

Definition of Choking in Sport: Re-conceptualization and Debate

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1 **Abstract**

2 In sport, choking under pressure is a negative athletic experience that may have psychologically
3 damaging effects. The media recognizes that choking is a dramatic drop in performance, whereas
4 researchers have labeled choking as *any* decrease in performance under pressure. This
5 discrepancy between the media's and researchers' perception of choking leads to ambiguity
6 among terms and confusion among researchers, applied practitioners, and the general public.
7 Thus, the current position paper will: critically analyze current choking definitions and explore
8 why they are not appropriate operational definitions; explain the current underperformance and
9 choking terminology debate; offer an alternative choking definition that should be debated; and
10 also identify ways that researchers can improve the robustness of choking investigations. It is
11 hoped that this paper will stimulate debate and improve the quality of future choking research.
12 Keywords: Under-performance, anxiety, paradoxical performance

1 more acute and significant decline” (p. 204). Furthermore, as a universally accepted
2 definition of choking in sport does not exist, researchers have been employing various
3 definitions, which is unlikely to provide a robust exploration and explanation of the
4 experience, and offer cogent evidence for practitioners working with athletes who choke.

5 **Aim and Rationale**

6 As definitions determine the nature and direction of future research (Cooper, Dewe, &
7 O’Driscoll, 2001), researchers should ensure that a choking definition is generated, which has
8 collective agreement and represents the choking experience. Thus, the aim of this paper is to:
9 reflect on the influence that previous and contemporary definitions have had on the
10 conceptualization of choking, discuss critically the current debate regarding the choking
11 definition, offer an alternative operational definition that should be debated, and identify
12 issues of importance for future choking research.

13 From this position (and within the debate that emerges from this Special Issue of the
14 *International Journal of Sport Psychology*), we hope to advance the choking literature by
15 stimulating discussion that leads to an accepted definition for researchers, applied
16 consultants, and the general public. Furthermore, we also hope this paper will encourage
17 researchers to more accurately investigate choking, rather than under-performances, in future.
18 The following sections discuss peer-reviewed published studies or book chapters that either
19 refer to the choking definition or explicitly investigate choking.

20 **Traditional Definition(s) of Choking in Sport**

21 Over the past 30 years, sport anxiety researchers have attempted to understand choking
22 and have also proposed a number of definitions. Traditional choking definitions have failed
23 to accurately include distinct, observable elements (i.e., increased anxiety under pressure, and
24 a considerable decrease in performance), which make it different from other performance
25 failures. For example, Daniel (1981) perceived choking as, “the inability to perform up to

1 previously exhibited standards” (p. 70). Similarly, Masters (1992) defined choking as “the
2 failure of normally expert skill under pressure” (p. 344). There are, however, many reasons
3 why athletes may not perform to previous standards or fail under pressure (e.g., a
4 performance slump or injury), which would not be considered choking. As such, the Daniel
5 and Masters definitions have not been widely used in choking literature.

6 Instead, researchers have predominantly used Baumeister’s (Baumeister, 1984;
7 Baumeister & Showers, 1986) choking definitions, which stated principally that choking is
8 inferior performance under pressure, while striving for optimal success. Although
9 researchers (e.g., Oudejans & Pijpers, 2009; Reeves, Tenenbaum, & Lidor, 2007; Vickers &
10 Williams, 2007; Wilson, 2008) have employed Baumeister’s choking definition(s) without
11 questioning its applicability, others (e.g., Gucciardi & Dimmock, 2008) have used it with
12 reservation and suggested that other definitions be constructed. One main criticism of
13 Baumeister’s definition is whether choking should be used to describe *any* decrement in
14 performance, or indicate a distinct and acute performance failure that differs from under-
15 performance (Hill et al., 2009). Similarly, other definitions (e.g., Beilock & Carr, 2001;
16 Beilock & Gray, 2007), which identify choking as performing worse than expected given
17 one’s level of skill, can be questioned in the same vein. It should be noted that Beilock and
18 Gray identified that choking occurs in response to high perceived pressure and did explain
19 that choking differs from other performance issues (e.g., a slump).

20 Recently, researchers have attempted to expand and re-conceptualize the choking
21 definition (e.g., Gucciardi, Longbottom, Jackson, & Dimmock, 2010; Mesagno, Marchant, &
22 Morris, 2008; Mesagno & Mullane-Grant, 2010) largely from critical analysis of
23 Baumeister’s (1984) and Beilock and Gray’s (2007) attempts. For example, Gucciardi et al.
24 (2010) suggested that choking is, “heightened levels of perceived pressure and where
25 incentives for optimal performance are at a maximum lead to acute or chronic forms of

1 suboptimal performance or performing more poorly than expected given one's skill level and
2 self-set performance expectations" (p. 79). Similarly, Mesagno and Mullane-Grant (2010)
3 defined choking as, "a critical deterioration in skill execution leading to substandard
4 performance that is caused by an elevation in anxiety levels under perceived pressure at a
5 time when successful outcome is normally attainable by the athlete" (p. 343). Both
6 definitions offer an increasingly explicit account of choking, with Mesagno and Mullane-
7 Grant emphasizing the element of increased anxiety, which is important because without
8 heightened anxiety, choking would not occur. Both contemporary definitions, however, still
9 imply that any sub-standard performance is choking, which remains contentious.

10 In an earlier study, Hill et al. (2009) recruited four 'expert' sport psychologists who had
11 extensive research and applied experience in stress and anxiety. Through a focus group
12 discussion, participants constructed a definition (and choking characteristics), which from an
13 applied sport psychology perspective, may distinguish it from other sub-optimal performance.
14 Accordingly, Hill et al. stated, "Choking in sport is a process whereby the individual
15 perceives that their resources are insufficient to meet the demands of the situation, and
16 concludes with a significant drop in performance – a choke" (p. 206). The Hill et al.
17 definition was the first to represent choking as a considerable, extreme and dramatic failure in
18 athletic performance, which extends previous and contemporary definitions. This position
19 has been recently supported (e.g., Hill et al., 2010b, 2011), however, the operational
20 definition does not refer to increased anxiety and ambiguous terms are used (e.g., "resources"
21 and "demands"), which limits its usability within (quantitative) research. From this
22 description, it is clear that, to date, an operational definition has evaded researchers.

23 Within the next section, we discuss and consider how influential definitions have been
24 on choking literature. We do not mean this to be an extensive review, but merely the
25 initiation of debate that may inform future research.

1 Use of Definitions in Choking Research

2 It is important to differentiate choking from an under-performance, yet, researchers
3 have primarily considered any performance decrease as choking. For example, Gucciardi and
4 Dimmock (2008) examined and compared extant choking models in sport. Twenty
5 experienced golfers were asked to putt 10 times to a target three meters away under low- and
6 high-pressure while using either three explicit knowledge cues, three task-irrelevant
7 knowledge cues, or a single swing thought cue. Gucciardi and Dimmock explained that
8 participants experienced choking when their absolute error score increased by an average of
9 approximately 3 centimeters per 10 putts while focusing on the explicit knowledge cues.
10 These results represented a statistically significant performance difference between the low-
11 and high-pressure conditions for the explicit knowledge group, however, the choking
12 experiences were only minor performance decrements under pressure, and may have been an
13 under-performance rather than a “choke”. Nevertheless, this study offered support for the
14 self-focus model and indicated that abstract swing thoughts and irrelevant thoughts may
15 prevent experienced golfers from choking.

16 Similarly, Wilson, Smith, and Holmes’s (2007) asked participants to complete 20 putts
17 to five different holes (two from 3 m; two from 3.3 m; one from 3.6 m) under low- and high-
18 pressure. Participants were divided into low and high trait anxious groups and an absolute
19 error score was recorded for each putt. Results indicated that the low trait anxious group
20 experienced relatively stable performance during the low- and high-pressure. The high trait
21 anxious group, however, were said to have choked, even though performance deteriorated by
22 approximately 1 cm per set of 20 putts. This study offered support for the distraction theories
23 of choking, as it was inferred that cognitive anxiety overwhelmed working memory of the
24 high trait anxious participants.

1 Using a different sport, Wang, Marchant, Morris, and Gibbs (2004) asked participants
2 to complete the Self-Consciousness Scale (SCS) and the Sport Anxiety Scale (SAS) prior to
3 20 basketball free throws under low- and high-pressure situations. Choking was said to have
4 occurred, even though performance deteriorated by an average of only 1 (1.03) shot per 20
5 attempts. Choking was also correlated to high scores on the SCS and SAS, and offered
6 support for the moderating role of public self-consciousness and trait somatic anxiety.
7 Although missing one free throw may be significant during the closing stages of a basketball
8 game, in an experiment with 66 participants, this represents a slight decrease in performance
9 which arguably may not signify a choking experience.

10 Jordet and colleagues (e.g., Jordet, 2009; Jordet, Hartman, & Vuijk, 2012) have also
11 contributed to the choking literature recently, through the examination of penalty shoot-outs
12 in highly pressurized world-renowned soccer tournaments. In these archival studies, choking
13 was considered to have occurred if the player did not score (either by missing the goal or by
14 being saved by the goal keeper) even though they, as expert players, were capable of doing so
15 under pressure. Failed shots were labeled as choking and as a significant drop in
16 performance. We would argue, however, that it is uncertain whether a single, discrete failed
17 performance (i.e., one penalty shot) can be considered robustly as choking. This is especially
18 true if the ball was on target to score but was saved by the goal keeper because the outcome
19 was based on something other than the striker's performance (i.e., the goal keeper's ability).
20 If an analysis were considered for single failed shots, then a more robust choking-related
21 analysis (considering the debate raised by Hill et al., 2009) on the number of drastically
22 missed shots (e.g., missing the goal altogether without touching the keeper or goal) would be
23 appropriate. These missed shots would signify a dramatic performance decrease based on the
24 athletes' skill level, rather than an under-performance. Furthermore, Jordet and colleagues
25 have provided a well-articulated argument about why anxiety was maximized in world-class

1 soccer matches, yet, anxiety measures were not used (due to the archival study), which leads
2 to anxiety assumptions and limited generalization.

3 The above studies provide examples of how Baumeister's definition(s) can be used to
4 label minimal performance decrements as choking. In turn, their findings (alongside similar
5 studies) have shaped our understanding of choking that includes suggested mechanisms and
6 moderators, despite some ambiguity about whether choking was examined. If choking is an
7 acute, substantial decline in performance that differs from an under-performance, then these
8 studies have provided an excellent insight into the processes associated with sub-optimal
9 performances, but not necessarily choking.

10 Thus, we ask the following questions: Are researchers confident they are investigating
11 choking if only a minor decrease in performance is obtained? Is there a difference between
12 an under-performance and choking in terms of performance outcome, underlying
13 mechanisms, and moderators? Will the same theory-matched interventions alleviate the
14 likelihood of an under-performance and a choke? We argue that choking is a distinctive
15 sporting failure that differs from other performance failures both qualitatively and
16 quantitatively (Hill et al., 2010b, 2011).

17 **Ever-Changing Evidence of Choking**

18 The above claims have emerged initially from anecdotal (including media) reports
19 where choking is described as a particularly dramatic, significant, collapse in performance
20 standards under pressure. Although researchers should not be driven by media colloquialism,
21 we argue that research should reflect real life terminology. In addition, there has been a
22 changing emphasis on the term 'acute' / 'significant' drop (in performance) to be included
23 within traditional choking definitions. For example, Clark, Tofler and Lardon (2005) have
24 stated that choking is, "a colloquial, pejorative term, used to convey the phenomenon of *acute*
25 performance failure under perceived stress" (p. 962). Likewise, Wilson, Chattington, Marple-

1 Horvat and Smith (2007) stated that choking is "...acute performance decrements despite the
2 ability and incentives for good performance" (p.439). Thus, a sense has begun to emerge that
3 choking may differ from sub-standard performances by being an acute or significant
4 performance drop.

5 Furthermore, recent qualitative choking research (e.g., Hill et al., 2010b, 2011) has
6 indicated that athletes may perceive a difference in cognitions, emotions, and consequences
7 between choking and an under-performance. For example, participants in Hill et al. (2010b)
8 study of elite golfers recognized that choking was, "hacking...a complete drop in
9 performance...a blow up...a mess" (p. 229) compared to an under-performance. Participants
10 also explained that choking was, "more intense" where they "could not even think straight",
11 while under-performing, "there is still a chance it could be a good round" (p. 229). Similarly,
12 Hill and Shaw (2013) explored experienced athletes who had choked regularly while playing
13 a team sport and found that an under-performance was when, "you do one or two things
14 wrong...but when you choke...can't play at all...can't do anything right...the only thing is
15 get off the field". This distinction between an under-performance and choking has not been
16 found in other similar qualitative studies (e.g., Gucciardi et al., 2010), nevertheless
17 researchers could be exploring a different entity that has clear and important implications for
18 theoretical researchers and applied practitioners alike.

19 **Proposed Operational Definition and Characteristics**

20 Based on the above information and a critical, extensive review of the extant
21 operational definitions, we propose choking as an acute and considerable decrease in skill
22 execution and performance when self-expected standards are normally achievable, which is
23 the result of increased anxiety under perceived pressure. This definition provides key
24 observable elements (i.e., increased anxiety and substantial performance decrease) and
25 explanation that the performance is below normal for the athlete. Researchers have not yet

1 investigated the magnitude of a performance decrement necessary for choking to occur, thus,
2 future research and debate is needed to improve this definition. Factors that appear to
3 distinguish choking from an underperformance are (in no particular order): 1) the magnitude
4 of performance decrement (e.g., Baumeister, 1984; Hill et al., 2009), 2) negative cognitive
5 appraisal of anxiety (or debilitating anxiety; Gucciardi et al., 2010; Hill et al., 2010b), 3) a
6 lack of perceived control (Gucciardi et al., 2010; Hill et al., 2010; 2011; Otten, 2009), and 4)
7 self-presentational concerns (Mesagno, 2009; Mesagno, Harvey, & Janelle, 2011), which we
8 propose should inform future choking research. Choking is also the result of striving to
9 achieve success, rather than caused directly by physiological factors such as injury or fatigue.
10 Finally, the retrieval of normal performance standards after choking is difficult and gives rise
11 to post-choke intense / negative affect (Hill et al., 2010b, 2011).

12 **Issues for Future Choking Research**

13 We believe that only minimal research studies (e.g., Vickers & Williams, 2007) have
14 convincingly investigated choking quantitatively based on the magnitude of their decrement
15 in performance. With the limited choking research, we are unable to determine what
16 magnitude of a decrease in performance constitutes choking, so we are not at liberty to
17 propose a certain percentage decrease that constitutes all choking experiences. Instead, and
18 until then, we provide suggestions for researchers to consider in future when conducting and
19 explaining their choking research and findings. First, quantitative researchers should
20 question whether the magnitude of the performance decrease is choking or just an under-
21 performance. If it can be debated that the experimental results is an under-performance based
22 on the magnitude of the performance decrease, then the authors should provide justification
23 for why the results exhibit choking. Mesagno and colleagues (Mesagno et al., 2011, 2012;
24 Mesagno & Mullane-Grant, 2010) have been careful to justify their quantitative results as
25 choking due to possible contentious performance results. Nevertheless, researchers can still

1 debate whether the magnitude of the decrement was under-performance or choking. If the
2 results of a study are not convincingly choking, then perhaps researcher(s) can concede that
3 the results favor under-performance. Second, instead of adopting Baumeister's (1984)
4 definition and accepting any performance decrease as choking, researchers should carefully
5 consider their selected definition and ensure they explain their results on the basis of that
6 definition. If their results do not conform to their adopted definition, then they should discuss
7 why it may or may not be choking using that definition. Finally, researchers should also
8 consider the inclusion of measurements of those factors that may distinguish a choke from an
9 underperformance (e.g., negative appraisal of anxiety, perceived control, or self-
10 presentational concerns) to improve confidence in the identification and isolation of choking.

11 **Final Comments**

12 The purpose of this paper was to reflect on existing choking definitions, discuss the
13 current choking and under-performance debate, offer an operational definition, and create
14 discussion to advance empirical understanding for future researchers to consider. We believe
15 Baumeister's (1984) definition is outdated and a new operational definition should emerge
16 based on recent choking literature (e.g., Hill et al., 2009). If researchers believe that our
17 definition (or those developed from this manuscript) is appropriate, then we would have
18 successfully achieved our goal of improving the quality of future choking research. We
19 would caution researchers investigating ambiguously defined factors of performance under
20 pressure (e.g., clutch performance, perceived control) to create clear operational definitions to
21 ensure clarity of the research paradigm. We also hope that this dialogue incites more
22 research into whether a choking experience differs from an under-performance, and what
23 cognitive processes are involved in both experiences.

24

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