the practitioner might infer from the athlete
137 showing extraordinarily high motivation to extend their career that it would be safe to eschew
138 focusing on psychological preparation for retirement, in favor of focusing on strategies to
139 extend career longevity. In contrast, the ‘outside view’ examines whether others have faced a
140 similar situation, and what happened (e.g., considering how many other performers have
141 maintained the necessary level of performance at that age). Effectively, the inside view lends
142 itself to ‘this time it’s different’ thinking, rather than learning from what has happened to
143 others in the same situation.

144 Mauboussin (2013) argued that three cognitive illusions lead to the dominance of the
145 inside view in decision-making: (a) the illusion of superiority, where individuals have an
146 unrealistically positive view of themselves (Alicke & Govorun, 2005); (b) the illusion of
147 optimism, where people see their future as more positive than that of others (Weinstein,
148 1980); and (c) the illusion of control, where individuals behave as if chance events are within
149 their control (for example, Gino et al., 2011). These illusions, and the use of the inside view
150 when making decisions, can manifest in many ways in sport psychology practice. For
151 example, we may greatly overestimate the extent to which we are able to facilitate behavior
152 change in our athletes, and take too positive a view of the sport psychology evidence-base.
153 There is no psychological intervention that works 100% of the time, and finding or obtaining

154 the evidence required to make such a claim about several popular sport psychology
155 interventions is problematic (Gardner & Moore, 2006; Keegan, 2016a). When taking the
156 inside view, we may take an over-optimistic view of an athlete's likely potential, or career
157 longevity, or even our own effectiveness as practitioners. All of these were certainly the case
158 for one of the authors during the early part of his career. When fate dealt career-limiting
159 injuries and/or illnesses to clients who were showing great potential, he recommended
160 interventions touted in academia as very effective, such as guided imagery, positive self-talk
161 and modeling videos, yet these failed to have the desired effects in the 'real world'. Through
162 these experiences, the dangers of the cognitive illusions above became apparent. Therefore, it
163 is important to take the outside view: assess distributions of outcomes, make a prediction
164 based on real, relevant and reliable data, and fine tune, when necessary, with information
165 from the inside view. In the case of career longevity, mentioned above, the practitioner may
166 be wise to take the 'base case' assumption as being that the athlete should consider retirement
167 planning, if very few other athletes have been able to maintain high-performance level at that
168 age. For example, it might be more ethical, less stressful/harmful, and a better medium-term
169 strategy to consider post competitive career planning such as new qualifications or financial
170 planning courses. However, if the client has a particularly low biological age, for example,
171 this 'inside view' information can be used to fine tune decisions regarding the best strategy.
172 Therefore, the aim here is not to dismiss the inside view: Rather, it is to use the often-
173 neglected outside view as the initial base case, with the inside knowledge then used to adjust
174 from this point (cf. Duke, 2018).

175 **Mistake #2: Tunnel Vision**

176 Tunnel vision – simply defined as the reluctance to consider alternatives to one's
177 preferred line of thought - can be damaging to decision-making in several ways, and therefore
178 should be carefully guarded against by the sport psychology practitioner. Mauboussin's

179 (2013) notion of tunnel vision captures several sources of potential errors in decision-making
180 from a dual processing perspective, for example, the anchoring-and-adjustment heuristic
181 (Tversky & Kahneman, 1974). This heuristic describes how people often start with a specific
182 piece of information (the anchor) and adjust *from there* to come up with a final answer.
183 However, research has demonstrated that there is a systematic bias to make insufficient
184 adjustments from the anchor (Epley & Gilovich, 2001). The anchor can be relevant, for
185 example, the initial offer in the process of a house sale or wage negotiation. But the anchor
186 may also be *irrelevant*, such as when Tversky and Kahneman classically showed that an
187 arbitrary number from spinning a roulette-wheel influenced people's estimations of the
188 percentage of African countries in the United Nations. In sport psychology **practice**, a
189 common 'anchor' might be our assumptions about the effectiveness of certain psychological
190 skills, or unfounded expectations of an athlete's talent or skill level. Mauboussin
191 recommended that practitioners should work to avoid permitting 'anchoring' to occur in the
192 first place, and also seek to facilitate sufficient flexibility in decision-making to allow for
193 factors such as injury, personal issues, aging and other factors that may influence progress.
194 Another example of tunnel vision in **sport psychology practice** is the narrow emphasis on
195 performance-enhancement, as opposed to wellbeing, career-transitions, or other potential
196 service aims (Andersen, 2018). This tendency is problematic on a number of fronts, including
197 the fact that much of the beneficial effect offered by sport psychologists is likely due to the
198 relationships they form with clients rather than the interventions per se: an issue that can also
199 lead sport **psychology practitioners** to judge their effectiveness based on their clients'
200 performances. Of course, the latter is beyond the **practitioners'** control and therefore any such
201 evaluation is problematic (see Andersen, 2009).

202 Similarly reflecting 'tunnel vision', the representativeness heuristic (Tversky &
203 Kahneman, 1974) refers to a tendency to rush to conclusions based on representative

204 categories that come easily to mind. For example, we might make assumptions regarding the
205 likely athletic prowess of a client based on appearance. However, not only is it important for
206 sport psychology **practitioners** not to fall into this way of thinking, it is also crucial to
207 understand that other people will. For example, Lovell et al. (2011) found that athletes'
208 perceptions of female sport **psychology practitioners'** likely competence were influenced by
209 the latter's body mass index and style of dress. Therefore, **practitioners** may benefit from
210 either challenging (i.e., as a profession) or at least explicitly considering the potential impact
211 of representativeness heuristics in facilitating-versus-undermining our effectiveness:
212 particularly as we move between settings and cultures (Ryba, 2017).

213 The availability heuristic (Kahneman, 2011) is another source of tunnel vision that
214 should be considered by the practitioner. This vulnerability occurs when we judge the
215 frequency or probability of an event according to what readily comes to mind. Therefore, we
216 tend to overestimate the probability of something we have seen recently, or that is very vivid
217 in our memory, happening again. For example, the widespread coverage of violent crime in
218 the media has been shown to lead to fear of crime that is out-of-proportion to its actual
219 occurrence (Romer et al., 2006). In a sport psychology **practice** context, we might assume
220 that an intervention will likely work with a specific client as it has worked well for another
221 recent client with superficially similar issues. However, this will not necessarily be the case.
222 Indeed, Keegan (2016b) detailed how this assumption led him to a key failure in his early
223 career, where two athletes who presented very similarly actually needed very different
224 support. The success of key strategies with one athlete, and their immediate availability in
225 recent memory, led him into offering a similar approach to the other athlete, only to be
226 ineffective. The availability heuristic may also lead to mistakes at the needs analysis stage:
227 for example, **an athlete requested the one of the authors' help with competitive anxiety issues,**
228 **attributing their lapses in concentration to anxiety, which the author had seen in other**

229 performers and so accepted the athlete's interpretation. However, observation revealed
230 inappropriate hydration and nutrition during competition, which turned out later to be the
231 reason why the athlete would become tired and have trouble concentrating late on in
232 competition. Thus, a referral to a dietician was made, and the problem was resolved in a very
233 different manner. Therefore, to avoid tunnel vision, a practitioner may consider mitigation
234 strategies: for example, seeking dissenting feedback or alternative perspectives (e.g., use of
235 mentors/colleagues as 'critical friends', which was actually what led the author to consider
236 non-psychological reasons for the athlete's issues in the above example), and avoiding
237 making decisions while at emotional extremes (such as a knee-jerk reaction after a bad result
238 for the athlete): as heuristics are more commonly observed when emotions are high (Slovic et
239 al., 2007).

240 **Mistake #3: Emphasizing Disposition Over Situation**

241 Even sport psychology practitioners - who are explicitly trained regarding the
242 importance of the social environment in determining behavior (e.g., Bronfenbrenner, 1994;
243 Michie et al., 2011; West et al., 2005) - can easily fall into the trap of overemphasizing
244 disposition, and underemphasizing the situation, when trying to evaluate the causes of
245 athletes' behaviors. Indeed, the early decades of sport psychology research often focused on
246 the search for personality traits associated with sports participation and performance, and
247 even today, talk of trait-like individual characteristics, such as mental toughness or resilience,
248 dominates the talk of sport psychology in 'pop' psychology coverage. However, an
249 examination of the dual processing literature would caution practitioners against such an
250 approach. One of the earliest cognitive biases investigated was the 'fundamental attribution
251 error', where humans tend to overemphasize dispositional explanations for behavior and
252 under-emphasize situational ones (Ross et al., 1977). This bias appears more prevalent in
253 Western cultures than Eastern ones, likely due to the more individualistic nature of the former

254 compared to the more collectivistic culture of the latter (Choi et al., 1999; Morris & Peng,
255 1994). Over time, however, substantial research has shown that the situation and social cues
256 can play a much greater role in an individual's behavior than stable traits and dispositions
257 (Kalimeri et al., 2010; Lepri et al., 2012). Therefore, it is important for **sport** psychology
258 practitioners to acknowledge the extent to which our **own** social environment influences our
259 judgement and decision-making processes **when delivering scientific support**.

260 The effects of group pressure on individual decisions were first demonstrated in Asch's
261 classic experiments (1951), and five decades later Berns et al. (2005) provided greater insight
262 into the processes behind conformity pressure. Using a mental rotation task while measuring
263 brain activity by functional magnetic resonance imaging (fMRI), the researchers found that
264 group pressure affected participants' perceptual processes, prior to cognitive processes and
265 explicit decision-making, by imposing a virtual image on the participants' minds that eclipsed
266 what they could actually see. According to Mauboussin (2013), social influence on decision-
267 making occurs partly due to asymmetric information, where we recognize that others might
268 know things we do not, and therefore we take their opinions as more primary/influential. In
269 addition, responding to peer pressure seems to be a universal human characteristic. For
270 example, the Asch experiment has been repeated over one hundred times in twenty countries
271 with similar results (Bond & Smith, 1996). The implications for this social influence on how
272 we **actually** perceive seemingly objective information has significant implications for sport
273 psychology practice. Therefore, when analyzing cognitions and behavior – of clients and
274 ourselves – it is important that we appreciate the situational factors that may influence those.
275 Although individual personality characteristics do influence behavior in sport (Allen et al.,
276 2013), the social psychology literature is replete with **examples** of studies, such as those
277 noted above, that indicate that the situation is likely more important than disposition in
278 explaining the decisions people make. Therefore, extreme caution should be taken when

279 interpreting the results of studies (or anecdotes) that capture experiences from a small sample
280 of elite performers, and try to draw conclusions or inferences regarding the effectiveness of
281 psychological strategies that may have led to their success (Hassmén et al., 2016; Keegan
282 2016a). Such work is replete with survivorship bias (Brown et al., 1992): only sampling from
283 the privileged/lucky few who ‘make it’ and ignoring the rest. Practitioners should therefore
284 avoid uncritically adopting strategies based chiefly on anecdotes, case reports and interview-
285 based studies where there is no clear, causal and systematic difference demonstrated between
286 athletes who adopt a particular strategy and those who do not. **That is not to ‘dismiss’**
287 **anecdotes and case studies, but rather recommend highly judicious application. At the other**
288 **end of the evidence spectrum, even when an intervention has been shown to work in**
289 **randomized controlled trials, caution should still be exercised. For example, the ecological**
290 **validity of experimental protocols, the representativeness of the samples, and applicability to**
291 **your specific client in their specific circumstances, should all be considered. Overall,**
292 **whichever interventions are selected, and whichever evidence is used to inform that, we**
293 **might surmise that** one should only proceed with caution and appropriate monitoring in place:
294 **never ‘set-and-forget’.**

295 Our reasoning here concurs with Schinke and Stambulova (2017) that sport
296 psychology practice should be context-driven. A full understanding of the situational factors
297 affecting clients is vital to enable effective practice. **Further,** however, this situational
298 awareness also applies to the situation of the practitioner: We should strive to create
299 supportive, facilitative structures for our **own** decision-making, and be aware of subconscious
300 influences. Strategies could include: (a) noting situations where subconscious biases, such as
301 survivorship bias, might influence the strategies we suggest to athletes, and taking steps to
302 minimize these; and (b) ensuring that we evaluate carefully the evidence-base for
303 interventions we are considering, and note cases where this evidence base lacks a clear,

304 systematic examination of the differences between survivors and non-survivors in the
305 process-at-hand. For example, in cases where the intervention lacks consistent-and-
306 compelling research evidence - and instead has been advocated based on the testimony of a
307 few successes - a cautious practitioner may lean towards viewing such claims with skepticism
308 and either reconsidering their decision or exercising careful design and checks when
309 implementing them.

310 There is also the consideration of the affect heuristic (Slovic et al., 2007) where, as
311 previously noted, our emotions can negatively influence the quality of our judgements. To
312 avoid decision-making pitfalls associated with the way emotion impacts cognition, sport
313 psychology practitioners may seek to make key decisions in an environment with an
314 acceptable stress level, (e.g., at a physical and emotional distance from the high-pressure
315 environment of competition). Such a precaution would also enable the practitioner to act as a
316 good role model for the athlete, making key decisions in a calm, considered manner. This
317 strategy also fits well with Poczwardowski et al.'s (1998) notion of managing oneself as an
318 intervention instrument. Of course, putting such advice into practice is not easy given the
319 "pressure-cooker" of serious sports competition that most practitioners work within.
320 However, there are a number of ways of making this process easier. For instance, one of the
321 current authors has developed a policy of never providing support immediately before or
322 during competition, or suggesting any changes to the athlete's psychological strategies for at
323 least 48 hours post-competition. This provides a barrier to making emotion-laden, knee-jerk
324 decisions, similar to Duke's (2018) concept of the Ulysses contract. Though this may not
325 work for all practitioners, this policy is made clear to all potential clients and explained, and
326 once athletes understand the rationale for this they are usually very receptive. In addition,
327 extensive use of a humble checklist (see Discussion) can help avoid the intuitive, emotion-
328 driven decision-making that is likely to dominate in these contexts.

Mistake #4: Misunderstanding Complex Adaptive Systems

‘Keep it simple’ is a piece of advice given in many fields, but can be very dangerous for the sport psychology practitioner, who is not only dealing with one of the most complex known organisms (i.e., the human) but doing so within a system of very complex social interactions. Given the *complex* nature of psychological and social ‘things’, an understanding of complex adaptive systems is important for the practitioner, and yet they can be counterintuitive (Holland, 2006). Social insects such as ants and bees are examples of creatures whose complex swarm behaviour cannot be understood by isolating individuals and only studying one-at-a-time. Instead, it is often more informative to study the entire flock, colony, or ‘system’ (Miller & Page, 2007). The value of viewing sports teams from a complex systems perspective has been noted in the motor control literature (Silva et al., 2016) but it can be of great benefit to the sport psychology practitioner too. The athletes and coaches we support exist in complex adaptive systems, and when we support them we interact with that system: either perturbing it or even becoming a part of it.

In complex adaptive systems, we can never understand the whole by exclusively studying its parts. As Mauboussin (2013, p. 76) noted: “If you want to understand an ant colony don’t ask an ant. Study the colony”. Typically, however, human reasoning prefers to understand events as simple, linear cause-and-effect associations, and even in the clear absence of the necessary information to be able to do so, we will try to ascribe causes to events we experience (Gazzaniga, 2005). We cannot fully understand system-level effects by studying agent-level causes, but people tend towards individual-level explanations as they can appear plausible and are more accessible. In sport, ‘star’ players and coaches are often credited for success of a team, but these individuals rely on the people, structure and norms of the collective (Burton & Raedeke, 2008). Many players and coaches are unable to replicate great success with one team when they switch to another: a phenomenon that has been well-

354 demonstrated in business. For example, Groysberg et al.'s (2004) study of over 1,000
355 successful equity analysts showed that when they switched firms, their performances
356 deteriorated sharply. The researchers concluded that the system-level advantages that the
357 previous employer supplied, such as the right support network, were likely not present with
358 the new employer. However, due to our inherent bias **towards** attributing behaviour and
359 outcomes to individuals' traits, it is likely that the blame for the poor performance would rest
360 with the unfortunate employee. This **bias is also possible** in sports. For example, as Andersen
361 (2018) noted, sport psychology practitioners sometimes appear in the media discussing
362 behaviors of athletes and coaches in the public eye. Leaving aside the ethical issues involved,
363 such discussions often focus on individual behaviors and take little account of the system-
364 level influences. For example, much has been written about the coaching and management
365 style of Sir Alex Ferguson (former manager of Manchester United Football Club; see, for
366 example, Hughes, 2015). In such discussions, his individual management style and character
367 tend to be prioritized. While acknowledging that we can learn lessons from individual level
368 analysis, there are real dangers in ascribing system-level outcomes to individual behaviors.
369 For example, numerous studies have found strong correlations between wage expenditure in
370 professional sports teams and success (Ferri et al., 2017; Kuper & Szymanski, 2012). It is
371 very unlikely that coaches whose teams lack this financial '**clout**' can directly import lessons
372 from Manchester United managers and expect **comparable** success.

373 Another important lesson here is that when administering interventions it is not
374 always possible to tell whether they are having the desired impact. There are simply too many
375 potentially confounding variables in the 'real world' when working with an n=1 to have the
376 level of confidence that we could obtain from a randomized controlled trial (Moore, 2007).
377 Therefore, practitioners should be very cautious when interpreting the effectiveness of their
378 interventions. **And of course, the issue of what constitutes effectiveness is important to**

379 consider too. The construal of what is effective-or-not will likely be very different for
380 different client groups and situations, and will even vary considerably for the same client
381 over time. Therefore, even if we were able to state with certainty that an intervention had
382 acutely enhanced performance, this might simply not be important in the context of
383 promoting mental health and wellbeing, or indeed where multiple priority outcomes need to
384 be balanced (e.g., Keegan et al., 2020). Ultimately, the well-being of the client should always
385 be the practitioner's number one concern, and we should be wary of narratives that equate
386 'effectiveness' with performance enhancement, as noted above (Andersen, 2009). While
387 acknowledging that a fallibilist working philosophy may not always go down well in high-
388 performance cultures - that can favor strong confidence and the appearance of focusing
389 almost exclusively on results - we argue that cautious and prudent decision-making provides
390 a strong base to an ethical, evidence-based practice (Moore, 2007).

391 **Mistake #5: The Formula for Success**

392 We have argued in the preceding two sections that: (a) humans often emphasize the
393 individual rather than the situation when trying to understand behavior; and that (b) we also
394 often try to understand complex adaptive systems (such as sports teams) by studying them at
395 an individual, rather than system, level. Both these mistakes relate to the importance of
396 understanding context, meaning that practitioners should be very cautious of suggestions that
397 there are generally applicable rules or 'formulas' that we can apply to ensure positive
398 outcomes with clients.

399 Numerous **sport psychology** books and articles, as well as those written by successful
400 coaches, athletes and businesspeople, appear to offer 'formulas' for success (for example,
401 Duckworth, 2016; Gladwell, 2009; Syed, 2010). However, as evidence-driven practitioners
402 we should be very skeptical of **simple formulas**, as success will depend heavily on context –
403 **consider the example from** the preceding section, **wherein** the star player in one team

404 **performs** poorly in another. A different context (e.g., different culture, new team, new career,
405 new economic conditions) may mean that the same ‘rules’ and ‘hacks’ no longer facilitate
406 success. Though research that draws common attributes from high-performing players and
407 teams is valuable in **characterizing** the attributes and capabilities that exist in those settings, it
408 relies on correlations, which are never sufficient evidence for causation (Alrich, 1995).
409 Indeed talent development research is clear that psychological ‘traits’ can be poor predictors
410 of subsequent success (Vaeyens et al., 2008). A ‘formulas’ approach also relies on
411 survivorship bias as it is an incomplete sample: all elite athletes share the attribute of – for
412 example – having a brain, but having a brain does not make one an elite athlete. Across
413 careers in many different spheres, socioeconomic status, sex/gender, season-of-birth bias etc.
414 are all more dependable determinants of eventual achievement (Côté et al., 2006; Ng et al.,
415 2005). Yet no commentator has ever noted admiringly that the trophy-lifter was born in the
416 right place, to a financially secure household at a **favorable** time of year: likely factors
417 explaining much more variance in performance (Baker & Logan, 2007; Hancock et al.,
418 2018). As such, it is crucial that we do not misconstrue personal attributes (including luck
419 and happenstance) as a prescription for optimizing performance.

420 To counteract this bias, and understanding that such biases are unconscious and occur
421 quickly and ‘unchecked’, practitioners should seek to ensure their decision-making
422 *proactively* considers contextual and situational factors. Such circumstance-based thinking
423 will involve thoughtfully reconciling interventions - based on theory and research - with the
424 prevailing conditions. Such an approach would enable coaches, for instance, to uphold certain
425 core values while **recognizing** changing conditions and reacting accordingly. Returning to
426 Keegan’s (2016b) example of very similar athletes presenting with similar issues (‘Belle’ and
427 ‘Lynn’), it could be argued a focus on the individuals’ age, position, narrative, location, skills
428 and presenting ‘problem’ all pointed to the same support strategy. Nevertheless, an increased

429 emphasis on wider context and environment may have directed attention to the athletes'
430 different social support, life-histories and frames-of-reference – and thus could **have** avoided
431 the relative failure to support 'Lynn'. The key thing here is to **recognize** that there is no
432 consistent prescription that will work as 'best practice' in domains with multiple dimensions,
433 as this depends on the circumstances.

434 **Mistake #6: Bertrand Russell's Chickens – Falling Prey to the Problem of Induction**

435 **It is very easy for sport psychology practitioners to fall prey to the problem of**
436 **induction**, that of extrapolating from specific observations to general conclusions. **However,**
437 **inductive reasoning can** fail quite badly in complex systems such as psychology, sport and
438 talent development – indeed it has long been acknowledged as a flawed way of attaining
439 reliable theories or laws (Hume, 1748). Complex adaptive systems display heterogeneity,
440 emergence (i.e., often uncontrolled, unpredictable pattern formation), and phase transitions
441 (sudden changes in the way a thing works and looks – such as the 'phases' of water from ice
442 to liquid to gas). This problem was famously illustrated by Russell's (1959) allegory of a
443 chicken that is fed by a farmer a thousand days in a row, reinforcing its feelings of security
444 and well-being until the farmer arrives one day holding a large knife behind his back. In this
445 case, all the chicken's experiences and feedback have led to a firm expectation so assured that
446 it seems to be a fundamental law of the chicken's world, but the system in which it operates
447 then undergoes a critical phase transition. In a similar manner, repeated good outcomes in
448 sport provide us with a firm expectation that our athletes' strategies are working, but we need
449 to be alert to the possibility of unexpected, often unpredictable phase transitions: We cannot
450 expect the success, or the **athlete's** development, to continue once we accept we are in a
451 complex adaptive system/environment. Examples might include a particular set of tactics no
452 longer working because opponents have adapted to them, a particular psychological skill no
453 longer providing an 'edge' as it has become widely adopted by opponents (or mis-managed

454 or forgotten by the athlete), or the effects of injury or aging. The same applies to our
455 development as practitioners. It is unrealistic for us to expect linear development or a
456 sustained plateau of success, and we are likely to undergo phase transitions as our knowledge
457 and experience grows and our personal circumstances and careers change. **For example, one**
458 **author's practice underwent a phase transition after reading about, and understanding, the**
459 **potential usefulness of a dual processing approach. This led to an increasingly cautious,**
460 **fallibilistic approach to interventions, and one focused much more on helping athletes with**
461 **probabilistic decision-making, and less focused on psychological skills training. However, his**
462 **career and personal circumstances were such that he could afford to experiment with this**
463 **radically different approach at that time; practitioners under pressure from performance**
464 **directors to achieve instant results would likely not have the space and time to afford such an**
465 **approach in that situation.**

466 Another potential mistake when faced with phase transitions is having confidence in
467 predictions. People often presume that outcomes that have occurred were inevitable and
468 predictable, a phenomenon termed 'hindsight bias' (Fischhoff, 1975). As an example, in
469 studies where participants are given a short story with several possible outcomes, one of
470 which they are told is true, they tend to assign a higher probability to the 'true' one,
471 regardless of its objective likelihood (Kahneman, 2011). In reality, however, the likelihood of
472 accurately predicting outcomes in complex environments is low (Salganik et al., 2006). For
473 example, financial analysts make forecasts of company earnings that are used by fund
474 managers and others to guide their investment choices. Dreman (2011) found in analyzing
475 over 800,000 such estimates that the likelihood of predicting a company's earnings in five
476 years' time (within plus or minus 5%) was one in forty billion, concluding that such
477 forecasting was a waste of time. Compelling research by Salganik et al. – examining how
478 music tracks become popular - concluded that social influence plays a major role in success

479 in fields such as music, and therefore success is impossible to predict, because tiny
480 differences in initial conditions caused substantial variations in outcomes.

481 The impossibility of such predictions also seems to be evident in sport, from the
482 documented lack of success in talent identification programs. In a recent systematic review,
483 Johnston et al. (2018) concluded that commonly-used predictors were “inconsistent and
484 unreliable” (p. 107). This problem speaks to the importance of grounding interventions firmly
485 in the here and now, rather than trying to predict future developments. Coaches and others
486 will often try to enhance confidence and achievement motivation in athletes by suggesting
487 that if they work hard and prepare well success will inevitably follow. Such behavior is a
488 version of the well-documented ‘just world fallacy’ (see, for example, Furnham, 2003),
489 which is a bias leading people to believe that individuals’ **outcomes typically, on average,**
490 **lead to fair and ‘just’ consequences – i.e., "people get what they deserve"**. Although well
491 meaning, such suggestions are dangerous due to the potential psychological implications if
492 success does *not* follow, as will often be the case in such a complex environment where there
493 is no simple, guaranteed link between hard work and success. **In a just world viewpoint,**
494 **failure implies that the person must not have tried hard enough, or done it right – which is**
495 **ostensibly unfair when facing complexity.** A more sensible approach for the practitioner may
496 be to counsel athletes against hanging all their hopes and self-esteem on one particular
497 outcome, such as continued high-level success in sport.

498 **Mistake #7: Conflating Skill and Luck**

499 One manifestation of the just world fallacy is the common assumption that results in
500 sport are all about talent and skill, with the more deserving performer emerging triumphant.
501 **This fallacy, together with the ‘narrative fallacy’ and a failure to consider reversion to the**
502 **mean and the paradox-of-skill, can be a dangerous combination for the practitioner as it can**
503 **leave them prone to a lack of consideration of the important role of luck in sport.** However, in

504 most human endeavors (including sports), results are a combination of skill and luck. The
505 importance of luck in competitive sport outcomes has been a topic of interest in the
506 philosophy of sport literature for some years (see, for example, Loland, 2015). We define
507 luck here as a chance occurrence that is out of the individual's control and unpredictable
508 (Mauboussin, 2012). A snooker player, for example, can perform brilliantly but still lose due
509 to a bad 'run of the balls' (particularly during ricochets and 'breaks'): an unforeseeable set of
510 consequences despite high quality shot-making. The considerable role of luck in short-term
511 performance has been demonstrated by Rendleman (2020) in golf, who also found support for
512 the 'paradox of skill' (Mauboussin, 2012), with luck playing a more important role in
513 determining competition outcomes in higher skilled golfers (PGA tour professionals) than
514 lower skilled ones (high-handicap amateurs). The reason for this apparent paradox is that as
515 skill improves, performance becomes more consistent and therefore the differences between
516 performers at a high level are smaller than those at a lower level. Despite this demonstrable
517 influence, luck is often downplayed in sports and rarely discussed by commentators as a
518 reason for winning or losing (McNerney, 2011). Instead, pundits often focus their analyses on
519 small differences in strategy and tactics to explain outcomes, which in elite sport are often
520 achieved by extremely narrow margins. This is a manifestation of the 'narrative fallacy'
521 (Gazzaniga, 2005), where we try to ascribe causes to events while not being in possession of
522 all the necessary information.

523 The key issue here for the practitioner is to bear in mind the importance of luck in
524 determining short-term performance. A series of good results can be the result of a lucky
525 streak, and a series of bad results can be the result of an unlucky streak. Mauboussin (2013)
526 cited the famous example of the New York Yankees baseball team winning only four of their
527 first 12 games in 2005. The team's owner and manager were both highly critical of the
528 players' performances, and when their performance turned, eventually finishing the season in

529 joint first place, some commentators attributed this to the tongue-lashing meted out by their
530 unhappy manager after the disastrous start. Scientifically, if we accept the above problems
531 posed by complex systems and ‘dumb luck’, the reason for such a change in performance is
532 impossible to pinpoint. To try to pinpoint a reason - though it would seem to be almost
533 inevitable due to the natural human tendency to create narratives with simple causation - is
534 likely fruitless and misleading: it creates a risk of incorrect conclusions and flawed advice.
535 Instead, such a change in performance – observed in many instances across many sports - is
536 much more likely due to ‘reversion to the mean’. This phenomenon was first observed by
537 Galton (1886), who found that tall parents tend to have taller than average children, but that
538 those children tend to be closer to the average height of the population than their very tall
539 parents. In sport, outcomes are a result of a mix of skill and luck, and ‘outlier’ performance –
540 excellent or terrible - will tend to revert to a mean over time as luck is random and this tends
541 to even out. For example, Rendleman (2020) demonstrated mean reversion in golfers in their
542 first and second round competition performance, with performances further from their long-
543 term average in the first round being followed by second round performance closer to their
544 long-term mean.

545 So how might the applied practitioner make use of a dual processing perspective and
546 avoid falling into System 1’s trap of mistaking luck for skill? Firstly, it is crucial always to
547 evaluate the mix of luck and skill in the system within which they are working, and avoid
548 drawing conclusions from outcomes in activities involving luck. Instead, the emphasis
549 should, for the practitioner, always be on the process rather than the outcome. Practitioners
550 should be wary of automatically diagnosing runs of poor results as slumps, or runs of higher
551 than average results as indicative of inherent attributes within the athlete, or due to the
552 efficacy of an intervention (as per the ‘hot hand’ fallacy - Bar-Eli et al., 2006). Awareness
553 and monitoring of such cognitive errors **are both** crucial in our profession, where we may

554 often assume that changes in performance in the absence of any obvious physical or
555 behavioral alterations (e.g., injury, training, diet) have a psychological cause.

556 Discussion

557 Although the literature on decision-making in sport and exercise psychology practice
558 is relatively sparse, there are many relevant findings in mainstream psychology, particularly
559 relating to a dual processing approach to cognition. We have emphasized above how a long
560 list of biases and heuristics can impact the practitioner's decision-making process. The
561 following brief guidelines, summarizing the key take-away points from this article, may
562 provide a more theoretically-based and systematic approach to decision-making than that
563 provided by the current sport and exercise literature (see Figure 1 for a diagrammatic
564 representation of these).

- 565 1. *Raise your awareness.* With any problem, the first step towards solving it is to
566 **recognize** its nature, and knowing the warning signs. The extant literature clearly
567 demonstrates that we are all prone to making decision-making mistakes in
568 environments where we have incomplete information and uncertainty, which is
569 precisely the situation in which sport psychology practitioners find ourselves.
570 Compounding this complexity, the research makes clear that we must also **recognize**
571 the existence of the bias blind spot (Pronin et al., 2002), where individuals can
572 identify biases at work in others' judgements, but are less likely to see their impact on
573 their own judgements. Therefore, a foundational first step practitioners can make
574 towards effective decision-making is to profile our own biases and blind spots, so as
575 to become aware and proactively mitigate/manage them. Each practitioner might
576 attempt to construct a list of biases to which they are particularly prone, and/or a list
577 of key biases and heuristics that are likely to apply in particular situations. Given the
578 bias blind spot, we suggest using a mentor to identify and note what they perceive to

579 be one's biases and heuristics when working with clients. The practitioner could then
580 'check-in' with the resulting 'biases profile' each time when making important
581 decisions relating to clients – and seek to query whether one of these biases may be
582 influencing their thinking in an unhelpful way.

583 Another important issue to consider here is what happens once decisions have
584 been made, actions taken, and outcomes have occurred. Practitioners should monitor
585 their tendency towards hindsight bias when reflecting upon outcomes, and invite our
586 mentors to challenge suggestions that the practitioner knew what was going to happen
587 before the fact. As per the fallibilistic philosophy-of-practice, we suggest that
588 practitioners always remain circumspect as events unfold and decisions play out.

- 589 2. *Diversify your perspectives.* One of the most powerful ways of enabling an effective
590 decision-making process is to consider others' viewpoints and experiences. Indeed, in
591 a profession that is so person-centered and where outcomes are always uncertain, this
592 approach would seem to be highly appropriate. Though many situations facing
593 practitioners and their clients may be rare for those individuals, many other people
594 will have faced similar situations before, and we can use their experiences as a
595 reference point for our decision-making. However, the outside view is likely to be
596 missing in our heuristic, implicit thought processes. Therefore, we may seek to
597 establish how others have fared when in the same situation, and initially be skeptical
598 of any suggestion that this time the outcome will be different (i.e., better). Likewise, it
599 can be useful to consider what motivates the decisions of others, and consider the
600 power of the situation in influencing these. Such 'second-guessing' can help to avoid
601 personality-based explanations for decisions and outcomes that do not take full
602 account of the social context.

603 As we increasingly understand how these biases and vulnerabilities influence
604 our practice, we may also accept that our own actions will trigger reactions from
605 athletes, coaches and parents etc. that can be impossible to anticipate in advance.
606 Decisions when working with athletes never take place in a void, so ‘wargaming’ - a
607 systematic examination of possible repercussions (NB: possible, not merely probable)
608 - can help to mitigate against unexpected or undesirable events, by using both the
609 outside and inside views to inform, steer and evaluate the decisions we are working
610 through.

- 611 3. *Recognize the role of skill and luck.* Consider randomness of distribution of outcomes
612 and anticipate mean reversion, to avoid falling prey to the narrative fallacy and
613 misdiagnosing ‘slumps’ and ‘hot hands’. Such misdiagnosis could lead to suboptimal
614 strategies being adopted, or changes being made to an athlete’s psychological
615 approach where this is not warranted. In sport, extremely good or bad outcomes tend -
616 over time - to be followed by more average ones, so educating athletes on this and
617 reinforcing this message when appropriate could help moderate their negative affect
618 following below-average performances and reduce the likelihood of unrealistic
619 expectations following above-average performances. Similarly, we may seek to focus
620 our feedback and evaluations on the skill component: not conflating skill and luck
621 when evaluating either our clients or our own performance. Even the experienced
622 practitioner may make the mistake of attributing performance success to a client’s
623 physical skills or psychological approach when in fact luck, or mean reversion, has
624 played a dominant role. For example, a number of sport psychology professionals
625 appeared in the media to discuss the apparent success of Manchester United manager
626 Ole Gunar Solskjaer when he replaced the previous incumbent, a change that was
627 initially accompanied by a considerable improvement in team results. Maskor (2019),

628 for instance, claimed that this improvement was due to the leadership style of the new
629 manager being more effective than that of his predecessor. However, it is equally
630 possible that this upturn in results was a simple case of mean reversion. This
631 conclusion is supported by the team's subsequent performance record, which
632 underwent a substantial downturn before once again improving somewhat and thus
633 averaging out. Nonetheless, Maskor, and other commentators, made unwarranted
634 assumptions regarding the likely causes of the initial performance change based on a
635 very small sample of data, falling prey to the narrative fallacy. We would therefore
636 argue that – to avoid falling victim to the vagaries of luck and mean reversion -
637 practitioners may benefit from monitoring a robust, diverse range of 'performance
638 metrics' in their clients and themselves, and over a sufficient time period to ensure
639 sensible, informed conclusions can be reached regarding likely cause and effect, or
640 effectiveness of strategies. Assuming that changes in performance have underlying
641 psychological causes can mislead practitioners and their clients alike.

642 4. *Proactively seek critical feedback from diverse sources*: Feedback is essential to
643 develop expertise in any skill. However, to make effective use of feedback we need to
644 avoid confirmation bias and other belief system defences. Mentoring is an essential
645 part of training in our profession, but even once an individual becomes certified or
646 licensed, it is crucial to have someone to turn to for objective, unbiased feedback
647 regarding one's decision-making processes. That person should be the 'critical friend'
648 rather than a cheerleader, challenging the practitioner and inserting the critical and
649 alternative viewpoints, from a position of seeking to help rather than undermine. The
650 use of the 'devil's advocate' has been shown to improve strategic decision-making
651 quality (Schweiger et al., 1989). Another simple way of ensuring feedback, advocated
652 by Kahneman (2011), is to keep a decision-making journal where you record details

653 of important decisions you make in your sport psychology practice. To be effective,
654 the journal should be reviewed regularly, and then it will become a valuable, unbiased
655 source of feedback. It will enable you to determine whether there are mistakes you
656 make repeatedly, whether there are certain types of decisions you find particularly
657 difficult, and the effects of situational factors on your decision-making. For example,
658 a practitioner may note that they are more likely to make hasty, ill-considered
659 decisions when a performer is having a poor run of results and is desperate to turn this
660 around. Having noted this, the practitioner can learn to take extra care in such
661 situations in future.

662 5. *Create a checklist.* To ensure that our decision-making processes remain
663 systematically focused on the key issues, checklists can be very useful. Hales et al.
664 (2008, p. 22) defined the checklist as “an organized tool that outlines criteria of
665 consideration for a particular process”. Their use has enhanced both aviation
666 (Gawande, 2009), and surgical (Haynes et al., 2009), safety, ensuring attention is
667 always paid to the key factors enhancing success in these environments. Sport
668 **psychology practitioners** can greatly benefit from these findings, as the use of simple
669 checklists can avoid the pitfalls of intuitive, impressionistic judgments, and ensure
670 that key considerations are incorporated at more or less the right moment (Kahneman,
671 2011). For example, such checklists could be useful in planning assessments,
672 performing a sport analysis or needs analysis, or deciding on the precise details of the
673 implementation of an intervention. The practitioner’s decision-making journal can be
674 used here to create the checklist, for if the journal is used consistently and
675 comprehensively for a reasonable period it should reveal where decisions have been
676 difficult or problematic before. We can use this information to create a useful
677 checklist of key points to consider when making future decisions. To serve its purpose

678 as a decision aid, the checklist should concentrate on steps that need to be taken to
679 consistently produce good decisions in this context, and to be general enough to allow
680 for varying situations, but specific enough to be a useful guide to action (Mauboussin,
681 2013).

682 We **recognize** that professionals often bridle at the suggestion of using
683 checklists, with a common argument being that checklists remove the expert
684 judgement that comes from experience (Gawande, 2009). However, we argue that the
685 sport psychology practitioner should use their experience, and the empirical evidence,
686 to develop *their own* checklists and make adjustments to them where necessary. They
687 are not an alternative to expert judgement: they are ‘decision-aids’ for supporting and
688 supplementing (not controlling/constraining) the other decision-making processes,
689 incorporating the best available evidence, and attempting to ensure the best possible
690 outcomes for our clients.

691 6. *Perform a ‘premortem’*. This technique, developed by Klein (2007), is based on the
692 idea of prospective hindsight, where individuals imagine that a future event has
693 already occurred. This is essentially the opposite of the postmortem, which most
694 practitioners will have employed, i.e., where we examine the reasons for an outcome
695 after it occurs. With a premortem, which we perform at the outset (e.g., before
696 administering an intervention with a client), we imagine that our intervention has
697 resulted in a very bad outcome, and try to identify why. This technique is very
698 effective at identifying potential problems, and solutions to these problems. For
699 example, Gallop, Willy and Bischoff (2016) found that premortems were superior to
700 brainstorming techniques in identifying risks and possible solutions in a computer
701 system upgrade scenario. When working in a team, such as a multidisciplinary team

702 of sport scientists, or a trainee working with their supervisor, the premortem promotes
703 a more open, critical discussion of alternatives (Klein, 2007).

704 **Conclusion**

705 This paper set out to develop and articulate simple practical suggestions, based on a
706 dual processing approach, which may sharpen the decision-making skills of both the
707 trainee/junior and experienced practitioner. We took the view that, reflecting the substantive
708 evidence base, reducing harms and avoiding errors was a more dependable approach to
709 ‘optimizing’ practitioner decision making. This initial analysis uncovers opportunities and a
710 stimulus for empirical research examining how to support, mitigate and optimize
711 practitioners’ decision-making. For example, studies examining the effectiveness of bias
712 awareness-raising techniques, journals, checklists and premortems would be valuable
713 additions to the sport psychology literature. **These could include not only randomized trials**
714 **and other controlled, laboratory-based studies, but also case studies where practitioners**
715 **demonstrate how they applied such techniques to clients. We would also encourage the use of**
716 **a variety of research methods, including mixed methods studies, to overcome some of the**
717 **limitations of the extent literature mentioned earlier. For example, when planning research to**
718 **determine the effects of checklist use when developing imagery interventions with athletes,**
719 **researchers could consider laboratory-based, randomised controlled studies to achieve strong**
720 **experimental control and high statistical power, qualitative studies to explore the perceptions**
721 **of practitioners when using this technique, and case studies to examine their actual use with**
722 **real clients.** Although these suggestions are strongly grounded in the research literature of
723 various psychology sub-disciplines, they have yet to be tested in a sport psychology context.
724 Indeed, the paucity of research examining effective decision-making in sport psychology
725 practitioners makes this an area ripe for further examination.
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