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PERFORMANCE SLUMPS IN SPORT: A SYSTEMATIC REVIEW

Abstract

The systematic review explored the under-researched experience of performance slumps in sport with four objectives: (i) review definitions of a performance slump; (ii) identify known causes of a performance slump; (iii) identify the symptoms athletes present when in a performance slump; and (iv) review approaches used to combat a slump in performance. Literature searches into three databases (PsychARTICLES, PsychINFO and SPORTDiscus) resulted in the inclusion of quantitative ($n = 14$) and qualitative ($n = 4$) empirical research studies. The findings were thematically analysed and narratively synthesised. Results showed that: (i) definitions of a performance slump vary; (ii) perceived expectations for success and athletes attributing poor performance to something about themselves have been empirically verified as performance slump causes; (iii) during a slump, athletes might display a range of emotional and psychological symptoms and/or adopt skill-focused attention; and (iv) athletes reported several ways of coping with a performance slump, and research has offered succeeding under pressure as a potential route out of a slump. This systematic review highlights the need for empirical investigation of the performance slump phenomenon. Future studies should be directed towards understanding the prominent symptoms athletes experience during the slump, so that cause, context, competitor and symptomatic dependant intervention strategies can be designed.

Keywords: performance slumps, sport, athletes, systematic review

Introduction

In sport, the term ‘performance slump’ is commonly used to describe a prolonged shortfall in an athlete’s performance (Goldberg, 1998) and has been used to describe the form of high-profile professional athletes across different sports. In June 2017, following defeat in the French Open and falling to number 3 in the world rankings for the first time since 2011, Novak Djokovic was suggested to be in a performance slump (Davis, 2017). Lionel Messi was said to be enduring a slump in January 2018, after failing to score a goal in four consecutive games (BeSoccer, 2018), while Tiger Woods was branded with the slump tag in 2011 after not winning on tour for 107 weeks (Donohue, 2013).

A ‘performance slump’ has been described as a natural, unavoidable, and stressful circumstance (Goldberg, 1998), that appears and disappears for unknown reasons (Goldberg, 1998). Taylor (1988) defined a performance slump as: *“an unexplained decline in performance from a previously determined baseline level of a particular athlete that extends longer than would be expected from normal cyclic variations in performance in a given sport”* (p.40) and proposed a three-step slump identification procedure. First, compare current performance level with average performance to identify variation from ‘normal’. Second, assess the significance of the variation and identify a meaningful change from normal cyclic variations. Third, objectively review the athlete's performance and training environment to diagnose the cause of the decline in performance. Despite the clarity offered by Taylor, empirical research appears to define a performance slump in subtly different ways. The first objective of this paper is to review the definitions of performance slumps used to empirically study the phenomenon in sport.

Researchers agree that potential causes of performance slumps are wide ranging (Goldberg, 1998; Grove, 2004), and may include: (i) physical deficiencies, such as injury and overtraining; (ii) psychological factors, including deficiencies in confidence and having

unrealistic expectations of one's capabilities; (iii) behavioural problems, for example, not maintaining routines and self-handicapping – *“any action or choice of performance setting that enhances the opportunity to externalize (or excuse) failure and to internalize (reasonably accept credit for) success”* (Jones & Berglas, 1978; p.406); (iv) environmental influences, such as motivational climate and non-sport stressors; (v) technical difficulties, including problems with skill acquisition and refinement; and (vi) problematic coach-athlete relationships (Goldberg, 1998). As such, the second objective of this paper was to empirically categorise the prominent causes of performance slumps in sport.

Researchers (e.g., Taylor, 1988; Grove, 2004) have claimed that athletes suffer from a range of symptoms when experiencing a performance slump, such as frustration – *“irritable distress in response to limitation, exclusion, and failure”* (Jeronimus & Laceulle, 2017; p.1), stress – *“psychological stress is a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being”* (Lazarus & Folkman, 1984; p.19), anxiety – *“an unpleasant psychological state in reaction to perceived stress concerning the performance of a task under pressure”* (Cheng, Hardy & Markland, 2009; p.271) and helplessness – a feeling of inability to escape after experiencing several negative situations (Cashmore, 2002). For athletes and practitioners, it is important to be able to diagnose a performance slump and tailor interventions to treat the symptoms athletes present. The third objective of this paper was to compile a list of potential symptoms that have emerged from the empirical study of the performance slump phenomenon in sport.

Much of the literature has focused on how to overturn slumps in performance (e.g., Goldberg, 1998; Taylor, 1988). For example, Goldberg (1998) provides a 10-step program which includes methods such as goal-setting, imagery and developing mental toughness. The

final objective of this paper was to identify the methods athletes adopt as ways of coping with a performance slump and critically review empirically tested intervention strategies.

In summary, although the term performance slump is ingrained in the vernacular of sport, the literature gives the impression that the phenomenon is poorly understood. The first review of the area (Taylor, 1988) concluded that although the phenomenon was considered (e.g., Bennett & Pravitz, 1987; Henschen, 1986), there was no evidence of “*theory-building and no empirical study of its antecedents or outcomes*” (Taylor, 1988; p.40). This view has appeared to change little over the years (Kim et al., 2014). Therefore, a comprehensive account of research into the performance slump phenomenon is pertinent. To this end, a systematic review of the empirical literature was completed with four specific objectives: (i) to review definitions of a performance slump; (ii) to identify known causes of a performance slump; (iii) to identify the symptoms athletes present when in a performance slump; and (iv) to review approaches used to combat a slump in performance.

Methodology

The *Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocols* (PRISMA-P; Moher et al., 2015) was consulted for the development of a methodological and analytical protocol. In addition, the approach took methodological guidance from Swann, Keegan, Piggott and Crust (2012), *Centre for Reviews and Dissemination* (CRD, 2009) and *The Cochrane Handbook* (Higgins & Green., 2011) to enhance reliability (Chan et al., 2004; Dwan et al., 2013; Kirkham, Altman & Williamson, 2010).

Inclusion and Exclusion Criteria

The following inclusion and exclusion criteria were applied: (i) published peer-reviewed empirical research studies; (ii) published in English language; (iii) published before September 26th 2021 (when the search was completed); (iv) contain a specific reference to performance slumps in the title, abstract or keywords; (v) relate to athletes at any level of sport; and (vi)

contain empirical data that is pertinent to the objectives of the study (i.e., studies were omitted that referenced performance slumps but did not report data that informed one or more of the objectives).

Searching Process

The research objectives were broken down into keywords, search terms and phrases in order to begin searches of the PsychARTICLES, PsychINFO and SPORTDISCUS databases (Smith, 2010). We *sampled* each return for relevance and *mined* to produce a comprehensive set of search terms and phrases for exploration (CRD, 2009; Smith, 2010; Weed, Coren & Fiore, 2009). The search terms applied to the databases included:

Slumps

AND

(Sport* OR Streak* OR Perform* OR Athlet* OR Psych* OR Experienc*)

NOT

(Medic* OR Business OR Finan* OR Injur*)

The searching process was iterative, and at each stage studies were carefully considered against the inclusion and exclusion criteria.

Search Findings

The searching process resulted in the inclusion of quantitative ($n = 13$) and qualitative ($n = 4$) empirical research studies. Hand-searching the reference lists of relevant articles (CRD, 2009; Higgins & Green, 2011) resulted in the addition of one more appropriate study, resulting in the inclusion of 18 empirical studies in total. A full breakdown of the searching process can be seen in Figure 1.

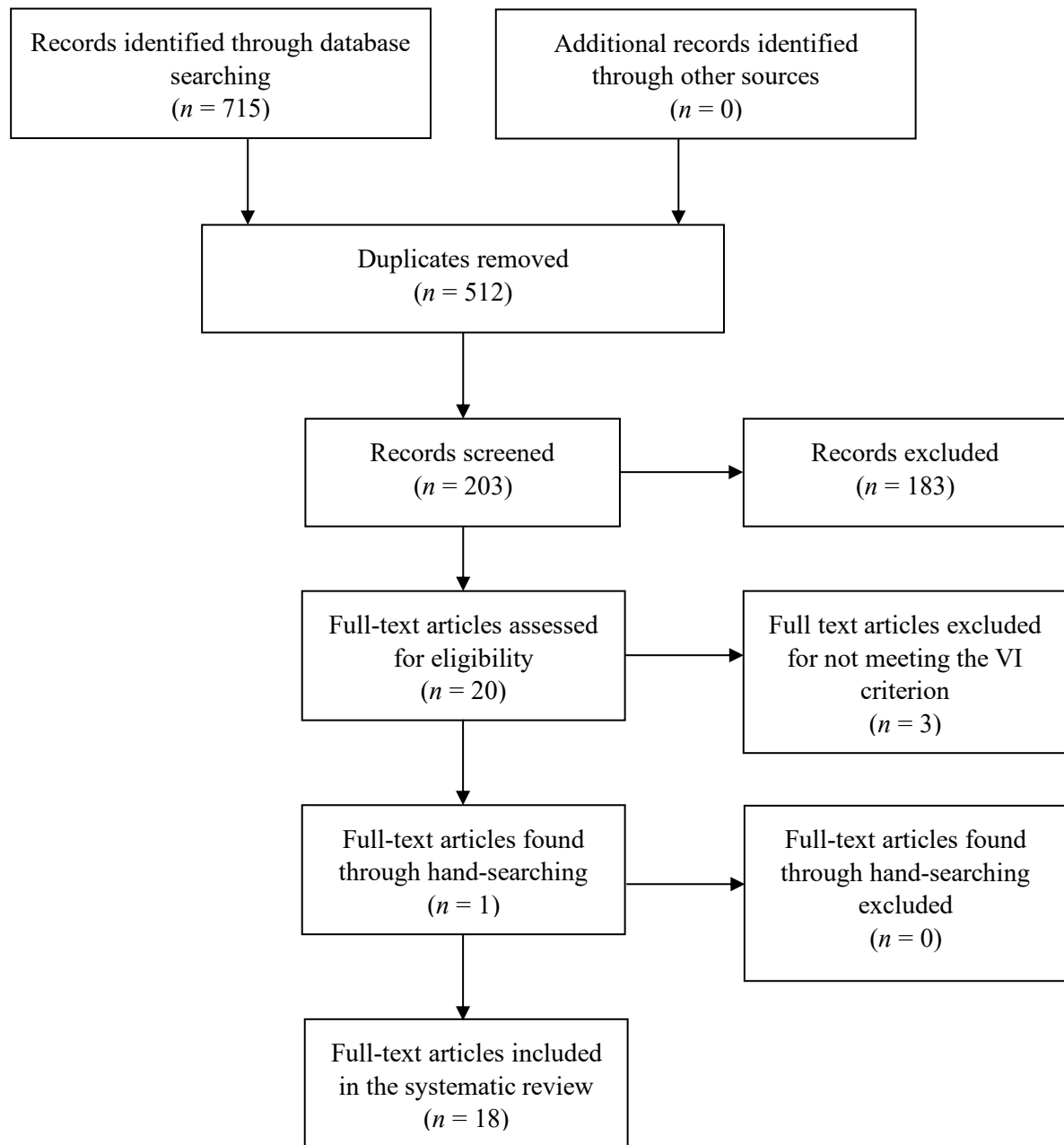


Figure 1. PRISMA flow diagram of the searching process.

Expert Panel

Three academic researchers with expertise in psychological aspects of sport performance and systematic reviews volunteered to members of an expert panel. Each panel member received a comprehensive audit trail, which consisted of the inclusion criteria, search terms, searches

conducted, and the studies identified for inclusion. The experts were asked to assess the suitability of the inclusion criteria; provide any additional search terms for further exploration; and evaluate the list of identified studies to ensure no key studies were missed. All experts independently approved the searching process and the studies identified for inclusion in this review. Additional search terms were recommended and applied in subsequent searches, but no other study was identified.

Data Synthesis

Thematic analysis was used to synthesise the findings (Pope, Mays & Popay, 2007). The four research objectives were used in a deductive approach to the analysis. Then an inductive thematic analysis identified prominent themes (CRD, 2009). Although most findings came from quantitative studies (14 of 18), the diverse nature of the methods, measures and outcomes employed suggested that a meta-analysis was not appropriate. Instead, a narrative approach to data synthesis, which allows the incorporation of both quantitative and qualitative studies was applied (Mays, Pope & Popay, 2005; Snilsveit, Oliver & Vojtkova, 2012).

Results

Each study was categorised according to the pertinence of the research design and findings to the four research objectives: 13 studies defined a performance slump (Ball, 2013; Brown, Butt & Sarkar, 2019; Dunn et al., 2014; Eklund, Grove & Heard, 1998; Gray & Allsop, 2013; Grove & Heard, 1997; Grove et al., 1997; Grove & Stoll, 1999; Kim et al., 2014; Madden, Kirkby & McDonald, 1989; Madden, Summers & Brown, 1990; Prapavessis & Grove, 1995; Prapavessis et al., 2003); 3 studies identified causes of performance slumps (Ball, 2013; Conroy & Benjamin, 2001; Tamminen et al., 2013); 8 studies reported symptoms experienced during a performance slump (Brown et al., 2019; Conroy & Benjamin, 2001; Gray, 2004; Gray & Allsop, 2013; Grove et al., 1997; Grove & Stoll, 1999; Kim et al., 2014; Tamminen et al., 2013); and 12 studies included data related to combatting performance slumps (Brown et al.,

2019; Dunn et al., 2014; Eklund et al., 1998; Gray & Allsop, 2013; Grove & Heard, 1997; Kolt, Kirkby & Lindner, 1995; Madden et al., 1989, 1990; Maniar et al., 2001; Prapavessis & Grove, 1995; Prapavessis et al., 2003; Tamminen et al., 2013). A breakdown of the results in each study and the methods employed can be seen in Table 1.

Definitions of a Performance Slump in Sport

A performance slump in sport has been introduced to participants as: “*athletes experience an unexpected...decrease in their performance*” (Kim et al., 2014; p.137); “*unexpected declines...where you could not seem to reach your normal performance standards*” (Dunn et al., 2014; 306); and “*a time when you cannot seem to do anything right*” (Grove et al., 1997; p.100; see also, Ball, 2013; Eklund et al., 1998; Grove & Heard, 1997; Grove & Stoll, 1999; Madden et al., 1989; Madden et al., 1990; Prapavessis & Grove, 1995; Prapavessis et al., 2003). Furthermore, Ball (2013) framed the concept by asking a sample of national or international athletes ($n = 70$) from a variety of individual sports (e.g., swimming, tennis) and team sports (e.g., football, basketball) “*how often in the past have you experienced unexplained slumps in your sporting performance*” (p.237), but did not elaborate on what *unexplained* referred to. In response to the question, 23% of athletes reported that an unexplained slump was a frequent problem, 54% reported it was an infrequent problem and 23% stated it was hardly ever or never a problem.

The timeframes attached to a performance slump experience were either generic, such as “*prolonged*” (Kim et al., 2014; p. 137), “*a few days*” (Dunn et al., 2014; p.306) or “*some weeks*” (Grove et al., 1997; p.100) or specific to the context, such as “*a period that went beyond four or five [cricket] innings of lower-than-expected performance*” (Brown et al., 2019; p.7). Gray and Allsop (2013) took a data driven approach to define a performance slump in baseball. After completing 20 at-bats (with a 5-minute break in between each at-

bat), athletes who scored: “<7 hits; batting average of .300 or less” (p.371), were deemed as being in a performance slump.

Known causes of a Performance Slump in Sport

Causes of a performance slump were reported (Ball, 2013; Conroy & Benjamin, 2001; Tamminen et al., 2013). An intercollegiate and international male swimmer shared that he fell into a performance slump after perceiving that his performances after his “*best race ever*” (Conroy & Benjamin, 2001; p.114) never lived up to *his* expectations. An interpretative phenomenological analysis of interviews investigating experiences of adversity in international level female athletes across a variety of sports (e.g., track and field, swimming and long-distance running) found a track and field athlete who attributed a performance slump to the “*perceived expectations for success*” (Tamminen et al., 2013; p.32) of significant others. Ball (2013) administered the Causal Dimension Scale (CDS-II, McAuley, 1992) to high level athletes who were asked to complete the scale with respect to a recent negative sporting performance. A regression analysis found that the number of prior unexplained slumps reported by athletes was predicted by the extent the performance outcome was perceived to be caused by the athlete’s own behaviour (i.e., locus of causality, $\beta = .17, p < .05$) and the likelihood of athlete’s internal attribution to change or influence one’s behaviour over time (i.e., stability, $\beta = .47, p < .001$).

Symptoms athletes present when in a Performance Slump

Psychological symptoms

The relationship between performance slump appraisal and perceived stress was investigated by Grove and Stoll (1999). They found that the strongest predictor of perceived stress was appraisal of a slump as a perceived loss, although perceived threat and perceived challenge appraisals were also significant predictors. That is, stress was elevated no matter how the slump was appraised. Grove and Stoll (1999) also found that the more athletes believe that

they can control the cause of the slump the lower the perceived stress they experience. Brown et al. (2019) reported that cricket batters suffering from a performance slump midseason were unable to cope with the stress of the slump, and as a result, lost their place in the team. In addition, players close to retiring lacked the motivation to deal with the stressful experience of the slump as they had fulfilled their career goals (Brown et al., 2019).

Conroy and Benjamin (2001) discussed that a male intercollegiate and international swimmer consistently compared his performances to his “*best race ever*” (p.114) which made him fall into a performance slump. The athlete felt an inability to cope, considered quitting the sport, suffered motivation problems and doubted his capabilities to achieve his dream of swimming at the Olympics. It was reported that his conscious thought to perform optimally was overridden by his subconscious thought to protect his “*best race ever*”. As such, the swimmer’s preparation for future performances was affected due to a fear that his performance would not live up to his “*best race ever*” (Conroy & Benjamin, 2001).

Tamminen et al. (2013) reported that an occurrence of a slump caused one female track and field athlete to isolate herself from others and led her to question her ability and athletic identity. Brown et al. (2019) also reported that cricket batters doubt their capabilities when in a performance slump. At the same time, batters reported experiencing negative emotional responses, such as anger, frustration, under-arousal, over-arousal, and a drop-in confidence and motivation. Furthermore, batters recalled “*poor judgment,*” “*loose shots,*” and “*mental blocks*” that were identified as symptomatic of batting slumps” (Brown et al., 2019, p10).

Attentional Focus

Gray (2004) found that skilled baseball batters’ capability to recall the position of their bat when a tone sounded during the bat swing was associated with the level of their batting

performance across the preceding 24 pitches; the lower the performance level, the fewer judgement errors made. Gray and Allsop (2013) later corroborated this finding by showing that skilled batters deemed to be enduring a cold streak (or performance slump) were inclined to make fewer judgement errors than batters in a normal or hot streak. They concluded that *“batters in the cold streak group had a more inward attentional focus”* (p.380).

Employing a neurophysiological approach (Electroencephalography, EEG) Kim et al. (2014) measured frontal theta power of high-school student athletes while they fixated a cross on a computer monitor. The authors rationalised interest in frontal theta power because of its association with cognitive control and attention, mental fatigue, and depression (Cohen & Donner, 2013; El Badri et al., 2001; Tanaka et al., 2012). The analysis compared athletes who were classified as encountering or not encountering a slump according to their response to a subjective questionnaire. Lower frontal theta power was reported for athletes who were encountering a performance slump.

Approaches used to counter a slump in performance

Eleven studies have captured the approaches athletes commonly adopt to cope with a performance slump (Brown et al., 2019; Dunn et al., 2014; Eklund et al., 1998; Grove & Heard, 1997; Kolt et al., 1995; Madden et al., 1989, 1990; Maniar et al., 2001; Prapavessis & Grove, 1995; Prapavessis et al., 2003; Tamminen et al., 2013). In addition, a single experimental study proposed a performance slump intervention (Gray & Allsop, 2013).

Ways of Coping with a Performance Slump

Madden et al. (1989) found that competitive male and female middle-distance runners (competing at international, national or state level) reported the use of problem-focused coping strategies, social support and increased effort and resolve (e.g., resilience) to overcome slumps in performance, with international athletes tending to favour problem-

focused coping strategies. Likewise, Madden et al. (1990) found that basketball players who appraised competitive situations as stressful were more likely to use problem-focused coping strategies, whereas those who were less inclined to view competitive situations as stressful were more likely to utilise increased effort and resolve, social support, and wishful thinking when coping with slumps in performance. Kolt et al.'s (1995) sample of female and male gymnasts also reported using increased effort and resolve, seeking social support and adopting wishful thinking, as well as becoming problem focused when dealing with performance slumps. In addition, female athletes were more likely to seek social support and portray wishful thinking in comparison to the males sampled in previous studies (e.g., Madden et al., 1989, 1990). This finding is consistent with Tamminen et al.'s (2013) study where a female athlete reflected on the positive impact of social support from teammates and her coach.

In Prapavessis and Grove's (1995) study, a total of 120 coping strategies were reported by junior ($n = 62$) and semi-professional athletes ($n = 55$). The two samples agreed that the most effective strategies were those directed to technical components of the task (e.g., breaking down the execution of a skill) or to adopting a positive mental approach (Prapavessis & Grove, 1995). Junior athletes were particularly inclined to attend to technique but relied on technical knowledge that was less specific than their semi-professional counterparts. Junior athletes were also more inclined to seek help from others, including players, coaches and psychologists. Some junior and semi-professional athletes did claim, however, that their response to a performance slump was to simply let it run its course without intervention. In associated work, Maniar et al. (2001) found that student-athletes were inclined to seek assistance when experiencing a midseason slump and were more inclined to consult coaches or family members than dedicated mental health professionals (e.g., counsellors or psychologists). Females were more prone to seek support than males.

Finally, Maniar et al. (2001) reported that student-athletes favoured method for dealing with a slump was goal-setting or imagery.

Several players interviewed by Brown et al. (2019) also reported adopting cognitive-behavioural methods, such as imagery and positive self-talk. Others discussed the importance of peer support. Moreover, the development of resilience through determination, work ethic, confidence and competitiveness were considered important; as was awareness of player strengths as it was thought to enable them to successfully plan and implement a route out of the slump, particularly if the slump occurred towards the end of the season (Brown et al., 2019). It was also found that batters who appraised their performance slump as a natural occurrence, benefitted from the reduction in cognitive and emotional responses that allowed players to increase their concentration and determination, as well as develop their self-awareness (Brown et al., 2019). Finally, Brown et al. (2019) identified that experience has a role in the capability of players to cope with a performance slump. Players reflected that in the early stage of their career they “*lacked the resources (e.g., confidence)*” (p.12) to deal effectively with the slump experience.

Three papers studied the effect of personality and individual differences on the preferred coping methods of athletes. Prapavessis et al. (2003) conducted two studies on how means of coping with performance slumps was affected by self-handicapping. Athletes who self-handicap were prone to use emotion-oriented coping (e.g., self-blame and self-absorption; Study 1 & 2), which were perceived as more meaningful than problem-focused strategies (Study 2). Moreover, denial, avoidance and wishful thinking strategies were reported by self-handicapping athletes (Study 1 & 2). Grove and Heard (1997) found that inclination to adopt task-orientated (i.e., problem-focused) coping strategies was a positive predictor of the personality traits of optimism and sport-confidence, whereas emotional-orientated coping tendencies were negative predictors of both personality constructs. More

recently, Dunn et al. (2014) found that intercollegiate female volleyball athletes classified as healthy perfectionists (less than perfect performance is not a major cause for concern) also tended to prefer a problem focused coping strategy (e.g., increased effort) to deal with a slump. In contrast, unhealthy perfectionists, who are inclined to display anxiety about avoiding failure and doubt about their own abilities (Rice & Ashby, 2007; Stoeber & Otto, 2006; Stoeber, 2011), tended to report avoidance coping methods, such as behavioural disengagement. Both healthy and unhealthy perfectionists reported a preference to engage in planning activities. In contrast, athletes classified as non-perfectionists were less likely to engage in planning a way out of the performance slump, and less inclined to increase their effort and display determination when experiencing a slump in their performance.

Psychometric inventories of performance slump related coping

The study of the ways athletes might cope with a slump in performance has included the development of two psychometric inventories that were based on measures formerly developed to capture how individuals deal with stress, namely the Ways of Coping Sport scale (WOCS) and the Coping Orientation to Problems Experienced (COPE) inventory. Grove et al. (1997) investigated the validity of the 8-factor WOCS (Madden et al., 1989, 1990) by sampling 630 athletes from a range of sports. Confirmatory analysis found no evidence to support Madden et al.'s (1989, 1990) 8-factor structure which consisted of: increased effort & resolve, wishful thinking, seeking social support, problem-focused coping, emphasising the positive, denial, general emotionality and detachment. Instead, Grove et al. (1997) proposed a 4-factor solution that comprised of seeking social support, denial/avoidance, wishful thinking and effort/resolve, but *not* problem-focused coping. Eklund, Grove and Heard (1998) performed confirmatory factor analysis of responses to the original COPE Inventory (Carver, Scheier & Weintraub, 1989) and a modified sport-specific version (MCOPE; Crocker & Graham, 1995) by separate samples of local league to

international level athletes from team and individual sports. A 14-factor COPE (COPE-14AP) inventory and a 10-factor MCOPE inventory was found to provide the best accounts of the data (Eklund et al., 1998). The eight ways of coping with a performance slump that were shared by the two inventories were: active coping/planning; suppression of competing activities; venting emotions; denial; behaviour disengagement; humour; and emotional and instrumental social support. In addition, the COPE-14AP model included ways of coping associated with positive reinterpretation, religion, acceptance, mental disengagement, restraint, and alcohol or drug use, whereas, the MCOPE-10 included additional ways of coping associated with self-blame and increased effort.

In conclusion, athletes have reported a range of cognitive, psychological, and social methods to cope with their performance slumps. These include: problem-focused coping (Dunn et al., 2014; Grove & Heard, 1997; Madden et al. 1989, 1990), increased effort and resolve (Kolt et al., 1995; Grove et al., 1997; Madden et al. 1989, 1990), social support (Brown et al., 2019; Kolt et al., 1995; Madden et al., 1989, 1990; Maniar et al., 2001; Tamminen et al., 2013), emotion-orientated coping (Prapavessis et al., 2003), denial (Grove et al., 1997; Prapavessis et al., 2003), avoidance coping (Grove et al., 1997; Dunn et al., 2014; Grove et al., 1997; Prapavessis et al., 2003), wishful thinking (Grove et al., 1997; Kolt et al., 1995; Madden et al., 1990; Prapavessis et al., 2003), technical refinement (Prapavessis & Grove, 1995), goal-setting (Maniar et al., 2001; Prapavessis & Grove, 1995), imagery (Brown et al., 2019; Maniar et al., 2001; Prapavessis & Grove, 1995), positive self-talk (Brown et al., 2019) and a positive mental approach (Prapavessis & Grove, 1995). In addition, researchers have developed psychometric measures (WOCS-4, COPE-14AP, MCOPE-10) to capture ways of coping with performance slumps (Eklund et al., 1998; Grove et al., 1997).

Succeeding Under Pressure

Gray and Allsop (2013) had skilled baseball players perform a simulated batting task. They found that players experiencing a cold streak (i.e., performance slump) were more aware of the position of their bat when a tone sounded than players in a normal or hot streak. However, when players in a cold streak succeeded under pressure their batting average subsequently improved; that is, *“succeeding under pressure served to break them out of their cold streak”* (Gray & Allsop, 2013; p.376).

Discussion

Defining a Performance Slump

The first aim of this systematic review was to review definitions of a performance slump used for empirical research. Taylor’s (1988) original definition of a performance slump in sport - *“an unexplained decline in performance from a previously determined baseline level of a particular athlete that extends longer than would be expected from normal cyclic variations in performance in a given sport.”* (p.40) - infers that two criteria must be met to classify a decline in performance as a slump: (i) the decline should be unexplained and (ii) the decline extends for longer than would be expected.

The first criterion is perpetuated by commentators such as Grove (2004): *“The inability to pinpoint a specific cause for the extended period of poor performance is an important phenomenological aspect of performance slumps. Frequently (but not always), there is no apparent explanation for the performance deterioration”* (p.834). However, researchers have asked athletes to state the main reason a performance slump had occurred (Grove & Stoll, 1999), and athletes appear able to posit the cause of a slump (Tamminen et al., 2013) and reflect on how much control the athlete had over the cause (Grove & Stoll, 1999). Therefore, the 23% of athletes sampled by Ball (2013) who reported that they rarely or never experienced an unexplained slump might have claimed so because they were able to

attribute a cause to their decline in performance. The research implies that Taylor's (1988) original definition should be adapted to reflect the possibility that athletes may be able to explain their decline in performance. As such, we propose an updated definition of a performance slump in a sporting context: *substandard athletic sport performance that extends longer than would be expected from normal cyclic variations in performance, and where the knowledge of the cause is either hidden or apparent to an individual and/or coach.* The current state of empirical research prevents specification of the longevity of substandard performance that denotes a performance slump, which suggests the second criteria within Taylor's (1988) definition – the decline extends for longer than would be expected – should be retained as a sensible working definition.

Data driven approaches to capture the effects on attention of a temporary slump in performance across a single data collection session (Gray, 2004; Gray & Allsop, 2013) are more in keeping with the concept of a performance block – an interim loss of control and inhibited execution of movements (Bennett et al., 2015). The point at which a performance block becomes a performance slump is unclear, and is likely specific to the performance context (e.g., innings in cricket, Brown et al., 2019) and the interpretation of athletes (Ball, 2013).

Causes of Performance Slumps

Common causes of performance slumps have been proposed by researchers, such as injury (Taylor, 1988), lack of confidence or resilience (Goldberg, 1998) and compromised skill acquisition (Grove, 2004); however, possible causes of slumps emerging from the review were limited to an athlete's perceived expectations for success (e.g., Conroy & Benjamin, 2001; Tamminen et al., 2013) and what the athlete attributes a slump to (Ball, 2013).

The female track and field athlete interviewed by Tamminen et al.'s (2013) identified expectancies of significant others as a cause of a performance slump. However, expectations

for performance excellence can be derived from a range of external sources and may not be limited to the athlete's immediate support network. Ball (2013) reported that the extent that athletes attributed a recent poor performance to themselves, and the stability of the attribution were predictors of the number of (unexplained) performance slumps experienced. These findings should be treated with caution given the difficulty to establish temporal precedence within the cross-sectional design of the study. Put simply, it is unclear within the data as to whether internal attributions cause performance slumps, or whether they become prevalent when an athlete is in a performance slump. Nonetheless, internal attributions for negative performances, particularly ones that are stable, may lead to deficiencies in motivation and confidence that harm performances (Hanrahan & Biddle, 2008; Rees, Ingledew & Hardy, 2005) and may increase the likelihood of a performance slump occurring (Ball, 2013). However, Grove and Stoll (1999) found that the more athletes believe that they are in control of the cause of the slump the lower the perceived stress they experience. Lower levels of stress may free an athlete's resources to identify and implement strategies to navigate out of a slump (Brown et al., 2019).

Overall, the empirical evidence is consistent with the view that causes of slumps in sporting performance are largely unknown (Kim et al., 2014). Anecdotal appraisals attribute performance slumps to factors frequently associated with acute declines in performance such as anxiety, stress, burnout and a drop-in confidence (e.g., Goldberg, 1998). Empirical investigation into whether such factors precipitate more chronic declines in performance seems a logical place to direct research efforts.

Symptoms of Performance Slumps

From the interviews of cricket batsmen conducted by Brown et al. (2019) a range of slump symptoms emerged; many of which corroborated existing empirical findings. Specifically,

doubting one's capabilities is consistent with the recollection of a female track and field athlete who began to question their ability and identity as an athlete (Tamminen et al., 2013). A loss of judgement implies either a deficit in attention (Kim et al., 2014) or a change in attentional focus, such as the shift toward monitoring automated and well-developed skills (Gray, 2004; Gray & Allsop, 2013). Finally, the perception of stress is common to both the batsmen in Brown et al.'s (2019) study and the athletes surveyed by Grove and Stoll (1999) who showed that feelings of stress were heightened regardless of whether the slump was appraised as a loss, threat or a challenge. It remains to be seen if such symptoms become more deeply embedded within the athlete as experiences of performance slumps accumulate (Ball, 2013).

The majority of studies assume that the retrospective recall of events by athletes was accurate. The exception was Gray and colleagues (Gray, 2004; Gray & Allsop, 2013) attempt to experimentally capture the symptoms of athletes enduring a loss of form; however, data was collected in relation to a sustained drop in performance in a single session (a performance block) rather than a decline in performance that was outside normal cyclic variations. In addition, Kim et al.'s (2014) findings – athletes in performance slumps possess lower frontal theta power – should be met with caution for two reasons. Firstly, athletes were categorised into a slump group and a non-slump group via a subjective questionnaire. And secondly, the EEG measures taken within the study were not performed within a sporting context.

Therefore, it seems necessary to investigate whether the symptoms identified by this systematic review, which are thought to arise because of sustained periods of poor performance (in different sports/contexts) are prominent when athletes are actually in the midst of a performance slump. Better understanding of the symptoms of a performance slump

will help researchers clarify the defining features of a slump, identify the potential causes and design and test targeted intervention strategies.

Dealing with Performance Slumps

This systematic review found that the main avenue of investigation into performance slumps centred on the approaches adopted by athletes to counter a slump in performance. Maniar et al. (2001) reported a preference for student-athletes to use imagery and goal-setting when in a slump. Setting specific goals enhances performance (Locke & Latham, 2002), builds self-confidence (Weinberg, Butt & Knight, 2001; Zimmerman, 2008) and develops mental resilience (Connaughton, Hanton & Jones, 2010). Similarly, mental imagery can establish or increase confidence (Munroe-Chandler & Hall, 2004) and has been found to benefit elite level performance (Hardy & Callow, 1999; Morris, Spittle & Watt, 2005). Therefore, many of the interventions commonly adopted by athletes to tackle a performance slump may be broadly considered effective.

Three studies used the formative 8-factor WOCS (Madden et al., 1989, 1990; Kolt et al., 1995; see Table 1), which has been criticised as the factors were derived from a single analysis on a small sample of basketball athletes (Grove et al., 1997), which might explain inconsistencies across samples (Gaudreau & Blondin, 2002) and issues of applicability and specificity (Ben-Porath, Waller & Butcher, 1991). Currently, Grove et al.'s (1997) 4-factor WOCS scale and Eklund and colleagues (1998) COPE-14AP and MCOPE-10 appear suitable means of capturing athletes slump-related coping methods. The administration of these scales to athletes in the midst of a performance slump coupled with performance tracking would offer greater insight into the effective means of curtailing prolonged declines in performance.

Athletes have cited "*internal-mental*" and "*internal-technical*" strategies as ways of coping with a performance slump (Prapavessis & Grove, 1995; p.18). Internal-mental

methods like ‘avoiding negativism’ or causal attribution retraining (Ball, 2013) are psychological skills that have been shown to be effective in helping athletes to respond to events that are appraised negatively (Le Foll, Rasclé & Higgins, 2008). Given that a performance slump event may often be appraised negatively (Grove & Stoll, 1999), internal-mental strategies seem a reasonable intervention to develop and test.

Internal-technical methods, such as ‘returning to basics’ (e.g., breaking down the skill), are consistent with the experimental finding that athletes who were experiencing a temporary loss of form (a cold streak) were more inclined to monitor key components of the skill (Gray, 2004; Gray & Allsop, 2013). Gray and Allsop (2013) hypothesised that baseball batters in a cold streak tended to adopt an internal attentional focus in an attempt to find a technical solution. Previous research has often posited that anxiety provokes athletes to attend to their movements to the detriment of performance (e.g., Beilock et al., 2002) and has consistently found that an internal focus of attention, rather than an external focus, is detrimental to learning and performance (see Wulf, 2013). However, the findings of Gray and Allsop (2013) imply that skill-focused attention may not be detrimental to athletes in slumps; a finding in keeping with Carson and Collins’s (2016) Five-A Model for technical refinement. Studies have suggested expert performers should refrain from attending to their movements in order to reach optimal performance (Weiss & Reber, 2012; Wulf, 2013). However, other research has argued ‘somatic reflection’ (i.e., consciously monitoring body movements) to be a method of improving an expert athlete’s performance (Montero, 2010; Toner & Moran, 2015; Shustermann, 2011). Further work is needed to see whether attending to the skill perpetuates the problem or help lifts athletes and/or expert athletes out of the slump. Regardless, Gray and Allsop (2013) found that when athletes in performance slumps succeeded under pressure their subsequent performance improved. Given that a known symptom of performance slumps is increased stress (Brown et al., 2019; Grove & Stoll,

1999), coaches may find it relatively easy to manipulate pressure in practice while at the same time design practice activities and/or competitive experiences that promote clutch performances that break athletes out of their slump. How an athlete succeeds under pressure in order to get out of a performance slump is an important question, however, it is a question beyond the scope of this systematic review.

Future Directions

How a performance slump is conceptualised has been left open to interpretation. Future research should first be dedicated to the investigation of the relationship between context-specific drops in performance and the symptoms endured by athletes during this time. This will aid diagnosis of athletes' experiences as performance slumps and, therefore, facilitate the researching of the phenomenon. Studies should acknowledge both sport-specific performance outcome data and the lived experiences of athletes across a range of sports (Bronfenbrenner, 2005), as the mechanisms that underpin the phenomenon are likely dependent on a range of contextualised social-environmental factors.

To progress theoretical understanding of the performance slump phenomenon it may be fruitful for researchers to utilise existing conceptual frameworks. A performance slump may occur for several different reasons (e.g., depression, personal problems). However, Nieuwenhuys and Oudejans' (2012; 2017) model of the anxiety-performance relationship provides a scaffold onto which some of the empirical findings reported by this systematic review can be attached. The model proposes that the interaction between situational factors and individual dispositions can raise anxiety and lead to the greater deployment of attentional resources to the task at hand. When extra attention is assigned to goal-directed processes then expected or exceptional performance is likely *if* individuals possess the self-control to do so in the moment (Englert, 2017). However, *if* attention becomes attracted to threats to performance (e.g., loss of resources, Grove & Stoll, 1999) then declines in performance will

likely result. The performance slump-related literature reviewed presents evidence that anxiety is raised during a slump experience (Brown et al., 2019; Grove & Stoll, 1999) regardless of whether the slump was perceived as a threat, loss or challenge (Grove & Stoll, 1999). How then an athlete appraises their performance slump may dictate the extent and direction of the extra attentional resources invested. If an athlete believes they can control the slump by lowering anxiety (Grove & Stoll, 1999) or adopt coping strategies that are goal-directed (or task-orientated, Grove & Heard, 1997) they may accumulate positive performances under pressure that reverse the trend of sustained substandard performance (Gray & Allsop, 2013). However, a performance slump may create an attentional deficit (Kim et al., 2014) or mental block (Brown et al., 2019) that causes athletes to become less goal-directed and more attracted to threat, demonstrated by some athletes questioning their ability and identity (Tamminen et al., 2013) or recalling other stable internally-directed negative thoughts (Ball, 2013) that may go on to elicit inefficient and potentially ineffective internal-technical strategies (Gray, 2004; Gray & Allsop, 2013). As a result, negative performances may accumulate and the performance slump may perpetuate (Ball, 2013). Existing conceptual frameworks taken from closely associated research areas may help provide structure to what we currently know about performance slumps and identify key relationships to investigate in order to better understand the phenomenon.

At the opposite end of the performance continuum lies the phenomenon of flow – “*a deeply rewarding and optimal experience characterized by intense focus on a specific activity to the point of becoming totally absorbed in it, and the exclusion of all other thoughts and emotions*” (Swann et al., 2012; p.3). Csikszentmihalyi (2002) asserts that a flow state arises from the optimal balance of challenge and skill supplemented by clear goals and unambiguous feedback. The experience of flow has been characterised as athletes experiencing: (i) a focus on the task at hand; (ii) loss of self-consciousness; (iii) action-

awareness merging (e.g., oneself is completely absorbed in tasks); (iv) a sense of control; (v) an autotelic experience (e.g., enjoyable and rewarding); and (vi) time transformation (e.g., perceiving time has speeded up or slowed down). The conditions that afford flow and the symptoms athletes demonstrate in a flow state may be the polar opposite of the conditions that induce a performance slump and the symptoms endured by an athlete in a slump. For example, rather than an autotelic experience, slumps tend to be viewed as stressful and challenging (Grove & Stoll, 1999); rather than a loss of self-consciousness, slumps may provoke skill (self-) focused attention (Gray, 2004; Gray & Allsop, 2013); rather than pursue clear goals, performers in slumps need to re-establish goals as a way of lifting them out of the slump (Maniar et al., 2001). As such, future research may wish to explore whether the concept of flow provides insight into the symptoms an athlete portrays when in a performance slump.

Conclusion

In over 30 years since Taylor's (1988) appraisal of performance slumps, a limited amount of empirical work has examined the concept. The work to date has largely focused on finding ways to fix a problem that is poorly understood. This systematic review provides a platform for future researchers to explore performance slumps in sport, in the hope that in another 30 years we have a fuller understanding of how to define a slump; the symptoms of a slump; the common causes of slumps; and cause, context, competitor and symptomatic dependant intervention strategies.

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Table 1: A summary of participants and methods from each study

Author/s	Design	Participants	Method	Main Findings
Ball (2013)	Quantitative	70 Elite Athletes (Females = 4; Males = 66; <i>M age</i> = 24.3)	CDS-II	Athletes who attribute performance decline to something about themselves are more likely to experience unexplained slumps.
Brown, Butt & Sarkar (2019)	Qualitative	14 Male Cricket Athletes. First phase of the study: 4 males (aged 22-28; <i>M age</i> = 26.52). Second phase of the study: 10 males (aged 19-42; <i>M age</i> = 27.12)	One-to-One Interviews and Focus Group	A lack of motivation, under arousal, overarousal, doubting capabilities, an inability to deal with stress, anger, drops in confidence, poor judgement, loose shots, and mental blocks were symptoms of performance slumps. Athletes adopt cognitive-behavioural methods to try alleviating the slump (e.g., positive self-talk).
Conroy & Benjamin (2001)	Qualitative	A 22-year-old male swimmer who competed at college and international level	Sport Psychology Consultation	The athlete's performance failed to live up to his 'best race ever' in his opinion causing a performance slump. Symptoms during the slump included: an inability to cope, motivation problems, doubting capabilities and a consideration to quit the sport.
Dunn, Causgrove Dunn, Gamache & Holt (2014)	Quantitative	137 Female Volleyball Athletes (aged 18-25; <i>M age</i> = 19.94)	Sport-MPS-2 and M-COPE	Healthy perfectionists favoured a problem-focused coping approach. Unhealthy perfectionists favour an avoidance approach (e.g., behavioural disengagement).
Eklund, Grove & Heard (1998)	Quantitative	Study 1 = 870 athletes (<i>M age</i> = 22.48) Study 2 = 621 athletes (<i>M age</i> = 22.24)	COPE and M-COPE	COPE-14AP and MCOPE-10 were deemed suitable psychometric measures of capturing ways of coping with performance slumps.

Gray & Allsop (2013)	Quantitative	Study 1 = 36 Male Baseball Players (<i>M</i> age = 20.9) Study 2 = 20 Male Baseball Players (<i>M</i> age = 21.7)	Experimental design study: Baseball batting simulation task	Succeeding under pressure helped athletes break out of their performance slump.
Gray (2004)	Quantitative	Study 2 = 10 Expert Baseball Players; age data was not provided.	Baseball batting simulation task	Lower the performance in the task the fewer judgemental errors were made. Batters in a performance slump adopted skill-focused attention.
Grove & Heard (1997)	Quantitative	213 Athletes. First Sample: 90 Athletes (<i>M</i> age = 22.28). Second Sample: 123 Athletes (<i>M</i> age = 22.17).	CISS; LOT; TSCI	Problem-focused strategies appeared more suitable for athletes displaying optimism or sport-confidence
Grove & Stoll (1999)	Quantitative:	591 Athletes (<i>M</i> age = 22)	CDS-II	During a performance slump stress increases regardless of how it is perceived.
Grove, Eklund & Heard (1997)	Quantitative	630 Athletes (<i>M</i> age = 21.64)	WOCS	Confirmatory analysis did not support Madden et al.'s (1989, 1990) 8-factor WOCS structure. A 4-factor solution was proposed that comprised of seeking social support, denial/avoidance, wishful thinking and effort/resolve.
Kim, Ali, Ryu, Choi, Park & Yeo (2014)	Quantitative	18 High School Student Athletes (Male = 13; Female = 5; <i>M</i> age = 17.7)	EEG; Subjective Questionnaire	Lower frontal theta power was reported for athletes encountering a performance slump.
Kolt, Kirkby & Lindner (1995)	Quantitative:	115 competitive gymnasts (83 Females, 32 Males; Female <i>M</i> age = 14.3; Male <i>M</i> age = 15.5)	WOCS	Athletes reported Increased effort and resolve, Social support, Problem-focused coping and Wishful thinking as ways of coping with performance slumps.
Madden, Kirkby & McDonald (1989)	Quantitative	20 Athletes (Females = 9, Males = 11; <i>M</i> age = 17)	WOCS	Increased effort and resolve, social support and problem-focused coping were adopted as performance slump coping methods.

Madden, Summers & Brown (1990)	Quantitative	133 Athletes (Females = 49, Males = 84, aged 15-44)	WOCS	Increased effort and resolve, social support, problem-focused coping, and wishful thinking were adopted as performance slump coping methods.
Maniar, Curry, Sommers-Flanagan & Walsh (2001)	Quantitative	60 University Student-Athletes; Age data was not collected.	APA	Coach or family support, Imagery and Goal-setting were preferred ways of coping with a performance slump.
Prapavessis & Grove (1995)	Qualitative	30 National Junior Athletes (Aged 14-18; <i>M</i> age = 16) 35 Semi-Professional Athletes (Ages 19-38; <i>M</i> age = 23.61)	Open Ended Question	Athletes adopted Internal-technical approaches (e.g., breaking down skill execution) and Internal-mental approaches (e.g., being positive) to deal with performance slumps.
Prapavessis, Grove, Maddison & Zillmann (2003)	Quantitative	Study 1 = 65 Male Athletes (<i>M</i> age = 20.45) Study 2 = 141 Male and Female Athletes (<i>M</i> age = 21.5)	Study 1: SHS, CISS Study 2: SHS, WOCS	Emotion-oriented coping (e.g., wishful thinking, denial, and avoidance) was preferred by athletes who self-handicap.
Tamminen, Holt & Neely (2013)	Qualitative	5 Female Athletes, (ages 18-23; <i>M</i> age = 21)	Semi-Structured Interviews	Perceived expectations for success causes performance slumps.

Key:

CAS-A = Children's Arousal Scale – Adult Version
CDS-II = Revised Causal Dimension Scale
Sport-MPS-2 = Sport-Multidimensional Perfectionism Scale-2
COPE = Coping Orientation to Problems Encountered
M-COPE = Modified-COPE
CISS = Coping Inventory for Stressful Situations
LOT = Life Orientation Test
TSCI = Trait Sport Confidence Inventory
WOCS = Ways of Coping Sport Scale
APQ = Athlete Preference Questionnaire
SHS = Self-Handicapping Scale