Managing Vulnerabilities in Practitioner Decision-Making within Sport Psychology Services: Responding to the Evidence Base

Abstract

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

Lay Summary:

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

Implications for Practice:

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

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

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

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

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

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

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

Mistake #1: This Time it's Different

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

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

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

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

Mistake #2: Tunnel Vision

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

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

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

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

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

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

Mistake #3: Emphasizing Disposition Over Situation

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

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

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

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

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

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

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

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

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

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

Mistake #5: The Formula for Success

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

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

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

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

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

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

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

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

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

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

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

Mistake #7: Conflating Skill and Luck

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

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

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

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

So how might the applied practitioner make use of a dual processing perspective and avoid falling into System 1's trap of mistaking luck for skill? Firstly, it is crucial always to evaluate the mix of luck and skill in the system within which they are working, and avoid drawing conclusions from outcomes in activities involving luck. Instead, the emphasis should, for the practitioner, always be on the process rather than the outcome. Practitioners should be wary of automatically diagnosing runs of poor results as slumps, or runs of higher than average results as indicative of inherent attributes within the athlete, or due to the efficacy of an intervention (as per the 'hot hand' fallacy - Bar-Eli et al., 2006). Awareness 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

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

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

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

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

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

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

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

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

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

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

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

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

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

Conclusion

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

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