

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25

Where is the evidence in our sport psychology practice? A UK perspective on the underpinnings of action

Date of submission: 22nd January 2015

26 Abstract

27 Practitioners advocate the importance to engage in evidence-based practice at the forefront of
28 issues regarding the provision of applied sport psychology. Accordingly, the present study
29 sought to contextualize the process of theory-research-practice. Specifically, four attentional-
30 based techniques established within the sport psychology literature were depicted as applied
31 scenarios and presented as a survey task. Experienced UK-based practitioners ($n = 14$) and
32 individuals currently undergoing training ($n = 14$) were recruited to ascertain their theoretical
33 and mechanistic knowledge, and whether these techniques were being utilized in the applied
34 environment. Results suggested that the application of the techniques, in addition to the
35 theoretical, and mechanistic knowledge may decrease from the trainee to experienced
36 practitioner. The study highlights the need for an increase in research designed to be
37 impactful in the applied setting, and addressing the needs of sport psychology practitioners, if
38 our discipline is to advance and remain as evidence-based.

39

40 ***Keywords: Evidence-based practice, applied sport psychology, attentional techniques, survey task***

41

42

43

44

45

46

47

48

49

50

51

52 What Do They Know? Exploring the Theoretical Grounding of Applied Practice

53 Evidence-based practice “involves the conscientious, explicit, and judicious use of the
54 best available research evidence to inform each stage of decision-making and service
55 delivery” (Dozois et al., 2014, p.155). Within the field of sport psychology, practitioners
56 adopting an evidence-based approach follow a working model of theory-research-practice.
57 This is an example of translational research, which involves the application of scientific
58 theories, constructs, research findings, and intervention techniques across psychological
59 domains (Smith & Smoll, 2011). This assertion that applied sport psychology is based on
60 scientific principles is embedded in our codes of ethics, standards for professional conduct,
61 and professional training accreditation criteria (e.g., American Psychological Association
62 (APA); Association for Applied Sport Psychology (AASP); British Association of Sport and
63 Exercise Sciences (BASES); British Psychological Society (BPS). However, while the
64 principal goals of applied sport psychology are to generate knowledge based on scientifically
65 valid evidence and apply this knowledge to the optimal improvement of performance, the
66 relation between the profession of applied and science psychology has turned out to be far
67 from straightforward.

68 Firstly, the somewhat vague definitions of what evidence-based practice entails,
69 “potentially enables all psychologists to characterize their professional services as being
70 evidence-based” (Drapeau & Hunsley, 2014, p.146). Secondly, although psychologists are
71 likely to agree that practice should be based on science (see Gardner, 2009; Moore, 2007),
72 there has been active debate about several facets, including the identity of psychologists as
73 scientist-practitioners; the optimal extent to which science can or should inform practice;
74 innovative ways of better integrating research and practice; and strategies for synthesizing
75 and disseminating research findings. Evidence-based practice should therefore rely, first and
76 foremost, “on research findings published in the peer-reviewed scientific literature and

77 provide a hierarchy of evidence to help psychologists determine to what extent an
78 intervention is evidence-based” (Dozois et al., 2014, p.155).

79 Specifically in relation to advising elite performers on the allocation of their thought
80 processes, Winter and Collins (2014) sought to ascertain a contextualized perspective of
81 established sport psychologists’ subjective reasoning underpinning their practices. One
82 superordinate theme to emerge from the study was the literature underpinning professional
83 practice. As supported by Gardner (2009), the development and acceptance of any scientific
84 discipline requires an ever expanding and maturing empirical base. Furthermore, and as
85 previously discussed, it is seen as fundamental to engage in evidence-based practice at the
86 forefront of issues regarding the provision of applied sport psychology (Cropley, Hanton,
87 Miles, & Niven, 2010; Moore, 2007). This notion was potentially challenged however, when
88 noting the views expressed by the experienced practitioners in the Winter and Collins study.
89 Specifically, dissatisfaction with the usefulness of the literature was articulated, resulting in
90 some experienced practitioners stating that they made only limited use of sport psychology
91 research to inform practice. Offering potential explanations for these findings, researchers
92 have highlighted a clear differentiation between the aims of sport psychologists who wish to
93 practice or apply their specialization, from that of research specialists, resulting in distinctly
94 different types of knowledge being generated (Collins, 2008; Collins & Kamin, 2012; Silva,
95 Conroy, & Zizzi, 1999). Furthermore, a consistent trend has been noted toward the
96 diminishing durability of knowledge across the various specialties within professional
97 psychology (Neimeyer, Taylor, & Rozensky, 2012; Neimeyer, Taylor, Rozensky, & Cox,
98 2014; Wise et al., 2010).

99 In this regard, epistemology is the branch of philosophy concerned with the nature
100 and scope of knowledge. It is concerned with answering the questions of what is knowledge,
101 how is it acquired, and how do we know what we know (Klein, 2011; Luper, 2004). The

102 recognition that evidence-based practice is important for allowing sport psychologists to
103 make informed decisions (Gardner & Moore, 2006) advocates the practitioner's ability to
104 enhance the accuracy and validity of his or her applied practice through professional
105 judgment and decision-making (PJDM, Martindale & Collins, 2005). Epistemology is
106 therefore important because it is fundamental to how we think and, without the ability to
107 understand how we acquire and develop knowledge, we have no coherent path on which to
108 base our thinking (Grecic & Collins, 2013). The individual practitioner must, therefore, be
109 able to reason action that can be defended discursively in argument and justified as morally
110 appropriate to the particular circumstances in which it was taken. In short, careful
111 consideration of the whys and why nots of an action is crucial for the professional practice of
112 applied sport psychology (cf. Martindale & Collins, 2010, 2013).

113 Regarding professional practice, research on attention is one of the fastest growing
114 fields in cognitive psychology (Posner & Rothbart, 2007). Accordingly, attentional research
115 or the scientific study of mental processes in elite performers is central to cognitive sport
116 psychology, because the ability to exert mental effort effectively is vital for optimal athletic
117 performance (Moran, 2009). Within the realm of performance sport, appropriate self-directed
118 thought processes prior to and during task execution have been shown to make a significant
119 difference to the level of performance attained (Abernethy, Maxwell, Jackson, & Masters,
120 2007; Singer, Lidor, & Cauraugh, 1993). Nevertheless, there is still a great deal of confusion
121 about the nature of and cognitive mechanisms underlying attention (Winter, MacPherson, &
122 Collins, 2014). Understanding and explaining the mechanisms, cognitive processes, and self-
123 regulatory strategies that enable the acquisition and proficient execution of skills is, therefore,
124 fundamental for the evidence-based practitioner (Singer, 2000).

125 Over the last several decades, a multitude of studies have examined the most common
126 interventions and differing approaches to the attentional processes underpinning skilled

127 performance. Traditionally, the approach from the sport psychology literature has advocated
128 the provision of mental skills training (MST; e.g., Frey, Laguna, & Ravizza, 2003; Wrisberg,
129 Simpson, Loberg, Withycombe, & Reed, 2009). Implementing this approach requires the
130 allocation of appropriate cognitive-behavioral techniques that can aid the right thoughts
131 tailored to preparation and optimal performance (Cotterill, 2011; Weinberg, 2008). As
132 opposed to developing conscious thoughts related to performance (Moran, 2009; Winter &
133 Collins, 2013) researchers have also determined the cognitive techniques that underlie
134 unconscious processing (e.g., Kinrade, Jackson, & Ashford, 2010; Lam, Maxwell, & Masters,
135 2010). However, notwithstanding whether the direction of conscious thoughts should be
136 task-related or promote automaticity through unconscious processing, these differing stances
137 represent the cognitive-based techniques available in our evidence-based literature.

138 A characteristic of the applied sport psychology profession therefore relates to the
139 attentional strategies and techniques grounded upon firm theoretical and research findings
140 (Smith & Smoll, 2011; Winter & Collins, 2013); hence the design of this investigation.
141 Through reviewing contemporary theory and research findings focused on the allocation of
142 attentional resources in performers, strategies were selected to be both applicable to an
143 ecologically valid environment and which encouraged individuals to focus on appropriate
144 information within performance sport (Bennett, 2000). Specifically, four techniques
145 grounded in theoretical underpinning and well established within the sport psychology
146 literature were chosen. We were primarily interested in determining whether these
147 techniques, prominent in the sport psychology literature, are being utilized by practitioners
148 and hence transferred to the applied environment. Secondly, and reflecting earlier stated
149 concerns on the impact of research on practice, to ascertain sport psychologists' knowledge
150 regarding the theoretical grounding and mechanistic underpinning of these applied practice
151 techniques. The final aim was to identify whether any differences exist between those

152 individuals currently training in the profession, compared to practitioners already established
153 in the field.

154 **The Survey**

155 **Participants**

156 Following institutional ethical approval, and informed consent, 14 experienced British
157 applied sport psychologists were initially recruited to participate in this study. The sample
158 comprised seven males (age: $M = 43.86$ years, $SD = 5.55$ years) and seven females (age: $M =$
159 40.43 years, $SD = 6.47$ years). The participants' applied experiences ranged from working
160 full-time with elite performers via an institutional body or their own private consultancy
161 practices, through to consulting with a range of different sports alongside their academic
162 positions within higher education institutions. Collectively, participants reported having a
163 mean of 18 years' experience as accredited practitioners ($SD = 5.02$ years). All were
164 accredited initially through BASES, while 12 were now also BPS chartered psychologists.
165 Furthermore, all participants were registered as practicing sport and exercise psychologists
166 with the Health and Care Professions Council (HCPC), the UK organization which governs
167 standards of professional practice in this area.

168 Additionally, 14 individuals currently undergoing training in the profession of applied
169 sport psychology were recruited to participate in this study. The sample comprised seven
170 males (age: $M = 32.86$ years, $SD = 10.89$ years) and seven females (age: $M = 24.86$ years, SD
171 $= 1.57$ years). The trainee participants were currently engaged in supervised experience
172 through BASES, or the BPS stage two training. Both these organizations offer training
173 programmes that result in, respectively, accreditation as a sport and exercise scientist, or
174 chartered status in sport and exercise psychology. The BASES route is designed for those
175 individuals who have completed a BASES endorsed undergraduate degree in sport science,
176 while the BPS route is for those individuals who have gained a psychology-accredited

177 undergraduate degree before progressing onto a MSc programme in sport and exercise
178 psychology. Following completion of the masters' degree, both organizations offer
179 independent supervised experience pathways whereby the trainee practitioner or probationary
180 sport and exercise psychologist, complete a self-directed supervisor-supported programme of
181 work designed to fulfill further knowledge and practical competencies.

182 **Survey Task**

183 Four psychological techniques were adopted from the sport psychology literature as
184 the basis for the survey task and depicted as applied scenarios. These were as follows: (a) a
185 tennis player is drilled to say 'ONE' at the exact moment the ball bounces, and 'TWO' when
186 the ball makes contact with the strings (cf. Gallwey, 1997; Jenkins, 2008 – inner game); (b)
187 an athlete utilizes the word 'Boom' when performing a standing vertical jump (cf. Dugdale &
188 Eklund, 2002; Rushall, Hall, Roux, Sasseville, & Rushall, 1988 – mood words); (c) table
189 tennis performers are instructed to pretend to draw a right-angled triangle with the bat. They
190 are then instructed, to impart topspin to the ball, they should strike the ball while bringing the
191 bat up the hypotenuse of the triangle (cf. Berry & Broadbent, 1984; Liao & Masters, 2001 –
192 analogy learning); (d) a performer uses a swing word or sound (e.g. 'swoosh') which matches
193 the action when driving in golf (cf. Jeannerod, 1999; MacPherson, Collins, & Obhi, 2009 -
194 rhythmicity).

195 **Procedure**

196 Prior to data collection, a pilot survey (Gratton & Jones, 2003) was conducted with a
197 BASES accredited practitioner. This allowed for revision, where necessary, of the format to
198 the survey and instructions provided to participants. It was deemed beneficial for participants
199 to receive verbal instructions, for clarity purposes, in addition to the written instructions
200 provided for completing the survey. Secondly, the pilot survey enabled any systematic bias
201 to be detected, whereby the participant was questioned in relation to the difficulty of the

202 tasks. It was reported that no systematic bias was perceived across the presented applied
203 scenarios.

204 Following the completion of informed consent, convenient times were agreed for the
205 participants to complete the surveys. All participants followed a standardized procedure,
206 prior to an initial introductory discussion being held. For each of the four applied scenarios,
207 participants were required to answer the following three questions: (a) is this technique
208 something you would use within your applied practice? (b) could you state the theoretical
209 underpinning to the technique? (c) can you describe the underlying mechanism? In other
210 words, why/how this technique may work? Order was balanced across participants to counter
211 any priming effects from one applied scenario to another. On completion of the survey,
212 participants were thanked for their participation.

213 **Data Analysis**

214 Responses to the three questions posed in the survey were analyzed as follows.
215 Question one was depicted as the percentage of trainee and experienced practitioners who
216 stated they would use each of the four psychological techniques within their applied practice.
217 Respective to the accuracy of respondents' answers regarding the theoretical and underlying
218 mechanism to each of the techniques (questions 2 and 3), a scoring system was derived for
219 analyzing these remaining two questions. A scale (0-3) was used with the following
220 descriptors: (0) wrong answer, nowhere near; (1) tenable answer, wrong idea; (2) getting
221 there, missed some elements; (3) perfect answer. As this scale was as ordinal level of
222 measurement, the Mann-Whitney U test was used to compare the responses between the
223 trainee and experienced practitioners. The Mann-Whitney U test is a nonparametric test used
224 to discover the difference between two groups, and is the equivalent to an independent t test
225 (Vincent & Weir, 2012).

226 **Inter-Rater Reliability**

227 To establish objectivity, two individuals assessed the completed surveys from both the
228 trainee and experienced practitioner sample. There was a >95% agreement when analyzing
229 the accuracy of respondents' answers regarding the theoretical and underlying mechanism to
230 each of the techniques (Wilson & Batterham, 1999).

231 **Results**

232 In response to the first question from the survey, Table 1 depicts the percentage of
233 trainee and experienced practitioners who stated they would use each of the four
234 psychological techniques within their applied practice.

235 A higher percentage of trainee practitioners advocated they would use each of the
236 attentional-based techniques within their applied practice, compared to the experienced
237 practitioners. This equated to approximately half the number of experienced practitioners
238 stating they would use the first three psychological techniques, as contrasted to the trainee
239 practitioners. Conversely, this trend differed with the rhythmicity technique, demonstrating a
240 similar application to practice by the experienced sport psychologists and the trainee sample.
241 It was also noted that the analogy learning technique received the lowest responses for use,
242 from both the trainee and experienced practitioners.

243 With regards to the theoretical and mechanistic underpinning responses to the
244 attentional-based techniques, the mean values from the respective scoring scale are presented
245 in Table 2 and 3. The Mann-Whitney U test revealed that the only significant differences
246 were found between the two groups for the mood words scenario: an athlete utilizes the word
247 'Boom' when performing a standing vertical jump (cf. Dugdale & Eklund, 2002; Rushall et
248 al., 1988). Responses differed between the trainee and experienced practitioners, regarding
249 both the theoretical ($Z = -2.51, p < .05$) and underlying mechanism ($Z = -2.73, p < .05$) for this
250 psychological technique. The trainee practitioners were significantly more accurate when
251 stating the theoretical underpinning of the mood words technique ($M = 2.14, SD = 1.10$) than

252 the experienced practitioners ($M = 0.93, SD = 1.14$). A similar finding was also portrayed
253 when describing the underlying mechanism, with the trainee practitioners demonstrating a
254 significantly more precise response ($M = 2.50, SD = 0.65$), than the experienced practitioners
255 ($M = 1.43, SD = 1.09$).

256 **Summary and Implications**

257 The present study examined the level of transferability from four exemplar,
258 attentional-based techniques in the sport psychology literature through to applied practice. A
259 characteristic of the applied sport psychology profession relates to attentional strategies and
260 techniques grounded upon firm theoretical and empirical research findings (Winter & Collins,
261 2013). Furthermore, it is increasingly seen as fundamental to engage in evidence-based
262 practice at the forefront of issues regarding the provision of applied sport psychology
263 (Cropley et al., 2010). Without this enhanced consideration, “practitioners are nothing more
264 than technicians who may know what to do, but have no understanding of why what they are
265 doing may work” (Moore, 2007, p.19). Hence, we were also interested in ascertaining both
266 trainee and experienced sport psychologists’ knowledge, regarding the theoretical grounding,
267 and mechanistic underpinning of these applied practice techniques.

268 Specifically with regards to application, approximately half the number of
269 experienced practitioners stated they would use the first three psychological techniques
270 within their applied practice, compared to the trainee practitioners. It could be argued that
271 the experienced practitioners, some of whom now consult on a full-time basis and practice
272 outside of academia, may overlook present literature-based techniques. However, the four
273 techniques were purposefully selected for this study to offer a spread from being well
274 established in the professional literature (e.g. Gallwey, 1997 – inner game), to holding recent
275 coverage (e.g. Jenkins, 2008 – inner game). Furthermore, the experienced practitioners were
276 generally less knowledgeable on the theoretical and mechanistic underpinning of the

277 techniques. The challenge for the established practitioner is to remain committed to the idea
278 that applied practice is informed by the evolving professional literature. While busy
279 professionals cannot be expected to accumulate and evaluate each empirical study that is
280 published, they are still surely expected to remain current in knowledge in order to meet the
281 professional requirement for continued professional development. Further highlighting the
282 need for practitioners to be able to acknowledge what they do not know, accepting the ever-
283 present gap between their current practice and scientific innovation (Moore, 2007).

284 An alternative explanation for this limited uptake of the literature-based techniques
285 can be related to the developed professional judgment and decision-making (PJDM,
286 Martindale & Collins, 2005) held by the experienced practitioners. Reflecting on PJDM
287 encourages a deeper level of conceptualization and coherence of practice, providing a
288 platform from which to further develop expertise in providing applied sport psychology
289 support (Martindale & Collins, 2013). The experienced practitioners in this study could,
290 arguably, have realized through PJDM the limitations of these literature-based techniques for
291 the challenges faced when allocating attentional resources in the applied field (Winter et al.,
292 2014) and developed other preferred strategies to the ones chosen in this study. If *this* were
293 the case, however, these consultants should still be expected to know the provenance or
294 starting point of their deliberations towards a, presumably, better option: in short, to know
295 where these strategies had come from *and* why they wouldn't use them.

296 In any applied discipline, scientist-practitioners seek guidance from a prevailing
297 theoretical and empirical paradigm to underpin, inform, and guide their work. The trainee
298 practitioners within this study have graduated from a masters' degree within the field of sport
299 psychology, before undertaking their BPS stage two, or BASES supervised experience
300 programmes. The working model of theory-research-practice is emphasized within these
301 educational programmes, providing an evidence-based approach to the neophyte practice of

302 sport psychology (Smith & Smoll, 2011). This working model was subsequently exemplified
303 in the mood word and task relevant cognitions technique, represented in the survey from the
304 standing vertical jump scenario (cf. Dugdale & Eklund, 2002; Rushall et al., 1988).
305 Specifically, this technique had the highest uptake from the trainee practitioners (92.86%),
306 and importantly the highest scores for theoretical ($M = 2.14$) and mechanistic underpinning
307 ($M = 2.50$). Thus, demonstrating a clear evidence-based decision, from theory-research-
308 practice.

309 However, a great deal of formal sport psychology education consists of the
310 programme developers directing what is to be learned and, it is assumed, trainee practitioners
311 are able to obtain the knowledge of concepts and skills they require, before transferring and
312 applying them effectively to the context in which they practice (Gilbert, Gallimore, & Trudel,
313 2009). The experienced practitioners, on the other hand have, through social interaction and
314 real-world practice, constructed meaning in practical ways so that knowledge may be more
315 effectively applied (Gilbert & Trudel, 2005). Conversely, there were instances from the
316 survey where the trainee practitioners stated they would use a technique within their practice,
317 for example 85.71% for the tennis scenario (cf. Gallwey, 1997 - inner game), without always
318 knowing the theoretical ($M = 1.36$) or accurately explaining the mechanistic underpinning (M
319 $= 1.93$). Gray (2001) has suggested that professional practice has too often been associated
320 with an overenthusiastic adoption of interventions with unproven efficacy and, in this case
321 from the trainee sample, without a sound understanding of the scientific evidence-base to the
322 inner game technique. By not understanding the evidence-base, the practitioner is unable to
323 critically evaluate new attentional-based methods, or fully understand what needs to be
324 targeted for the intervention to be successful (Moore, 2007).

325 In contrast to the other techniques within the study, the rhythmicity technique (cf.
326 Jeannerod, 1999; MacPherson et al., 2009) from the golf scenario demonstrated a similar

327 transferability to applied practice by the experienced sport psychologists (78.57%), compared
328 to their trainee sample (85.71%). Although other techniques received similar findings from
329 the trainee practitioner sample, the rhythmicity technique received the most transferability to
330 applied practice by the experienced sport psychologists. Notably, the experienced
331 practitioners were most knowledgeable with regards to the mechanistic underpinning for
332 rhythmicity compared to all the other techniques presented in the survey. In simple terms,
333 the experienced practitioners provided the most accurate responses for why/how this
334 technique may work, demonstrating an informed choice to use within their practice (Gardner
335 & Moore, 2006; Martindale & Collins, 2005, 2010, 2013).

336 Although no systematic bias was perceived across the presented applied scenarios,
337 less than half of the trainee practitioners surveyed (42.86%) and less than a quarter of the
338 experienced sample (21.43%) stated they would use the analogy learning technique within
339 their applied practice. In addition, there were no significant differences between the
340 experienced or trainee practitioners regarding the theoretical knowledge or mechanistic
341 underpinning of this technique. It can be argued that analogy learning has derived from a
342 theoretically driven basis (implicit motor learning - Masters, 1992) in contrast, for example,
343 to the inner game technique (cf. Gallwey, 1997; Jenkins, 2008) where the primary focus is for
344 practical application. Supporting this argument, researchers have critiqued the limited
345 transferability of analogy learning to the applied environment (Beek, 2000; Bennett, 2000;
346 Carson & Collins, 2011; Lam et al., 2010). Equally, due to the majority of performers having
347 already learnt explicitly (Winter & Collins, 2014) provides a practical explanation why so
348 few sport psychologists are adopting or willing to use this technique in their practice.

349 Furthermore in this regard, Silva et al. (1999) believe that applied sport psychology
350 has two very different aims, with one focusing on conducting research, while the second
351 describes the application of sport psychology principles with clients. The contention

352 underpinning this situation is that different aims within any discipline generate distinctly
353 different types of knowledge (Collins, 2008; Collins & Kamin, 2012). The analogy learning
354 technique, through its theoretically driven basis, could therefore be associated with a
355 generation of literature that is publication-focused, rather than on the applied implications per
356 se (Winter & Collins, 2014). Thus supporting the debate, in that there is a growing concern
357 over whether we are providing evidence-driven models for understanding, conceptualizing,
358 and intervening with athletes (cf. Gardner & Moore, 2006).

359 The greater degree of focused practice in a domain is the logical consequence of
360 advances of the discipline and profession of psychology. According to the APA, a
361 proficiency area in psychology is a defined area of psychological practice that requires
362 advanced knowledge and skills acquired through an organized sequence of formal education,
363 training, and experience. By specializing within a proficiency, sport psychologists continue
364 to address the challenges associated with their ethical requirements (e.g. APA, AASP,
365 BASES, BPS) and determine the range of information that they must acquire, maintain, and
366 renew to remain current and competent in their area of applied practice (Kaslow, Graves, &
367 Smith, 2012). Specialization is, therefore, an inevitable product of the developmental
368 processes within a discipline and a profession (Roberts, 2006) and, could be associated with a
369 developed idiosyncratic knowledge by these experienced practitioners.

370 However, it has been widely documented that the predominant philosophy adopted by
371 applied practitioners is the cognitive-behavioral approach (Burton & Raedeke, 2008; Winter
372 & Collins, 2014). A major premise being that athletes may need to learn cognitive strategies,
373 through mental skills training to cope with the various demands of training and competition
374 (Burton & Raedeke, 2008). Therefore, the scientific study of mental processes in elite
375 performers is central to this philosophy, because the ability to exert mental effort effectively
376 is vital for optimal athletic performance (Moran, 2009). As a consequence, it is hard to

377 imagine, if attention is central to practice as demonstrated in this dominant philosophical
378 approach, that by specializing these experienced practitioners did not recognize the
379 techniques, by specifically identifying the theoretical and mechanistic knowledge.
380 Conversely, as Carlstedt (2013) recently stated “too many sport psychology practitioners
381 work within a vacuum; becoming too comfortable with approaches they were trained in, that
382 may be, at least to a certain extent, no longer adequate or qualify as being evidence-based”
383 (p.4).

384 In relation to this, recent researchers have noted a wide range of perceived half-lives
385 across the various specialties within professional psychology and a consistent trend toward
386 the diminishing durability of knowledge (Neimeyer et al., 2014; Wise et al., 2010). As an
387 indicator of professional obsolescence, the half-life of knowledge is the time it takes a
388 practicing professional, in the absence of any new learning, to become roughly half as
389 knowledgeable or competent to practice in his or her field (Neimeyer et al., 2012). As a
390 general rule in this study, the experienced practitioners were less knowledgeable regarding
391 both the theoretical and mechanistic underpinnings of the techniques than their trainee
392 participants. The literature on continuing medical education as a comparative has noted
393 similar knowledge atrophy over time, linking this atrophy to lower levels of perceived
394 competence by colleagues and peers (Institute of Medicine, 2010).

395 However, with regards to this diminishing durability of knowledge, the observed half-
396 life of knowledge in applied sport psychology is not necessarily an indicator of its position
397 within the context of the larger field of professional psychology. For example, Neimeyer et
398 al. (2014) debated how “a short half-life could represent the escalating pace of new
399 knowledge gains in the field, just as it could reflect a hailstorm of critique aimed at its
400 collapsing central tenets. Likewise, a long half-life of knowledge could as well reflect the
401 timeless truths produced within a specialty, as it could the stagnant and moribund future it

402 faces” (p.97). Thus, regardless how this half-life of knowledge is perceived within the
403 profession, ultimately new sport psychology knowledge needs to remain current and
404 competent within this designated area of specialization. Furthermore, as highlighted in this
405 study, the concept of transferability needs to be considered, ensuring the needs of the
406 practicing psychologists employing the techniques within their applied work, is being met.

407 Branching out towards our allied disciplines, the gap between psychological science
408 and psychological practice has been repeatedly described and bemoaned (Drapeau &
409 Hunsley, 2014). Referring to previous literature concerning treatment-based outcomes, there
410 is abundant evidence that many clients are not receiving scientifically supported
411 interventions, while many clinicians appearing dubious of evidence-based practice
412 (Lilienfeld et al., 2013). A study of 508 members of APA Division 12 revealed that
413 respondents’ expressed only modest agreement with the proposition that controlled research
414 on psychotherapy is pertinent to their practice (Stewart & Chambless, 2007). They rated
415 current research on treatment outcome as modestly influential in their treatment decisions,
416 but less so than past clinical experiences, or colleagues’ advice.

417 Furthermore, in the Stewart, Stirman, and Chambless (2012) qualitative investigation,
418 clinicians noted positive aspects about treatment outcome research, such as being interested
419 in what works. However, consistent with previous research (e.g., Pagoto et al., 2007), they
420 had misgivings about the application of controlled research findings to their practices, do not
421 reflect the realities of clinical practice or patients seen therein, and were skeptical about using
422 manualized protocols. Therefore, although some research demonstrates a significant
423 credibility gap between why it works in research and practice, we would also highlight a
424 large block of work that stresses the need for evidence based practice (Dryden, 1989;
425 Einhorn, 1974; Elliott & Wexler, 1994; Mallinckrodt, 1993); notably across the field.

426

Limitations

427 While the present study illustrates a range of interesting findings regarding the
428 transferability of literature-based attentional techniques through to applied practice, they are
429 not without their limitations. Firstly, with regards to the concept of transferability, the
430 participants stated whether they would use each of the four attentional-based techniques.
431 However, there could be a subtle or substantive difference between the trainee participants
432 stating they *would* use, compared to not having actually employed these techniques at
433 present. Therefore, although counted as transferable, it is not necessarily reflective of this
434 sample with regards to real world practice, or representative of whether they *will* actually use
435 these techniques in their future practice. In contrast, it was more accurate for the experienced
436 practitioners to reflect back on the usage of these techniques, having collectively reported a
437 mean of 18 years' experience as accredited practitioners.

438 The predominant professional philosophy utilized by sport psychology consultants is
439 the cognitive-behavioral approach (Ravizza, 2002; Stainback et al., 2007). Consequently,
440 this study purposely selected attentional-based techniques because the ability to exert mental
441 effort effectively is vital for optimal athletic performance and hence central to cognitive sport
442 psychology. We would, nevertheless, encourage further research to consider if similar
443 findings are apparent within different consulting areas/techniques within the practice of sport
444 psychology. Furthermore, as the sample is limited to applied sport psychology, we would
445 also promote investigation through additional psychology disciplines and types of therapy, to
446 see whether similar trends in evidence-based practice are apparent across other trainee and
447 professional practitioners.

448 Finally, the findings from this survey study represent the views and experiences of the
449 current participants, and not necessarily those of all practicing sport psychologists. However,
450 from a more pragmatic point of view, the sample comprised sole practitioners, dual-role
451 applied sport psychologists (academics), and both BPS and BASES trainees, reflecting the

452 norms in current UK practice.

453 **Conclusion**

454 Overall, through examining the level of transferability from four attentional-based
455 techniques in the sport psychology literature, the present study has contextualized the process
456 of theory-research-practice and we would suggest, found it somewhat lacking! Practitioners
457 advocate the importance of attentional strategies in their applied work, however it was
458 evident from the findings of this study that the transferability of these literature-based
459 techniques are not always being adopted. Moreover, though seen as fundamental to engage
460 in evidence-based practice, the diminishing theoretical and mechanistic knowledge
461 underpinning the techniques from the trainee to experienced practitioner was apparent. Thus
462 highlighting how this evidence-based approach is only possible, if practitioners remain
463 committed to applied practice being informed by the professional literature, and acknowledge
464 what they do not know. From an additional philosophical standpoint, we would have to
465 question the publication of techniques in an applied field which have doubtful application.
466 As a result, we suggest a need for further research, designed to be impactful in the applied
467 setting and addressing the needs of the practicing psychologists employing the techniques
468 within their applied work, if our discipline is to advance and remain as evidence-based.

469

470

471

472

473

474

475

476

477 References

- 478 Abernethy, B., Maxwell, J. P., Jackson, R. C., & Masters, R. S. W. (2007). Skill in sport. In
479 F. T. Durso (Ed.), *Handbook of applied cognition* (2nd ed.). (pp. 333-359). Chichester,
480 UK: Wiley. doi:10.1002/9780470713181.ch13
- 481 Beek, P. J. (2000). Toward a theory of implicit learning in the perceptual-motor domain.
482 *International Journal of Sport Psychology*, 31, 547-554.
- 483 Berry, D. C., & Broadbent, D. E. (1984). On the relationship between task performance and
484 associated verbalizable knowledge. *Quarterly Journal of Experimental Psychology*,
485 36, 209-231.
- 486 Bennett, S. J. (2000). Implicit learning: Should it be used in practice? *International Journal*
487 *of Sport Psychology*, 31, 542-546.
- 488 Burton, D., & Raedeke, T. D. (2008). *Sport psychology for coaches*. Champaign, IL: Human
489 Kinetics.
- 490 Carlstedt, R. A. (2013). *Evidence-based applied sport psychology: A practitioner's manual*.
491 NY: Springer.
- 492 Carson, H. J., & Collins, D. (2011). Refining and regaining skills in fixation/diversification
493 stage performers: The five-A model. *International Review of Sport and Exercise*
494 *Psychology*, 4, 146-167. doi:10.1080/1750984X.2011.613682
- 495 Collins, D. (2008, December). *Strange Bedfellows: Why sport AND exercise psychology?*
496 Invited keynote at the inaugural British Psychological Society DSEP Conference,
497 London.
- 498 Collins, D. & Kamin, S. (2012). The performance coach. In S. Murphy (Ed.), *Handbook of*
499 *sport and performance psychology* (pp.692-706). Oxford: Oxford University Press.

- 500 Cotterill, S. T. (2011). Experiences of developing pre-performance routines with elite cricket
501 players. *Journal of Sport Psychology in Action*, 2, 81-91.
502 doi:10.1080/21520704.2011.584245
- 503 Cropley, B., Hanton, S., Miles, A., & Niven, A. (2010). Exploring the relationship between
504 effective and reflective practice in applied sport psychology. *The Sport Psychologist*,
505 24, 521-541.
- 506 Dozois, D. J. A., Mikail, S. F., Alden, L. E., Bieling, P. J., Buorgon, G., Clark, D. A.,
507 Drapeau, M., Gallson, D., Greenberg, L., & Hunsley, J. (2014). The CPA presidential
508 task force on evidence-based practice of psychological treatments. *Canadian*
509 *Psychology*, 55, 153–160. doi:10.1037/a0035767
- 510 Drapeau, M., & Hunsley, J. (2014). Where's the science? Introduction to a special issue of
511 Canadian psychology on science in psychology. *Canadian Psychology*, 55, 145-152.
512 doi:10.1037/a0037321
- 513 Dryden, W. (1989). The therapeutic alliance as an integrating framework. In W. Dryden (Ed).
514 *Key issues for counselling in action*. London: Sage.
- 515 Dugdale, J. R., & Eklund, R. C. (2002). Do not pay attention to the umpires: Thought
516 suppression and task-relevant focusing strategies. *Journal of Sport & Exercise*
517 *Psychology*, 24, 306-319.
- 518 Einhorn, H. J. (1974). Expert judgment: Some necessary conditions and an example. *Journal*
519 *of Applied Psychology*, 59, 562-571.
- 520 Elliott, R. & Wexler, M. M. (1994). Measuring the impact of sessions in process-experiential
521 therapy of depression: The session impacts scale. *Journal of Counseling Psychology*,
522 41, 166-174.

- 523 Frey, M., Laguna, P. L., & Ravizza, K. (2003). Collegiate athletes' mental skill use and
524 perceptions of success: An exploration of the practice and competition settings.
525 *Journal of Applied Sport Psychology, 15*, 115-128. doi:10.1080/10413200390213821
- 526 Gallwey, T. W. (1997). *The inner game of tennis: The classic guide to the mental side of peak*
527 *performance*. London: Random House Trade.
- 528 Gardner, F. L. (2009). Efficacy, mechanisms of change and the scientific development of
529 sport psychology. *Journal of Clinical Sport Psychology, 3*, 139-155.
- 530 Gardner, F. L., & Moore, Z. E. (2006). *Clinical sport psychology*. Champaign, IL: Human
531 Kinetics.
- 532 Gilbert, W., Gallimore, R., & Trudel, P. (2009) A learning community approach to coach
533 development in youth sport. *Journal of Coaching Education, 2*, 1-21.
- 534 Gilbert, W. D. & Trudel, P. (2005). Learning to coach through experience: conditions that
535 influence reflection. *Physical Educator, 62*, 32-43.
- 536 Gratton, C., & Jones, I. (2003). *Research methods for sport studies*. London: Routledge.
- 537 Gray, J. A. M. (2001). Evidence-based health care: How to make health policy and
538 management decisions (2nd ed.). New York: Churchill Livingstone.
- 539 Grecic, D., & Collins, D. (2013). The epistemological chain: Practical applications in sports.
540 *Quest, 65*, 151–168. doi:10.1080/00336297.2013.773525
- 541 Institute of Medicine. (2010). *Redesigning continuing education in the health professions*.
542 Washington, DC: The National Academies Press.
- 543 Jeannerod, M. (1999). To act or not to act: Perspectives on the representative of actions.
544 *Quarterly Journal of Experimental Psychology, 52*, 1-29.
- 545 Jenkins, S. (2008). Zen buddhism, sport psychology and golf. *International Journal of Sports*
546 *Science & Coaching, 3*, 215-236. doi:10.1260/174795408785024180
- 547 Kaslow, N. J., Graves, C. C., & Smith, C. O. (2012). Specialization in psychology and health

- 548 care reform. *Journal of Clinical Psychology in Medical Settings*, *19*, 12-21.
549 doi:10.1007/s10880-011-9273-0
- 550 Kinrade, N. P., Jackson, R. C., & Ashford, K. J. (2010). Dispositional reinvestment and skill
551 failure in cognitive and motor tasks. *Psychology of Sport and Exercise*, *11*, 312-319.
552 doi:10.1016/j.psychsport.2010.02.005
- 553 Klein, P. (2011). Epistemology. In E. Craig (Ed.), *Routledge encyclopedia of philosophy*.
554 London: Routledge.
- 555 Lam, W. K., Maxwell, J. P., & Masters, R. S. W. (2010). Probing the allocation of attention
556 in implicit (motor) learning. *Journal of Sports Sciences*, *28*, 1543-1554.
557 doi:10.1080/02640414.2010.517543
- 558 Liao, C., & Masters, R. S. W. (2001). Analogy learning: a means to implicit motor learning.
559 *Journal of Sports Sciences*, *19*, 307-319. doi:10.1080/02640410152006081
- 560 Lilienfeld, S. O., Ritschel, L. A., Lynn, S. J., Brown, A. P., Cautin, R. L., & Latzman, R. D.
561 (2013). The research-practice gap: Bridging the schism between eating disorder
562 researchers and practitioners. *International Journal of Eating Disorders*, *46*, 386-394.
563 doi:10.1002/eat.22090
- 564 Luper, S. (2004). *Essential knowledge: Readings in epistemology*. New York, NY: Pearson
565 Longman.
- 566 MacPherson, A. C., Collins, D., & Obhi, S. S. (2009). The importance of temporal structure
567 and rhythm for the optimum performance of motor skills: A new focus for
568 practitioners of sport psychology. *Journal of Applied Sport Psychology*, *21*(Supp.1),
569 S48-S61. doi:10.1080/10413200802595930
- 570 Mallinckrodt, B. (1993). Session impact, working alliance, and treatment outcome in brief
571 counseling. *Journal of Counseling Psychology*, *40*, 25-32.

- 572 Martindale, A., & Collins, D. (2005). Professional judgment and decision making: The role
573 of intention for impact. *The Sport Psychologist, 19*, 303-317.
- 574 Martindale, A., & Collins, D. (2010). But *why* does what works work? A response to Fifer,
575 Henschen, Gould, and Ravizza. *The Sport Psychologist, 24*, 113-116.
- 576 Martindale, A., & Collins, D. (2013). The development of professional judgment and
577 decision making expertise in applied sport psychology. *The Sport Psychologist, 26*,
578 390–398.
- 579 Masters, R. S. W. (1992). Knowledge, nerves and know-how: The role of explicit versus
580 implicit knowledge in the breakdown of a complex motor skill under pressure. *British*
581 *Journal of Psychology, 83*, 343-358. doi:10.1111/j.2044-8295.1992.tb02446.x
- 582 Moore, Z. E. (2007). Critical thinking and the evidence-based practice of sport psychology.
583 *Journal of Clinical Sport Psychology, 1*, 9-22.
- 584 Moran, A. (2009). Cognitive psychology in sport: Progress and prospects. *Psychology of*
585 *Sport and Exercise, 10*, 420-426. doi:10.1016/j.psychsport.2009.02.010
- 586 Neimeyer, G. J., Taylor, J. M., & Rozensky, R. (2012). The diminishing durability of
587 knowledge in professional psychology: A Delphi poll of specialties and proficiencies.
588 *Professional Psychology: Research and Practice, 43*, 364–371.
589 doi:10.1037/a0028698
- 590 Neimeyer, G. J., Taylor, J. M., Rozensky, R. H., & Cox, D. R. (2014). The diminishing
591 durability of knowledge in professional psychology: A second look at specializations.
592 *Professional Psychology: Research and Practice, 45*, 92-98. doi:10.1037/a0036176
- 593 Pagoto, S. L., Spring, B., Coups, E. J., Mulvaney, S., Coutu, M., & Ozakinci, G. (2007).
594 Barriers and facilitators of evidence-based practice perceived by behavioral science
595 health professionals. *Journal of Clinical Psychology, 63*, 695-705.
596 doi:10.1002/jclp.20376

- 597 Posner, M. I., & Rothbart, M. K. (2007). Research on attention networks as a model for the
598 integration of psychological science. *Annual Review of Psychology*, *58*, 1-23.
- 599 Roberts, M. C. (2006). Essential tension: Specialization with broad and general training in
600 psychology. *American Psychologist*, *61*, 862-870. doi:10.1037/0003-066X.61.8.862
- 601 Rushall, B. S., Hall, M., Roux, L., Sasseville, J., & Rushall, A. C. (1988). Effects of three
602 types of thought content instructions on skiing performance. *The Sport Psychologist*,
603 *2*, 283-297.
- 604 Silva, J. M., III, Conroy, D. E., & Zizzi, S. J. (1999). Critical issues confronting the
605 advancement of applied sport psychology. *Journal of Applied Sport Psychology*, *11*,
606 298-320. doi:10.1080/10413209908404206
- 607 Singer, R. N. (2000). Performance and human factors: Considerations about cognition and
608 attention for self-paced and externally-paced events. In T. Reilly & J. Greeves (Eds.),
609 *Advances in sport, leisure and ergonomics* (pp. 211-230). London: Routledge.
- 610 Singer, R. N., Lidor, R., & Cauraugh, J. H. (1993). To be aware or not aware? What to think
611 about while learning and performing a motor skill. *The Sport Psychologist*, *7*, 19-30.
- 612 Smith, R. E., & Smoll, F. L. (2011). Cognitive-behavioral coach training: A translational
613 approach to theory, research and intervention. In J. K. Luiselli & D. D. Reed (Eds.),
614 *Behavioral sport psychology: Evidence-based approaches to performance*
615 *enhancement* (pp. 227-248). London: Springer.
- 616 Stewart R. E., & Chambless, D. (2007). Does psychotherapy determine treatment decisions in
617 private practice? *Journal of Clinical Psychology*, *63*, 267-283. doi:10.1002/jclp.20347
- 618 Stewart, R. E., Stirman, S. W., & Chambless, D. L. (2012). A qualitative investigation of
619 practicing psychologists' attitudes toward research informed practice: Implications for
620 dissemination strategies. *Professional Psychology: Research and Practice*, *43*, 100-
621 109. doi:10.1037/a0025694

- 622 Vincent, W. J., & Weir, J. P. (2012). *Statistics in kinesiology* (4th ed.). Champaign, IL:
623 Human Kinetics.
- 624 Weinberg, R. S. (2008). Does imagery work? Effects on performance and mental skills.
625 *Journal of Imagery Research in Sport and Physical Activity*, 3, 1-20.
626 doi:10.2202/1932-0191.1025
- 627 Wilson, K., & Batterham, A. (1999). Stability of questionnaire items in sport and exercise
628 psychology: Bootstrap limits of agreement. *Journal of Sports Sciences*, 17, 725–734.
629 doi:10.1080/026404199365588
- 630 Winter, S., & Collins, D. (2013) Does priming really put the gloss on performance? *Journal*
631 *of Sport & Exercise Psychology*, 35, 299-307.
- 632 Winter, S., & Collins, D. (2014). Why do we do, what we do? *Journal of Applied Sport*
633 *Psychology*. doi:10.1080/10413200.2014.941511
- 634 Winter, S., MacPherson, A. C., & Collins, D. (2014). “To think, or not to think, that is the
635 question” *Sport, Exercise, and Performance Psychology*, 3, 102-115.
636 doi:10.1037/spy0000007
- 637 Wise, E. H., Sturm, C. A., Nutt, R. L., Rodolfa, E., Schaffer, J. B., & Webb, C. (2010). Life-
638 long learning for psychologists: Current status and a vision for the future.
639 *Professional Psychology: Research and Practice*, 41, 288-297. doi:10.1037/a0020424
- 640 Wrisberg, C. A., Simpson, D., Loberg, L. A., Withycombe, J. L., & Reed, A. (2009). NCAA
641 division-I student-athletes’ receptivity to mental skills training by sport psychology
642 consultants. *The Sport Psychologist*, 23, 470-486.