

Systematic Review of Clutch Performance

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10 Clutch Performance in Sport and Exercise: A Systematic Review

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26 **Abstract**

27 Improved performance under pressure in sport and exercise has been termed clutch
28 performance. The aim of this study was to systematically review, synthesise, and evaluate
29 existing research on clutch performance. Specifically, this review explored: (i) research
30 designs used to examine clutch performance; (ii) definitions of clutch performance; (iii)
31 theoretical frameworks underlying clutch performance; (iv) how clutch performance has been
32 measured; (v) the level of supporting evidence for clutch performance; and, (vi) evidence
33 regarding how clutch performances occur. Ten electronic databases were searched in October
34 2019, with 27 studies found to meet the eligibility criteria included in the review. The results
35 indicate that there is considerable definitional, conceptual, and measurement heterogeneity in
36 the field of clutch performance. Multiple, conflicting definitions of clutch performance were
37 identified in the literature, which consequently led to the adoption of two distinct approaches
38 to examining clutch performance as: (i) an ability; or, (ii) an isolated episode of performance.
39 These differing approaches have resulted in disparate measurement strategies, and
40 accordingly, there was mixed evidence for the concept of clutch performance and how it
41 occurs. In response to these issues, we propose four principles to help guide future research
42 towards refined explanations of clutch performance.

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44 **Keywords;** performance under pressure; subjective experience; psychology; optimal
45 performance; anxiety

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51 **Clutch Performance in Sport and Exercise: A Systematic Review**

52 Increased performance under pressure in sport and exercise has been referred to as
53 *clutch performance* (Otten, 2009; Swann et al., 2019). The term clutch performance is
54 frequently applied by the media to many high-profile, celebrated sporting moments, such as
55 Michael Jordan scoring with five seconds remaining to win the 1998 National Basketball
56 Association (NBA) Championship (Woodyard, 2018); the New England Patriots' 31-point,
57 second half comeback to win the 2017 Super Bowl (Hurley, 2019); and Sergio Aguero's
58 injury time goal to win Manchester City's first Premier League title in 2012 (Hart, 2017).
59 Recent evidence suggests that such clutch performances are intrinsically rewarding and
60 motivating (Swann et al., 2017a), and that clutch performances can also occur in exercise
61 settings (Swann et al., 2019). As these performances occur under pressure, clutch
62 performance has been considered psychological in origin (Otten, 2013). Facilitating clutch
63 performance is therefore of great interest to researchers and practitioners in the field of sport
64 and exercise psychology (Marchant et al., 2014; Otten, 2013)

65 The phrase 'in the clutch' was first used in a 1929 New York Times article to
66 describe when a baseball batter hits a safe 'blow' at an opportune moment (Safire, 2005).
67 Despite having a long history of colloquial use (e.g., West & Libby, 1969), scientific
68 definitions of clutch performance have only emerged relatively recently. The most prominent
69 definitions of clutch performance are those provided by Otten (2009) and Hibbs (2010).
70 Otten (2009) defined clutch performance as 'any performance increment or superior
71 performance that occurs under pressure circumstances' (p. 584). Hibbs (2010), meanwhile,
72 defined clutch performance as:

73 when a participant in competitive sport succeeds at a competitive-related, challenging
74 task during a clutch situation, is aware that the performance occurs during a clutch
75 situation, possesses the capacity to experience clutch situation-related stress, cares

76 about the outcome of the contest, and succeeds primarily due to skill rather than luck
77 or cheating (p. 55).

78 A clutch situation, according to Hibbs (2010), is ‘a point in a competitive sport where the
79 success or failure of the participants has a significant impact on the outcome of the contest’
80 (p. 48). Researchers have highlighted, however, that definitions of clutch performance remain
81 problematic. For example, Seifreid and Papatheodorou (2010) noted that ‘clutch exists as a
82 challenging concept which is inadequately defined in sport’ (p. 92), whilst Mesagno and Hill
83 (2013) stated that clutch performance is ‘ambiguously defined’ (p. 275). Swann et al.
84 (2017a), meanwhile, suggested that ‘standard definitions of clutch performance may require
85 refinement’ (p. 2278). Definitional critiques have also centered on the situations in which
86 clutch performances occur, based on evidence that clutch performances have been reported
87 outside of competitive sport settings, such as training (Swann et al., 2017a) and in exercise
88 contexts (Swann et al., 2019). As such, questions remain over how to adequately define
89 clutch performance, as well as the situations in which such performances occur.

90 Theoretical explanations of clutch performance have emerged from two different
91 approaches. Traditionally, theories of performance under pressure have focused on choking,
92 defined as ‘an acute and considerable decrease in skill execution and performance when self-
93 expected standards are normally achievable, which is the result of increased anxiety under
94 perceived pressure’ (Mesagno & Hill, 2013, p. 274). For example, attentional theories
95 propose that, in response to anxiety, athletes either divert attention towards the self (e.g., self-
96 focus theories; Beilock & Carr, 2001), or away from task-relevant cues (e.g., distraction
97 theories; Oudejans et al., 2011). More recently, an Integrated Model of Flow and Clutch
98 States has been proposed (Swann et al., 2017b, 2019). This model outlines that a specific
99 psychological state may underlie clutch performance (i.e., clutch states), which overlaps with,
100 yet is distinct from, the experience of flow (a deeply focused, absorbing, and autotelic

101 experience; Csikszentmihalyi, 2002). As such, explanations of clutch performance have
102 emerged out of research centred on either choking or flow.

103 A range of measurement approaches have been adopted to examine clutch
104 performance. Research in this field began with Cramer's (1977) investigation into the
105 existence of clutch hitters in baseball. For the subsequent 30 years, clutch performance
106 research was exclusively conducted within the sport of baseball, through the method of
107 sabermetrics (i.e., the statistical analysis of baseball; Costa et al., 2019). Generally, such
108 archival approaches have typically focused on whether clutch performance exists as an
109 observable phenomenon in sport. In the last decade, however, there has been a considerable
110 increase in the quantity and diversity of research examining clutch performance. For
111 example, measurement approaches have extended to include qualitative methodologies that
112 focus on the psychological state underlying clutch performance (e.g., Swann et al., 2017a),
113 whilst experimental approaches have included measuring variables such as subjective
114 experience (e.g., anxiety), technique changes in sport-specific skills (e.g., golf-putting
115 stroke), and objective performance (e.g., putting accuracy) during clutch performances (e.g.,
116 Gray & Cañal-Bruland, 2015). In parallel, research has expanded into a wide range of sports
117 beyond baseball, such as basketball (e.g., Otten, 2009), golf (e.g., Hill & Hemmings, 2015),
118 and tennis (e.g., Jetter & Walker, 2015), as well as exercise (e.g., Swann et al., 2019).

119 There are fundamental questions surrounding the strength of evidence underpinning
120 clutch performance as an observable phenomenon in sport. For example, Wallace et al.
121 (2013) found no evidence for NBA players displaying clutch performances during the fourth
122 quarter of playoff games. Similarly, Birnbaum (2008) demonstrated that clutch performance
123 in Major League Baseball (MLB) was not a predictor of future clutch performances, casting
124 doubt on the notion that certain players are more prone to producing clutch performances
125 than others. In contrast, Jetter and Walker (2015) found that higher-ranked professional

126 tennis players improved their winning percentage, both overall and in decisive sets (i.e.,
127 tiebreak sets), during important competitions (i.e., Grand Slam tournaments). This finding
128 suggested that higher-ranked players are able to produce clutch performances when the
129 incentives were greatest. Meanwhile, Solomonov et al. (2015) indicated that NBA players
130 with reputations for being clutch players (i.e., known for producing repeated clutch
131 performances) increased their output (e.g., points scored) in the last five minutes of critical
132 games. However, these players' overall base performance (e.g., shooting percentage) did not
133 increase. Solomonov et al. (2015) concluded that this finding provided limited evidence of
134 clutch players, in that whilst these players scored more points, this was a consequence of
135 shooting more often, rather than improved shooting accuracy. Thus, there is contradictory
136 evidence as to whether clutch performance exists in sport.

137 Against the backdrop of definitional issues and conflicting evidence, a systematic
138 review of clutch performance is both timely and important in terms of providing guidance on
139 future directions for the field. Systematic reviews aim to be 'comprehensive, methodical,
140 explicit, transparent, and as unbiased as possible in the questions they explore and how they
141 explore them' (Siddaway et al., 2019, p. 97). Thus, systematic reviews aim to produce a
142 summary of the literature that explores relations, contradictions, and gaps in a research field
143 and the reasons for these. In turn, systematic reviews can allow broad and more robust
144 conclusions to be drawn, which can outline future research directions and inform practice
145 (Siddaway et al., 2019). Furthermore, systematic reviews have previously been employed as
146 a method to review and bring clarity to constructs with definitional issues in the field of sport
147 and exercise psychology (Dohme et al., 2017; Swann et al., 2015). These aspects are highly
148 relevant to the field of clutch performance, which has yet to be systematically reviewed and
149 synthesised, and may benefit from greater clarity and direction.

175 irrelevant results, whilst ensuring all relevant literature was retained. The final search string
176 was: [clutch] AND [(sport* OR exerci* OR physical* OR athlet*)]. The singular use of the
177 term *clutch*, rather than *clutch performance*, was chosen to capture terminology relevant to
178 the concept, but that may not contain the term performance (e.g., hitting in the clutch, clutch
179 shooting). The search terms physical* (e.g., physical fitness) and athlet* (e.g., athlete) were
180 included as synonyms to supplement sport* and exerci*. Exercise was included in this review
181 as recent evidence suggests that clutch performances may also occur in exercise settings (e.g.,
182 Swann et al., 2019). Where possible, the first block was searched in the title, abstract, and
183 keyword field, whilst the second block was searched in the full text field. The full search
184 strategy for each database is presented in Supplementary File 2.

185 **Eligibility Criteria**

186 Inclusion and exclusion criteria were employed to ensure that the scope of the review
187 was clearly defined, and that all literature relevant to the aims of the review was identified
188 (Siddaway et al., 2019; Centre for Reviews and Dissemination, 2009). Criteria for inclusion
189 were that articles must: (a) be a peer-reviewed journal article published in the English
190 language; (b) report original empirical evidence (including original analyses of secondary
191 data); (c) be published prior to October 2019 (when the final search was undertaken); and, (d)
192 examine the nature, existence and/or occurrence of clutch performance in participants'
193 engaging in sport¹ (including sport-specific skills) or exercise², as defined by the World
194 Health Organisation (WHO, 2018). Articles were excluded that (e) referred to clutch as a
195 mechanical apparatus (e.g., a clutch in motorcycle sports). Following initial scoping of the

¹ 'An activity involving physical exertion, skill and/or hand-eye coordination as the primary focus of the activity, with elements of competition where rules and patterns of behaviour governing the activity exist formally through organizations; and may be participated in either individually or as a team' (WHO, 2018, p. 101)

² 'A subcategory of physical activity that is planned, structured, repetitive, and purposive, in the sense that the improvement or maintenance of one or more components of physical fitness is the objective' (WHO, 2018, p. 98)

196 literature, inclusion of original analyses of secondary data were deemed important for the
197 current review. Specifically, archival studies comprise a significant portion of the extant
198 literature, and consideration of these studies is pertinent to several aims of the review (e.g.,
199 how clutch performance has been measured).

200 **Screening Process**

201 Following database searching, articles were imported and screened in Endnote X8
202 reference management software (Thomas Reuters, California), during which duplicates were
203 automatically removed. Missed duplicates during this stage were removed manually during
204 the screening process. Articles were independently screened at the title, abstract, and
205 keyword level for relevance by the first and third author. Studies were retained if they
206 contained the term clutch in the title, abstract, or as a keyword, appeared to involve
207 participants in the domain of sport or exercise, and were not referring to clutch as a
208 mechanical apparatus (e.g., in motorsports). A number of steps were followed to ensure that
209 the screening process was as comprehensive as possible (Siddaway et al., 2019). If the
210 relevance of an article was uncertain, the full text was obtained for further screening. Once
211 full texts were obtained for all identified studies, a further manual search was conducted by
212 the first author. Specifically, reference lists of all identified studies were searched, in addition
213 to forward searching citations of identified studies using Google scholar. This process was
214 repeated with each new study added. Lastly, authors who had two or more first-author
215 publications at this stage of screening were contacted and asked to suggest any relevant
216 literature that was not presently included (Siddaway et al., 2019). This resulted in two
217 additional studies (Jackman et al., in press.; Maher et al., 2018) being included, which had
218 been published after the initial search date. After completing these steps, the first and third
219 authors screened the full texts in accordance with the eligibility criteria. In three cases
220 inclusion was uncertain (Cramer, 1977; Cramer & Palmer, 2008; Deane & Palmer, 2006)

221 because it was not initially clear if original data had been analysed. Upon repeated readings
222 and discussions, the reviewers agreed to include these papers as it was determined that
223 original data had been analysed.

224 **Data Extraction and Synthesis**

225 Data were extracted by the first author. These data included: (i) study characteristics
226 (methodology, study design, aims, hypotheses, theoretical framework); (ii) participant
227 characteristics (sample size, gender, mean age, sport, expertise); and (iii) key findings
228 relevant to the aims of the review (definitions, existence and occurrence of clutch
229 performance). Given the heterogenous nature of the included studies, a narrative synthesis
230 was undertaken. A narrative synthesis summarises and explains findings textually (Popay et
231 al., 2006), with the aim of generating new insights (Thomas et al., 2012). A preliminary
232 synthesis was initially conducted by tabulating textual summaries of the data according to the
233 review aims. Tabulation is valuable in developing initial summaries of the included studies,
234 as well as facilitating identification of patterns across studies (Higgins et al., 2019).
235 Following this preliminary synthesis, the relationships between studies were explored by
236 examining factors that may explain differences in findings between studies (Popay et al.,
237 2006). This was an important step as two of the five review aims related to empirical
238 findings. An interpretative approach was taken, in which findings of the included studies
239 were filtered according to the conceptual assumptions and methods adopted (Drisko, 2019).
240 Specifically, this involved examining how research design, definitions, and measurement
241 may have informed the results of individual studies.

242 **Quality Appraisal**

243 Study quality was appraised using the 16-item assessment tool (QATSDD) developed
244 by Sirriyeh et al. (2012)³. The QATSDD can be used to assess the quality of qualitative,
245 quantitative, and mixed methods studies. However, criterion 14 of the tool was excluded on
246 grounds of being ineffective for assessing reliability in qualitative research (Jaarsma &
247 Smith, 2018; Smith & McGannon, 2018), whilst criterion 9 of the tool was excluded when
248 scoring archival studies, as this criterion was deemed inappropriate for archival designs by
249 the research team.

250 To limit bias, and facilitate transparency and trustworthiness, authors of the present
251 review who were also authors on an included study were not involved in the quality
252 assessment of that study. As such, the first author assessed 26 of the 27 studies, whilst the
253 second, third, and fourth authors all assessed eight studies each. For the remaining studies,
254 two independent reviewers were used. The first independent reviewer assessed four studies
255 (three in conjunction with the first author, one in conjunction with the second independent
256 reviewer), whilst the second independent reviewer assessed one study. All studies were
257 assessed by two reviewers. As outlined in Sirriyeh et al. (2012), the reviewers met to discuss
258 and deliberate on any scoring differences, following which a final score was determined by
259 mutual agreement.

260 **Results**

261 In total, 4779 studies were identified across three separate searches. Following
262 duplicate removal, 2548 studies were independently screened for relevance. The majority of
263 studies screened at this stage were removed as they were not in the domain of sport or
264 exercise (clutch is a prominent term in the fields of zoology and mechanical engineering).
265 This process left 34 studies to be screened at the full text stage. An additional manual search

³ To ensure the most appropriate tool was selected, three appraisal tools were piloted with five of the included papers, which were of a diverse methodology. These were the QATSDD (Sirriyeh et al., 2012), Mixed Methods Appraisal Tool (Pluye et al., 2011), and the QualSyst (Kmet et al., 2004). Following piloting, the QATSDD (Sirriyeh et al., 2012) was considered the most appropriate tool for the present review.

266 identified 14 potentially relevant articles to be screened at the full text stage. Thus, 48 articles
267 were screened at the full text stage. Following full text screening, 21 articles were excluded.
268 Reasons for exclusion were that the studies: were not original empirical research ($n = 11$); did
269 not examine the nature, existence and/or occurrence of clutch performance ($n = 5$); were not
270 peer reviewed ($n = 2$); were not in the domain of sport or exercise ($n = 2$); and, were not
271 written in English ($n = 1$). Accordingly, 27 articles were included in the systematic review.
272 The PRISMA diagram of this process is provided in Figure 1.

273 INSERT FIGURE 1 AROUND HERE

274 **Characteristics of Included Studies**

275 Details of study characteristics, including type of sport/exercise, sample size,
276 methodology, methods, approach to research design, and key findings relevant to aims of the
277 review are presented in Table 1. In total, 17 studies were quantitative, six qualitative, and
278 four mixed methods. Of the quantitative studies, 13 employed archival methods, whilst the
279 remaining four studies used experimental methods. In the qualitative studies, both career-
280 based and event-focused⁴ semi-structured interview methods were used. Three mixed method
281 studies used a combination of psychometric measures and interviews (see Table 1 for
282 measures), whilst one mixed methods study (Swann et al., 2016) included performance
283 observation, naturalistic performance data, and event-focused, semi-structured interviews.

284 INSERT TABLE 1 AROUND HERE

285 There were 545 (304 male, 241 female) participants from studies that collected
286 primary data. Data were observed for at least 3652⁵ individuals from studies that obtained
287 secondary data (i.e., archival methods). Meanwhile, six studies did not report the sample size

⁴ Career-based interviews seek general understanding of a phenomenon over an athlete's career or significant period of time (Swann et al., 2018). Event-focused interviews collect data soon after one specific event (e.g., within hours/days), which allows for more detailed and chronological recall of the event (Swann et al., 2018)

⁵ The sample size from Otten & Barrett (2013) was not included in this calculation, as it was unclear how many athletes appeared more than once (e.g., as pitching, batting, and team statistics were calculated for multiple seasons, meaning the same athlete may have been observed more than once)

288 in adequate detail to report. Participants were examined in a range of sports, including:
289 baseball ($n = 8$); basketball ($n = 6$); golf ($n = 5$); mixed sport ($n = 3$); tennis ($n = 1$); and
290 American football ($n = 1$). A mix of participants engaging in both sport and exercise was
291 examined in two studies (Swann et al., 2017a, 2017b), whilst only participants in exercise
292 were examined by Swann et al. (2019).

293 **Quality Appraisal**

294 Table 1 also displays quality appraisal scores from the QATSDD (Sirriyeh et al.,
295 2012) for the included studies. The mean quality appraisal score across all studies was 61%.
296 Archival studies generally received the lowest quality scores, on account of lacking clear
297 conceptual frameworks, not justifying sample sizes, and omitting discussion of strengths and
298 weaknesses (a full score for each paper by category is found in Supplementary File 3).
299 Experimental studies, meanwhile, ranged from scores of 50% (McEwan et al., 2012) to 71%
300 (Otten, 2009). Qualitative and mixed method studies were generally the highest scoring and,
301 with the exception of Owens et al. (2016; 38%) and Maher et al. (2018; 56%), all scored
302 above 80% (see Table 1).

303 **Research Design**

304 There were two distinct approaches to how research was designed to examine clutch
305 performance. The most common approach ($n = 14$) was to examine clutch performance over
306 a series of related performances. For example, studies measured clutch performance across
307 multiple games (e.g., Solomonov et al., 2015), consecutive seasons (e.g., Birnbaum, 2008), or
308 entire careers (e.g., Deane & Palmer, 2006). These were primarily archival studies, but also
309 involved one mixed methods study (Owens et al., 2016; see Table 1). Hibbs (2010) has
310 previously termed this approach ‘clutch ability... when one is notable for delivering clutch
311 performances’ (p. 48). Accordingly, we term this the *clutch ability* approach.

337 (2009) definition. Six studies referenced Hibbs' (2010) definition of clutch performance. Of
338 note, five of these studies also referenced Otten's (2009) definition. In these five studies, both
339 definitions were viewed as complementary (i.e., used together – see Table 2), rather than
340 compared or contrasted. Indeed, none of the included studies examined the implication of
341 using different definitions of clutch performance on the same data (i.e., if using different
342 definitions changed the findings). Lastly, Maher et al. (2018) defined clutch performance as
343 “adaptive (e.g., clutch) responses” (p. 1) to pressure. The definition employed by Maher et al.
344 (2018) is considerably vague, and it is unclear how, or if, this definition fits with either
345 Otten's (2009) or Hibbs' (2010) definition of clutch performance.

346 **Clutch ability, clutch situations, and clutch states.** Clutch was defined as an ability
347 in four studies. Two of these definitions were specific to baseball (Cramer & Palmer, 2008;
348 Deane & Palmer, 2006), with the remaining definitions generalisable across sports (Jetter &
349 Walker, 2015; Owens et al., 2016 – see Table 2). Interestingly, Owens et al. (2016) cited
350 Otten's (2009) definition, but clearly positioned clutch as an ability (i.e., ‘a clutch athlete
351 exhibits superior performance under pressure’; Owens et al., 2016, p.4). As above, it is
352 unclear whether Otten's (2009) definition is episodic or can apply to studies examining clutch
353 ability.

354 A definition of a clutch situation was provided in four studies. Baseball-specific
355 definitions were provided in three of these studies (Birnbaum, 2008; Brooks, 1989; Ruane,
356 2005), whilst one study provided the broad definition of a clutch situation as ‘instances of
357 high pressure’ (McEwan et al., 2012, p. 144). Clutch states, meanwhile, were defined as the
358 psychological state underlying clutch performances (Jackman et al., 2017; Swann et al.,
359 2017b). Whilst both Jackman et al. (2017) and Swann et al. (2017b) also provided definitions
360 of clutch performance, it is unclear if clutch states and clutch performance are two distinct

361 constructs, or if they are interconnected (i.e., if the experience of clutch states is an inherent
362 aspect of clutch performance, and vice versa).

363 **Comment.** To date, various approaches to examining and defining clutch
364 performance have been employed in the literature. It is therefore important that consistent
365 terminology is used for the remainder of the Results. Accordingly, *clutch performance* will
366 be used as an umbrella term, incorporating both clutch ability (i.e., clutch performance over a
367 series of related performances) and clutch episodes (i.e., clutch performance as an isolated
368 performance episode). Where possible, the more specific terminology of either clutch ability
369 or clutch episodes will be used.

370 **Theoretical Frameworks and Clutch Performance**

371 Table 1 provides an overview of the theoretical frameworks and conceptual models
372 within the included studies. From the included studies, 33% ($n = 9$) provided no explicit
373 theoretical framework for clutch performance. These studies may therefore be considered
374 atheoretical. The following section discusses the different theoretical frameworks that were
375 employed in the remaining studies.

376 **Choking-based explanations.** Eleven studies examined clutch performance in
377 relation to choking. Primarily, these studies drew on attentional theories ($n = 8$), which
378 included self-focus theories ($n = 5$), distraction theories ($n = 1$), or both self-focus and
379 distraction theories ($n = 2$). Of note, the majority ($n = 5$) of studies utilising attentional
380 theories employed definitions that called for increased performance (e.g., Otten, 2009). No
381 explanation was provided, however, for how such theories accounted for increased
382 performance (i.e., only the proposed mechanisms behind performance breakdown were
383 described). One study (Worthy et al., 2009), meanwhile, drew on regulatory focus theory.
384 This theory explains that athletes are more likely experience performance decrements when
385 trying to avoid losing the game, as opposed to trying to win the game. Lastly, Hill and

386 Hemmings (2015) and Hill et al. (2017) examined the self-presentation model. The self-
387 presentation model is concerned with understanding how one's self-presentation motives
388 affect their performance anxiety, which may then precede attentional breakdowns via self-
389 focus or distraction.

390 **Integrated Model of Flow and Clutch States.** Six studies (Jackman et al., 2017, in
391 press; Swann et al., 2016, 2017a, 2017b, 2019) positioned clutch states within the Integrated
392 Model of Flow and Clutch States. This model outlines the performance contexts, process of
393 occurrence (discussed further below), subjective experience, and outcomes of clutch states.
394 Hence, this model focuses on explaining the psychological state underlying clutch
395 performance, rather than clutch performance per se (see *Inadequate Theoretical Framework*
396 for further discussion).

397 **Neoclassic economic theory.** One study (Cao et al., 2011) stated that 'neoclassical
398 economic theory predicts that individuals exert the most effort, and consequently produce
399 their best performances, when the returns to effort are highest' (p. 231). Little further
400 information, however, was provided about this theory, and how the results may or may not
401 support it.

402 **Measurement of Clutch Performance**

403 No established measure of clutch performance was utilised in the included studies.
404 Accordingly, this section reviews approaches to measurement with respect to the two
405 essential constructs of clutch performance (i.e., those constructs that are core across
406 definitions of clutch performance): (i) performance; and, (ii) pressure.

407 **Measuring performance.** Naturally, performance is inherent in the study of clutch
408 performance. The following section addresses approaches to measurement of performance in
409 studies examining clutch ability, and in studies examining clutch episodes.

435 improvement following pressure manipulation was considered clutch performance. As in the
436 archival designs, performance was considered to have improved if there was a statistically
437 significant increase compared to baseline performance. One study (Gray & Cañal-Bruland,
438 2015) meanwhile, considered clutch performance to be evident in those participants who did
439 not choke. Accordingly, the clutch performance group in this study still decreased
440 performance relative to baseline, but to a significantly lesser degree than those who choked.
441 This suggests confusion around the extent of the performance increment required to classify a
442 clutch performance.

443 One study (Swann et al., 2016) utilised both objective and subjective measures of
444 performance. Specifically, this study involved observations of professional golfers during the
445 final rounds of tournaments, a performance monitoring tool to objectively ‘indicate peaks and
446 troughs in the player’s performance’ (p. 104), and then event-focused interviews about the
447 same rounds as soon as possible afterwards. To date, this appears to be the only study that has
448 combined both objective and subjective measurement of performance.

449 **Measuring pressure.** The construct of pressure is central to definitions of clutch
450 performance. Pressure is ‘the presence of situational incentives for optimal, maximal, or
451 superior performance’ (Baumeister & Showers, 1986, p. 362), and importantly, involves a
452 subjective component. The following sections review approaches to measurement of pressure
453 in studies investigating clutch ability, and studies investigating clutch episodes.

454 **Clutch ability.** Table 4 provides an overview of the methods used to measure pressure
455 in the included studies. The majority of studies ($n = 13$; 94%) designed to measure clutch
456 ability did not directly measure pressure. Instead, as a proxy measure, certain in-game
457 situations were used to represent pressure. Across these 13 studies, eight different situations
458 were specified to infer pressure (see Table 4). Generally, these were situations considered
459 important to the overall outcome of the game or tournament, although there was some

484 methods allow for rich and detailed descriptions of subjective experiences (Smith & Sparkes,
485 2019), and hence, could offer a valuable avenue for in-depth explorations of pressure.

486 Experimental studies ($n = 4$) primarily employed psychometric measures of anxiety to
487 examine pressure. Gray et al. (2013) asked participants to respond to the Immediate Anxiety
488 Measures Scale (IAMS; Thomas et al., 2002). Similarly, Gray and Cañal-Bruland (2015)
489 used the cognitive and somatic anxiety items of the IAMS, which has been identified as a
490 valid and reliable measure of anxiety (Thomas et al., 2002), whilst also assessing changes in
491 participants' average heart rate between trials. Meanwhile, Otten (2009) employed the
492 Competitive State Anxiety Inventory 2 (Revised) (CSAI-2R; Cox et al., 2003), which is also
493 a validated measure of anxiety (Cox et al., 2003). Whilst anxiety has been identified as an
494 indicator of pressure (e.g., Gucciardi & Dimmock, 2008), measures of anxiety do not directly
495 measure perceptions of pressure (Kent et al., 2018). As such, it is arguably the case that these
496 experimental studies did not actually measure pressure, but examined a single, negatively
497 framed (e.g., Burton & Naylor, 1997), indicator of pressure. Lastly, McEwan et al. (2012)
498 asked participants 'how much pressure and anxiety they felt throughout the experiment' (p.
499 145). Responses to this question, however, did not undergo formal qualitative analysis, and
500 accordingly were not reported in the results. Hence, the validity of this pressure manipulation
501 is unclear.

502 **Evidence for Clutch Performance**

503 Evidence for clutch performance as an observable phenomenon was mixed. This
504 section reviews the evidence for clutch performance with respect to studies that examined
505 clutch ability, and studies that examined clutch episodes.

506 **Clutch ability.** Ten studies explicitly investigated the existence of clutch ability in
507 sport⁶. From these studies, eight did not provide support for the existence of clutch ability. In
508 studies examining baseball, fluctuations in performance during pressure situations were
509 demonstrated to be more likely a product of random variation (Brooks, 1989; Cramer &
510 Palmer, 2008; Deane & Palmer, 2006; Ruane, 2005), general hitting quantity (Cramer, 1977),
511 or in the case of pitching, other performance factors (e.g., run support; Birnbaum, 2009).
512 Further, clutch performance in one season was not predictive of clutch performance in future
513 seasons (Birnbaum, 2008). In basketball, meanwhile, Wallace et al. (2013) demonstrated that
514 most players were statistically average during the 4th quarter of NBA playoff games when
515 compared with the previous 3 quarters of the same game, indicating no evidence of clutch
516 ability.

517 In contrast, Jetter and Walker (2015) demonstrated support for the existence of clutch
518 ability in tennis. Higher ranked players were more likely to win a Grand Slam tournament
519 relative to other events, and also more likely to perform well in clutch situations within the
520 match (e.g., tie-breaks). Furthermore, Solomonov et al. (2015) showed that ‘clutch players’
521 performance generally improves in the sense that they exert more effort in the final, critical
522 moments of the game’ (p. 136). Metrics such as foul drawing, free throw attempts, and
523 successful free throws significantly increased compared to earlier periods in the game. These
524 findings raise questions as to what aspects of performance must increase to be considered a
525 clutch performance. For example, is increased effort, or specific components of performance
526 – such as fouls drawn – sufficient, or is a more global perspective of performance outcomes
527 necessary for clutch performance? In summary, there was limited support for the existence of
528 clutch performance when examined as an ability. The measurement limitations of these

⁶ Not all studies designed to examine clutch ability explicitly investigated whether the concept existed. Rather, four studies (Otten & Barrett, 2013; Cao et al., 2011; Owens et al., 2016; Worthy et al., 2013) assumed *a priori* that clutch performance, or clutch ability, existed.

529 studies, however, should be considered when assessing the validity of this conclusion.
530 Specifically, it is unclear to what extent pressure was experienced by athletes in these studies,
531 and the performance benchmarks used to assess performance were inconsistent.

532 **Clutch episodes.** In contrast to studies examining clutch ability, studies investigating
533 isolated clutch episodes demonstrated strong support for the existence of clutch performance.
534 Experimental studies generally indicated that participants could increase performance in
535 response to pressure manipulations (Gray et al., 2013; Otten, 2009; McEwan, 2012).
536 Qualitative studies showed that athletes could recall having clutch performances (Hill et al.,
537 2017; Hill & Hemmings, 2015; Maher et al., 2018), whilst at the experiential level, clutch
538 states – the subjective experience of clutch performance – were reported to occur during
539 excellent sport performances and rewarding exercise experiences (e.g., Jackman et al., 2017).
540 Specifically, clutch states were proposed to consist of 12 characteristics: absence of negative
541 thoughts; absorption; altered sensory perceptions; automaticity of skills; confidence;
542 deliberate focus; enhanced motivation; enjoyment; heightened arousal; heightened
543 awareness; intense effort; and perceived control (Jackman et al., 2017, in press; Swann et al.,
544 2016, 2017a, 2017b, 2019). In summary, support for clutch performance both as a
545 performance outcome, (e.g., Gray et al., 2013) and at an experiential level (e.g., Swann et al.,
546 2017a), was demonstrated in studies examining clutch episodes.

547 **Occurrence of Clutch Performance**

548 This section reviews factors involved in the occurrence of clutch performances. Given
549 that limited supporting evidence was found for clutch ability, this section focuses solely on
550 the occurrence of clutch episodes.

551 **Clutch episodes.** From experimental studies, a range of factors were identified in the
552 occurrence of clutch performance. Gray et al. (2013) demonstrated that in golf putting,
553 participants who increased performance under pressure had improved putting kinematics (i.e.,

554 swing amplitude) compared to baseline performance. McEwan et al. (2012), meanwhile,
555 showed that participants who warmed up under high-pressure conditions performed
556 significantly better in a single-shot, golf-putting task than those who warmed up under low-
557 pressure conditions. Lastly, Otten (2009) indicated that a sense of perceived control during a
558 free-throw task was the strongest predictor of clutch performance. The factors identified in
559 the occurrence of clutch performance, therefore, varied considerably across experimental
560 designs, and included technique improvements, warm-up strategies, and psychological
561 mechanisms.

562 The occurrence of clutch performance episodes was also investigated in qualitative
563 designs. Hill and Hemmings (2015) reported a number of approach coping strategies to
564 facilitate clutch performance, such as simulated practice, performance routines, and cognitive
565 restructuring (e.g., re-appraising threatening stressors as a challenge). The roles of simulated
566 practice and performance routines in the occurrence of clutch performance were also
567 highlighted by Maher et al. (2018) and Hill et al. (2017), in addition to a range of other
568 factors. For example, Hill et al. (2017) reported that a sense of perceived control and
569 challenge appraisal were also involved in the occurrence of clutch performances.
570 Collectively, factors that consistently emerged out of these qualitative studies were challenge
571 appraisal, simulated practice, and performance routines.

572 Four studies reported the occurrence of clutch states as a series of steps (Swann et al.,
573 2016, 2017b, 2019; Jackman et al., in press). Clutch states occurred in contexts characterised
574 by importance, and when the participant was still in contention to achieve an important goal.
575 Athletes and exercisers initially appraised the situation as a challenge before setting specific
576 goals relating to the desired outcome of that situation. Athletes and exercisers then made a
577 deliberate decision to ‘step up’ their effort and intensity in order to try and achieve those
578 goals (Swann et al., 2019, p. 92). In addition, Jackman et al. (in press) reported that the

579 occurrence of clutch states occur may be related to an athlete's mental toughness.
580 Specifically, athletes high in mental toughness reported a more rapid initiation of clutch
581 states than athletes low in mental toughness, particularly when in response to setbacks.
582 Whilst processes of occurrence for clutch states has been consistently reported (Swann et al.,
583 2016, 2017b, 2019; Jackman et al., in press), questions remain over the relationship between
584 clutch states and clutch performance (i.e., do clutch states always underlie clutch
585 performances?).

586 **Discussion and Recommendations**

587 The aim of this review was to synthesise and evaluate existing research on clutch
588 performance in sport and exercise. The findings indicated that research into clutch
589 performance has gathered momentum in the last decade. Over 75% ($n = 21$) of the included
590 studies were published since 2009, with a third ($n = 9$) published since 2016. This momentum
591 suggests that clutch performance is a contemporary field of research in sport and exercise
592 psychology (e.g., Perry, 2019). Findings from this review, however, also suggest there is
593 significant definitional, conceptual, and measurement heterogeneity within the field. Clutch
594 performance has been defined inconsistently, with definitions referring to this construct both
595 as an ability and an individual performance, whilst studies have also employed definitions of
596 clutch situations and clutch states. Accordingly, two major approaches are evident in the
597 field, which conceptualise clutch performance as an: (i) ability; and (ii) individual
598 performance episode. These differing approaches have resulted in disparate measurement of
599 clutch performance with questionable validity, and consequently, conflicting evidence
600 regarding the existence of clutch performance.

601 **Assessing Evidence for Clutch Performance**

602 Studies which explicitly investigated the existence of clutch ability ($n = 10$)
603 demonstrated limited support. As Hibbs (2010) noted, however, 'in order to assign clutch

604 ability to a competitor, one must first know what a clutch performance is' (p. 48). At present,
605 definitions of clutch performance lack specificity and clarity (see *Definitional Issues*), and
606 consequently, it is difficult to determine exactly what clutch ability is. Moreover, studies
607 examining the existence of clutch ability relied on proxy measures of pressure (i.e., certain
608 game situations were used to infer pressure), meaning that the extent to which these athletes
609 experienced pressure is unclear. Against this backdrop of definitional and measurement
610 issues, making any conclusions about the existence of clutch ability based on current
611 literature seems somewhat premature.

612 In contrast, support for isolated episodes of clutch performance was demonstrated
613 across qualitative, experimental, and mixed methods designs. These studies identified a
614 variety of factors in the occurrence of clutch performance. For example, technique
615 improvements (e.g., Gray et al., 2013), simulated practice and performance routines (e.g.,
616 Maher et al., 2018), and psychological processes (e.g., perceived control; Otten, 2009) were
617 all identified in the occurrence of clutch performance. In addition, Swann et al. (2016, 2017b,
618 2019) and Jackman et al. (in press) highlighted a sequential process in the occurrence of
619 clutch states. Whilst these studies provide evidence for isolated episodes of clutch
620 performance, they also highlight inconsistencies in how the occurrence of clutch performance
621 has been examined, ranging from exploration of distal factors (e.g., simulated practice;
622 Maher et al., 2018) to more proximal factors (e.g., perceived control; Otten, 2009). This
623 perhaps suggests that even within studies adopting a similar approach (i.e., clutch episodes),
624 there remains some confusion over how to examine the occurrence of clutch performance.

625 **Definitional Issues**

626 Definitions are important in facilitating conceptual clarity, informing measurement,
627 and determining the direction of future research (Cooper et al., 2001; Wacker, 2004). This
628 review demonstrated that 26% ($n = 7$) of studies did not provide a definition of clutch, in any

629 sense. When definitions were provided, these extended beyond defining clutch performance,
630 and were also provided in terms of an ability (i.e., the ability to produce repeated, increased
631 performances during critical game situations; Deane & Palmer, 2006), a situation (i.e.,
632 performance situation which is high in pressure; McEwan et al., 2012), and as a
633 psychological state (i.e., the subjective experience underlying clutch performance; Swann et
634 al., 2019). These varied definitions suggest conceptual confusion surrounding what clutch
635 performance is, and is not. The most common definitions of clutch performance, meanwhile,
636 were applied inconsistently. Otten's (2009) definition of clutch performance was cited both in
637 studies that examined clutch performance as an ability (e.g., Solomonov et al., 2015), and as
638 an individual episode (e.g., Hill et al., 2017). Further, five studies supplemented Otten's
639 (2009) definition with Hibbs' (2010) definition of clutch performance, despite there being
640 meaningful differences between the two (see *Guiding Principles for Clutch Performance*
641 *Research*). Hence, a key finding from this review is that current definitions of clutch
642 performance have not facilitated conceptual clarity and, accordingly, may require refinement
643 to clearly differentiate between clutch ability and clutch performance episodes.

644 **Inadequate Theoretical Framework**

645 Robust theory represents a fundamental aim of science, providing the foundation
646 upon which research and practice should be built (Cunningham, 2013; Doherty, 2013). The
647 present review indicated that current theoretical approaches to clutch performance are
648 insufficient. The most popular approach ($n = 11$) within the included studies was to employ
649 theories (i.e., attentional theories) and models (i.e., self-presentation model) that primarily
650 focused on explaining the mechanisms underlying performance breakdown. Both attentional
651 theories and the self-presentation model, however, are grounded in performance responses to
652 anxiety. Whilst anxiety is an indicator of pressure (e.g., Gucciardi & Dimmock, 2008), it has
653 not been demonstrated that experiencing pressure always results in anxiety. Indeed,

654 Baumeister and Shower's (1986) formative, and widely used (e.g., Low et al., 2020),
655 definition of pressure is relatively neutral (i.e., 'the presence of situational incentives for
656 optimal, maximal, or superior performance', p. 362). As such, it may not be the case that all
657 clutch performances are preceded by symptoms of anxiety or occur in a state of anxiety.
658 Therefore, based on current understandings of clutch performance, attentional theories and
659 the self-presentation model do not account for the range of potential responses to pressure
660 that may lead to clutch performance.

661 The Integrated Model of Flow and Clutch States (Swann et al., 2017b, 2019) was
662 employed in six studies, and describes the occurrence and experience of clutch states. Whilst
663 this model emerged from a primarily qualitative methodology based on inductive analysis,
664 and is to undergo harsher tests (e.g., experimental designs), it does outline a process of
665 occurrence for clutch states. Importantly, these predictions can be tested and, if unsupported,
666 falsified. It remains unclear, however, if clutch states are inherent to clutch performance, and
667 vice versa. As with attentional theories and the self-presentation model, the Integrated Model
668 of Flow and Clutch States (Swann et al., 2017b, 2019) only provides a partial explanation of
669 clutch performance (i.e., based on clutch states). Lastly, a third of the included studies ($n = 9$)
670 employed no theoretical framework for clutch performance. This both limits the utility of
671 these studies (i.e., cannot adequately explain and predict phenomena; Bacharach, 1989), and
672 highlights that a notable quantity of clutch performance research has been atheoretical. In
673 summary, current theories and conceptual models do not offer complete explanations of
674 clutch performance. Future research, therefore, needs to work towards development of a
675 specific theory of clutch performance.

676 **Methodological Critique**

677 Broadly defined constructs lacking in specificity and clarity may result in disparate
678 measurement (Wacker, 2004). The impact of unclear definitions of clutch performance is

679 evident in the extent to which measurement has been approached inconsistently. Clutch
680 performance was examined as an ability in just over half of the included studies, which
681 primarily involved utilising archival designs. Measurement of performance in archival
682 designs ranged from comparing performance within the same game (e.g., Wallace et al.,
683 2013) to comparing performance with a career average (e.g., Cao et al., 2011), highlighting
684 the unclear nature of what benchmark clutch performance should be compared against.
685 Further, archival studies did not directly measure pressure. Instead, pressure was treated as a
686 categorical variable that was inferred from the performance situation (i.e., it was assumed all
687 athletes experienced the same amount of pressure in certain situations, such as all games
688 within a Grand Slam tournament; Jetter & Walker, 2015). Indeed, only one study (Otten &
689 Barrett, 2013) justified why the performance situation (i.e., MLB playoffs) inferred pressure.
690 This general lack of measuring pressure is problematic as pressure involves a subjective
691 component (Baumeister & Showers, 1986) and, therefore, it cannot be assumed that all
692 athletes will perceive these situations in the same way.

693 The impact of unclear definitions was also evident in experimental studies that
694 examined clutch performance as an isolated episode. For example, different performance
695 thresholds were used to categorise clutch performances between experiments (e.g., Gray &
696 Cañal-Bruland, 2015). This suggests a need for consensus over the performance level
697 required for clutch performance (i.e., increased or maintained performance). Furthermore, the
698 use of psychometric measures of anxiety to assess pressure is incomplete. Whilst
699 measurement of anxiety may indicate the intensity of cognitive and somatic anxiety, this
700 provides little information regarding how, or if, pressure is interpreted facilitatively. Indeed,
701 it is not clear whether the perception of pressure necessarily results in increased anxiety.
702 Accordingly, more complete measurement of pressure is important, especially when
703 considering questions have been raised about the capability of experimental designs to

704 replicate the demands of naturalistic pressure situations (Gucciardi & Dimmock, 2008;
705 Jackson, 2013).

706 From the included studies, qualitative and mixed method approaches represent the
707 most appropriate measure of pressure at present. This is because interviews allow an in-depth
708 exploration of pressure following real-world episodes of clutch performance. These interview
709 methods, however, differed in their methodological strength. Specifically, three studies (Hill
710 & Hemmings, 2015; Hill et al., 2017; Maher et al., 2018) employed career-based interviews,
711 which ask athletes to report on events that occurred months or years in the past (Swann et al.,
712 2018). In contrast, event-focused interviews aim to interview athletes within hours or days of
713 a performance and have been suggested as a methodologically stronger alternative (Swann et
714 al., 2018). This is because event-focused interviews may reduce the risk of athletes'
715 forgetting details or presenting a biased recall (Brewer et al., 1991; Yarrow et al., 1970).
716 Accordingly, studies that employ single event-focused interviews (Jackman et al., in press;
717 Swann et al., 2017b, 2017a, 2019, 2016) may offer the most detailed and accurate qualitative
718 account of episodes of clutch performance. Studies that adopted repeat event-focused
719 interviews with the same individual (e.g., Jackman et al., 2017), meanwhile, can provide
720 insight into the consistent features underlying clutch performance, and how these features
721 may develop or diminish over time.

722 **Guiding Principles for Clutch Performance Research**

723 Findings from the current review indicate that there are significant definitional,
724 theoretical, and measurement issues within the field of clutch performance. These issues
725 centre on a lack of consensus surrounding what clutch performance is, and what it is not. As a
726 starting point in addressing these problems, we outline a number of recommendations in an
727 effort to facilitate greater conceptual clarity. Specifically, we draw on the findings of this
728 review to propose a number of guiding principles for future research on clutch performance.

729 First, clutch performance inherently requires pressure, which means that clutch
730 performance is a psychological construct. Pressure involves the presence of situational
731 incentives for optimal performance, and crucially, involves a subjective component (i.e., the
732 situation is internally appraised as important; Baumeister, 1984). Accordingly, clutch
733 performance cannot solely be measured as a behavioural outcome (such as runs scored;
734 Deane & Palmer, 2006), as this method cannot account for subjective appraisal of situational
735 importance. Measurement of pressure, therefore, is required when examining clutch
736 performance, and future research should investigate if, and through what mechanisms,
737 pressure may lead to increased performance.

738 Second, clutch performance is an isolated episode of performance – not an ability.
739 Baumeister and Showers (1986) noted that ‘pressure by definition focuses on a single,
740 present performance’ (p. 362). As discussed above, pressure is a requirement of clutch
741 performance, and hence clutch performance must be an isolated episode. Further, the current
742 review showed strong support for clutch performance as an isolated performance episode,
743 whilst evidence for clutch performance as an ability was limited. Indeed, any examination of
744 clutch ability inherently relies on first understanding singular episodes of clutch performance
745 (Hibbs, 2010). Accordingly, research should examine clutch performance as an isolated
746 performance episode, with a focus on understanding the requirements and boundaries of such
747 an episode, before investigating the notion of clutch ability.

748 Third, *positive* performance is required for clutch performance. Otten (2009) defines
749 clutch performance as ‘increased or superior performance’ (p. 582), whilst Hibbs (2010)
750 specifies a ‘successful performance’ (p. 49). Whilst the current review demonstrated support
751 for both of these positions (Gray et al., 2013; Swann et al., 2017b), several questions remain.
752 For example, when considering increased or superior performance, it is unclear what
753 magnitude performance needs to increase by, and what benchmark the performance is

754 compared against. It is also unclear as to what is required to constitute performance (e.g., is
755 increased effort, or particular components of performance, sufficient?). Using ‘successful
756 performance’, meanwhile, raises concerns over the extent to which clutch performance
757 conceptually overlaps with constructs such as coping and choking-resistance (Kaiseler et al.,
758 2009; Mesagno & Marchant, 2013). Therefore, at this stage, it is difficult to recommend the
759 position of either Otten (2009) or Hibbs (2010). Accordingly, we recommend that researchers
760 investigate *positive* performance under pressure. The intentions behind proposing the term
761 *positive* are twofold. Firstly, it acts as an umbrella term that encapsulates both increased, and
762 successful, performance. Secondly, investigating a broad range of performances is important
763 in bringing clarity to the questions raised above. For example, one line of inquiry for future
764 research may be examining what performance thresholds athletes and exercisers utilise to
765 evaluate their own performance under pressure. As such, this principle is proposed with the
766 intention to be tested, challenged and refined through future research.

767 Last, the role of perceived (i.e., positively appraised) performance should be
768 considered when evaluating clutch performance. The current review included a significant
769 body of literature that primarily reported on perceived performance (e.g., Swann et al., 2019),
770 in addition to studies that examined objective performance (e.g., Gray et al., 2013). Indeed,
771 neither Otten’s (2009) nor Hibbs’ (2010) definitions specify a distinction between perceived
772 or objective performance. As such, it is recommended future research examines both
773 objective and positively appraised performance. This principle should be adopted with an
774 emphasis on understanding how athletes and exercisers judge their own performance. That is,
775 do athletes and exercisers primarily rely on objective performance or perceived performance,
776 or a combination of both, when evaluating their own performance under pressure.

777 The four guiding principles outlined above are provided as a tentative solution
778 (Popper, 1981), and accordingly, are open to refutation. Indeed, these recommendations are

779 proposed with the aim to stimulate further debate around what constitutes clutch performance
780 and help guide future research. In summary, we recommend that researchers and practitioners
781 be critical in adopting existing definitions of clutch performance and aim to develop a refined
782 definition and theory of clutch performance.

783 **Strengths and Limitations**

784 The systematic nature of the review was a strength. Efforts were taken to ensure
785 transparency, limit author bias, and improve trustworthiness. Despite these strengths, there
786 are also several limitations of the current review that are important to note. Firstly, this
787 review excluded studies that were not in English or not in a peer reviewed journal, which
788 may have created a language and publication bias. Secondly, the focus on participants in
789 sports and exercise meant that related performance domains that may have investigated
790 clutch performance were excluded. Third, to ensure that clutch was a primary focus of the
791 study, the term clutch was only searched for in the title, abstract, and keyword field. Indeed,
792 this may partly explain the relatively low return of 27 studies that were included in the
793 present review, despite facilitation of performance under pressure being a fundamental aim of
794 sport and exercise psychology. We recognise that studies in overlapping fields may not use
795 the terminology of clutch performance, but rather more generic terminology (e.g.,
796 performance under pressure). However, to avoid the confounding of multiple concepts, and to
797 limit the amount of irrelevant studies in the screening process, the focus of the present review
798 was solely on the concept of clutch performance. Whilst the limitations of this review are
799 recognised, at all stages steps were taken to limit these, whilst some were also inherent to the
800 nature of the review question (e.g., a focus on sport and exercise).

801 **Conclusion**

802 The concept of clutch performance has experienced a substantial increase in research
803 attention and activity over the last decade. This review demonstrated, however, that there are

804 significant definitional, conceptual, and measurement issues within the field. Specifically,
805 there appears to be a lack of clarity regarding what clutch performance is, and what clutch
806 performance is not. In response, four guiding principles were provided as a tentative solution
807 (Popper, 1981). In putting forth these principles, we seek to open debate around the concept
808 of clutch performance in an effort to move the field forward. Indeed, definitional and
809 conceptual refinement is essential to facilitate appropriate measurement of clutch
810 performance, and in turn, move the field closer to its' overarching aim: to help individuals
811 perform positively under pressure.

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