

Alleviation of Choking Under Pressure in Elite Golf: An Action Research Study

Denise M. Hill

University of Gloucestershire

Sheldon Hanton

University of Wales Institute, Cardiff

Nic Matthews

University of Gloucestershire

Scott Fleming

University of Wales Institute, Cardiff

The study examined the effect of an evidence-based intervention on choking in golf. It is informed by the work of Hill, Hanton, Matthews and Fleming (2010a) that explored the experiences of elite golfers who either choked or excelled under pressure. The perceptions of elite golf coaches who worked with both ‘chokers’ and those who excelled, were also considered. It revealed that choking may be alleviated through the use of process goals, cognitive restructuring, imagery, simulated training and a pre/postshot routine. The present study incorporated each strategy into an intervention that was introduced to two professional golfers (aged 22) who choked under pressure regularly. Through an action research framework the impact of the intervention was evaluated over a ten month period via qualitative methods. The results indicated the intervention alleviated the participants’ choking episodes and so provides information that can be of use to practitioners working with golfers who choke.

Choking in sport is a term used to describe an acute performance breakdown (Clark, Tofler, & Lardon, 2005), such as that experienced by Greg Norman in the 1996 Masters golf event, when he inextricably lost by five shots despite leading the final round by six. Or that endured by Jana Novotna, whose performance in the 1993 Wimbledon final deteriorated to such an extent that she became, “unrecognisable...[as] an elite tennis player” (Gladwell, 2000, p. 84). However, despite its

Hill and Matthews are with the Faculty of Applied Sciences, University of Gloucestershire, Gloucester, UK. Fleming and Hanton are with the Cardiff School of Sport, University of Wales Institute, Cardiff, Cardiff, UK.

prevalence and detrimental impact on performance, choking has been subjected to limited research attention until recently (see Beilock & Gray, 2007). Hill, Hanton, Fleming, and Matthews (2009) define choking as, “a process whereby the individual perceives their resources are insufficient to meet the demands of the situation, and concludes with a significant drop in performance – a choke” (p. 206). However, Mesagno and Mullane-Grant (2010) proposed an alternative definition that they claim provides a more appropriate foundation for future choking research. It states that choking is a, “critical deterioration in skill execution, leading to substandard performance that is caused by an elevation in anxiety levels under perceived pressure, at a time when successful outcome is normally attainable by the athlete” (p. 343). Yet, it remains unclear whether this definition is suitable, as the choke differs from a *substandard* performance (Gucciardi, Longbottom, Jackson, & Dimmock, 2010; Hill, Hanton, Matthews, & Fleming, 2010b) and appears to be initiated by the athlete’s negative interpretation of their anxiety, rather than its *elevated levels* per se (Gucciardi et al., 2010; Otton, 2009). As such, the definition of choking presented by Hill et al. (2009) may provide currently the most fitting framework for researchers and practitioners to work within.

Despite on-going debate regarding the definition, it is agreed that choking is the result of attentional disturbances caused by self-focus and/or ‘distraction’ (see Beilock & Gray, 2007). Self-focus theories suggest that choking occurs as a result of the athlete consciously processing and/or monitoring their well-learned task when they perform under pressure. That is, rather than execute the skill automatically, the athlete monitors and/or attempts to control the explicit rule-based aspects of the skill (i.e., technique), that can lead to the breakdown of performance (see Jackson, Ashford, & Norsworthy, 2006). Conversely, distraction theories (e.g., Mullen, Hardy, & Tattersall, 2005) denote that perceived pressure will cause the athlete to process information required for skill execution alongside cognitions related to anxiety (e.g., self-doubts). Such inefficient processing of task relevant information can lead to choking unless the athlete responds with increased effort (Eysenck & Calvo, 1992).

Contemporary literature offers self-focus as the most likely mechanism of choking, although its supporting literature is almost exclusively experimental (see Hill et al., 2010b). Indeed, recent attempts to investigate choking through ecologically valid methods (e.g., Gucciardi et al., 2010; Wilson, Chattington, Marple-Horvat, & Smith, 2007) have in general offered support for the distraction theories. It is possible however that the mechanism by which an athlete chokes is also dependent on a range of individual variables including self-consciousness (Baumeister, 1984), skill level/type (Beilock & Carr, 2001) and dispositional reinvestment (Masters, Polman, & Hammond, 1993).

There have been few theoretically underpinned interventions designed to alleviate the choke, although implicit and analogy learning remain the most notable exceptions (see Lam, Maxwell, & Masters, 2009a). Both strategies require the athlete to learn a skill implicitly, while gaining limited explicit knowledge of the task. As a result, the athlete should not choke through self-focus as they acquire few explicit rule-based instructions to consciously monitor and/or control. The techniques used to prevent the accumulation of explicit knowledge differ between implicit and analogy learning. Namely, implicit methods require the athlete to learn the skill unintentionally. This can be achieved via several means including learning the skill while completing a secondary task or receiving reduced feedback

(see Maxwell, Masters, & Eves, 2000 for a review). Alternatively, analogy learning involves teaching the skill through biomechanical metaphors (e.g., draw a right-angled triangle with the bat to hit a table tennis shot), so that the athlete intends to learn, but still predominantly gains implicit knowledge (see Lam, Maxwell, & Masters, 2009b). There is considerable evidence that both implicit and analogy methods of learning can prevent performance breakdown under pressure, while more recent research indicates that they may also alleviate the choke (see Lam et al., 2009a). However, their use within the applied setting is considered to be limited at present. Firstly, it has been shown that implicit methods lead to a slower rate of learning compared with explicit instructions and therefore are unlikely to be adopted by coaches working with athletes (Maxwell et al., 2000). Secondly, the supporting evidence for the use of analogy learning has emerged from experimental studies examining either a simple table tennis shot (e.g., Lam et al., 2009a) or a modified seated basketball shot (e.g., Poolton, Masters, & Maxwell, 2006). Therefore, it remains unclear whether analogy can be used to prevent choking during the execution of complex motor skills within the 'real life' sport setting. Thirdly, both implicit and analogy learning methods appear to only prevent self-focus, and therefore may not alleviate choking through distraction. Finally, it is important to note that as elite athletes have already learnt their skill and accumulated explicit knowledge, the benefits of implicit and analogy learning are more likely to assist the novice performer.

Attempts to examine the efficacy of interventions designed to alleviate choking among elite athletes include Gucciardi and Dimmock's (2008) study. They found experienced golfers choked during a pressurized putting task when they focused on explicit technical instruction (e.g., position of the hands), but maintained their performance when they concentrated on an abstract 'swing thought' (e.g., smooth, tempo) or irrelevant thought (i.e., a color). However, the study did not establish whether the participants were vulnerable to choking and therefore likely to choke when exposed to pressure. Moreover, it was unclear whether the participants had choked, as they experienced only a modest deterioration in performance (i.e., an increase of approximately three centimeters, per set of ten putts, to a target three meters away). More recently, Oudejans and Pijpers (2009) completed two experiments that evaluated the impact of anxiety training on choking within a sample of elite basketball and darts players. One group practiced their skill within a non-pressurized environment, while the other practiced within conditions designed to increase their anxiety levels. When all participants performed subsequently within a highly pressurized test environment, only those who had practiced while anxious were able to avoid choking. Although it is accepted generally that regular exposure to anxiety can improve an athlete's performance under pressure (Mellalieu, Hanton, & Fletcher, 2006), Oudejans and Pijpers (2009) are the first to claim that this approach can prevent choking. However, this study also failed to establish whether the participants were vulnerable to choking, and the drop in performance while under pressure was again only moderate. In addition, the ecological validity of the second experiment is of concern for to increase perceived pressure, the dart players were required to perform their skill while attached to the upper section of a climbing wall.

To date, there are two studies (Mesagno, Marchant, & Morris, 2008; Mesagno, Marchant, & Morris, 2009) that have attempted to examine the impact of an

intervention on athletes considered to be 'susceptible' to choking. In both cases the participants were selected via three variables that have been associated with choking (i.e., high self-consciousness, Baumeister, 1984; high trait anxiety, Baumeister & Showers, 1986; and approach coping style, Wang, Marchant, & Morris, 2004). In their first study, Mesagno et al. (2008) used a single subject design and follow up interviews to ascertain the impact of a preperformance routine (PPR) on three experienced tenpin bowlers. The results indicated that the PPR prevented choking through the reduction of self-focus and distraction. Within their second study, Mesagno et al. (2009) required inexperienced basketball players to perform a free-throw while focusing on words to a song that had been played to them before the task. Once more, a mixed methods design was used to establish the intervention had alleviated choking. The two studies represent a significant advancement in the study of choking, for they were the first to examine the efficacy of a traditional psychological intervention (i.e., PRR) on athletes considered to be susceptible to choking, through qualitative methods. They also demonstrated that the interventions may alleviate choking through the prevention of self-focus *and* distraction. Despite this development the criteria used to select the 'chokers' remains questionable, as the supporting evidence for the role of self-consciousness, trait anxiety and coping style within choking is equivocal (see Hill et al., 2010b). A final concern is that each study was completed over a four week period with a single testing point postintervention, preventing judgment to be made about the longer term impact of the intervention. Mesagno and Mullane-Grant (2010) did provide further support for the impact of a PPR on choking, particularly when the routine included the modification of arousal levels, behavioral steps, attention control and cue words. Unfortunately, their participants were not afforded the opportunity to embed their PRR, the pressurized performance was tested only once, and they were not known to be 'choking susceptible' athletes.

Previous studies that have attempted to alleviate choking appear to have three limitations that future research should address. Firstly, any intervention should be tested upon participants who evidently choke under pressure. Secondly, it would be beneficial to examine the efficacy of a choking intervention longitudinally and within an ecologically valid setting. Finally, as effective interventions should be multimodal in nature and designed to meet the individual needs of the athlete (see Thomas, Mellalieu, & Hanton, 2009), it would be advantageous to evaluate the impact of a mental skills program that had been tailored to suit the requirements of 'choking susceptible' athletes. To address each limitation it is necessary to build on the work of Hill et al. (2009) and more specifically Hill et al. (2010a). From their study, Hill et al. (2009) generated characteristics that could be used to identify chokers, which in turn were used by Hill et al. (2010a) to recruit six elite golfers to their study, who evidently choked under pressure regularly. Thereafter, the choking experiences of the six participants were explored qualitatively, and compared with the experiences of five golfers who excelled under pressure conditions. The perceptions of four golf coaches who had worked extensively with both chokers and those who excelled were also considered. This study revealed that self-confidence, focus, anxiety management and perceived control were the psychological constructs that required enhancement to prevent choking, and that a pre/postshot routine, cognitive restructuring, imagery, simulated practice and holistic swing feel were strategies that were suggested to achieve this. Therefore, the following study will evaluate longitudinally the effect of an intervention designed to alleviate choking, that has

been devised from the findings of Hill et al. (2010a), informed by Hill et al. (2009), and reflects the needs of elite golfers who choke under pressure regularly. Through the use of action research, the intervention was tailored throughout a ten month season to suit the individual requirements of each participant.

Method

It has been suggested that intervention studies are often completed within an artificial setting, through the use of nonathletic samples and over a brief period of time (Kellman & Beckman, 2003). Consequently, many have failed to provide solutions to the practical problems experienced by athletes and coaches. In response, the aims of this intervention study were addressed through an action research approach (see Reason & Bradbury, 2007 for a review), that enables the long term impact of an intervention to be examined closely through a 'real-life' problem-centered focus (Castle, 1994). Accordingly, the adoption of an action research framework allows the researcher to generate both scientific and practical knowledge (Sparkes, 1991) that can enhance current theoretical understanding of a phenomenon while also offering relevant information for practitioners.

The key element of action research is the action-reflection cycle that entails observation, reflection, action and modification (Elliot, 1991). Hence, within this study the experiences of chokers were observed and reflected upon, followed by an evaluation of the intervention's effect. Thereafter, modifications to the intervention were completed if warranted. Action research offers more than a mere evaluation of an intervention however, and so the study also meets the criteria from Evans, Fleming, and Hardy (2000a) to: i) show a commitment to improvement and or/ solving practical problems; ii) include an intervention; iii) have a cycle of reflection and action; iv) offer praxis; v) be systematic; vi) be strategic; vii) be collaborative; viii) be empowering for the participants; ix) conducted ethically; x) employ recognizable research methods; xi) demonstrate reflexivity and ; xi) communicate its findings to practitioners/researchers.

Participants

Six elite golfers (1 female and 5 males; aged 20–38 years) were invited to take part in the study. Three were professional and the remainder had a low handicap (< 5). All participants choked under pressure regularly and had their choking experiences explored within Hill et al. (2010a). Only two participants, Adam and Chris (pseudonyms) were able to accept the invitation, as the others had either withdrawn from the sport or chosen to perform at a lower standard before the intervention began. Both participants were 22 year old male golfers and about to compete in their second year on the professional circuit. They were committed to playing at a highly pressurized level throughout the season and had perceived that their choking experiences were a result of low self-confidence, poor focus, debilitating anxiety, and a lack of perceived control (Hill et al., 2010a).

The Researcher

The lead author is an Accredited Sport and Exercise Scientist with the British Association of Sport and Exercise Sciences (BASES), who has worked extensively with athletes from a range of sports. She has offered psychological support to elite

golfers for approximately ten years, and has played golf to an International standard. She is familiar with the terminology used by elite golfers, and together this assured the manner in which she devised, delivered and monitored the intervention was appropriate.

Intervention

A solution-focused approach was used to frame the intervention that encourages both the immediate and long term improvement of an athlete's performance by providing solutions to the athlete's problems (see Hoigaard & Johansen, 2004). The intervention was devised from the findings of Hill et al. (2010a) and Hill et al. (2009) and thus consisted of various cognitive and behavioral psychological strategies that were designed to enhance the participants' self-confidence, focus, anxiety management and perceived control to alleviate choking. However, the solution-focused approach enabled the athlete to coconstruct and modify the precise nature of these strategies as the season progressed. The intervention consisted of a pre/postshot routine, cognitive restructuring, imagery, simulated practice and a holistic swing feel. Consistent with an action research and solution-focused approach, the changing needs of the participant and context were accommodated by introducing strategies at the most appropriate time and offering other psychological support when necessary. This included a reflection diary that was used by both participants throughout the season.

Procedure

In accordance with the BASES Code of Conduct, voluntary informed consent was gained from each participant. They were assured of their anonymity and thus any data that may have revealed their identity were not used. The study was approved by the Research Ethics Committee at the lead author's University. At the beginning of the off-season the lead author met with the participants to complete a pre-intervention meeting (December). The purpose was to ascertain whether they still choked under pressure regularly, were willing to adopt and embed the intervention, and were able to expose themselves to pressurized performances throughout the season. A second meeting was arranged shortly after (December-January) to introduce the intervention to the participants. Two more meetings were completed within the competitive season (early phase-April-May; and midphase-June) in which the impact of the intervention was considered at length. A final meeting occurred at the end of season (September) to reflect on the season and intervention. Throughout the season, each participant was able to contact the lead author (via a phone call or e-mail) if pertinent issues arose. Participants were also contacted by e-mail during each month of the season to ascertain their progress, and a follow-up recorded phone call was then completed. If necessary, an additional face-to-face meeting was also arranged.

Both participants competed in seven professional tournaments throughout the season. Soon after the event they were required to reflect on their performances within a diary and discuss key aspects of each performance with the lead author (via phone, e-mail, or in-person). They were encouraged to discuss any issue that arose, but were prompted (by the diary and lead author) to reflect particularly upon their self-confidence, focus, anxiety management and perceived control.

Data Collection

The data were collected through individual face-to-face meetings, phone conversations, e-mail correspondence, a reflective diary, observation, participant observation and a reflexive journal.

Individual Face-to-Face Meetings. It was planned initially that each participant would be met in person five times during the season by the lead author. However, the changing demands of the situation required that Chris was met six times. Each meeting lasted approximately two hours, and consisted of a semistructured interview in which the participants reflected on their recent performances under pressure and the perceived impact of the intervention. The interviews were designed in line with recommendations of Patton (2002), allowing the participant to discuss their experience in detail. Each interview was recorded and subsequently transcribed verbatim. The intervention was also introduced to Adam and Chris during the face-to-face meetings.

Telephone and E-mail. Although it is difficult to maintain rapport via telephone and e-mail correspondence, it was important to contact the participants regularly to increase adherence to the intervention (Shambrook & Bull, 1997) and to ensure it was having its intended impact. As logistics limited the number of face-to-face meetings arranged, it was the telephone and e-mail conversations that were used to explore frequently any issue the participant chose to raise. Each participant received regular phone calls (at least one per month) that were occasionally brief (approximately ten minutes). However, both Adam and Chris required four extended phone conversations during the season that lasted between forty five minutes and one hour. Each phone call was recorded, stored electronically and transcribed verbatim.

Reflective Diary. The participants were required to record their experiences of performing under pressure and their perceptions of the intervention within a reflective diary. They were encouraged to particularly consider whether the intervention had impacted on self-confidence, focus, anxiety management and perceived control. Although diaries are not used widely as a method of data collection, they do allow participants to record experiences close to the time of the event which can increase trustworthiness of the data (Willig, 2008).

Observation. Observation and participant observation were used to record Adam and Chris's behavior within the natural setting (i.e., at a competitive event) and reveal any behavior that they may not have been aware of (Patton, 2002). The observation was completed independently by the first author and one member of the research team with the key behaviors noted during the event and corroborated immediately afterward. The participant observation was performed by the lead author with any comments recorded after the performance.

Reflexive Journal. A reflexive journal was maintained by the lead author to primarily document field notes that included observations and reflections of the participants' progress. The use of field notes is commonplace within action research for it enables the researcher to understand the emerging situation and modify the action if required (Elliot, 1991).

Data Analysis and Trustworthiness

As recommended by action researchers, the data collection and analysis was an on-going and cyclical process that occurred throughout the study (McNiff & Whitehead, 2006). Following methods adopted within the sport psychology action research literature (e.g., Evans, Hardy, & Fleming 2000b) data were analyzed via line-by-line coding to allow themes and narrative to emerge. The themes were independently verified by a member of the team and agreed by both participants as an accurate representation of their experiences. The trustworthiness of the data were enhanced further through the lead author working extensively with the participants throughout the season and generating rapport and trust (Willig, 2008). In addition, the process of action research inherently encourages trustworthiness by being deliberate and self-reflexive (Elliot, 2007).

Narrative

To increase clarity the following narrative is subdivided into eight sections: i) Pre-intervention meeting (December); ii) Introduction to the intervention (December-January); iii) Off-season (January-March); iv) Competitive season early phase (April-May); v) Competitive season mid phase (June); vi) Competitive season late phase (July-August); vii) Competitive season end phase (Late August-Early September); viii) End of season reflection (Late September). As advocated within action research (McNiff & Whitehead, 2006), the data will be presented in the first-person (see Table 1).

Pre-Intervention Meeting (December)

As six months had passed since the participants had discussed their choking experience (Hill et al., 2010a), it was necessary to confirm that they still choked and it continued to be a result of low self-confidence, poor focus, a lack of anxiety management and low perceived control. Adam thought that he had choked more in the past season than at any other point in his career and that the cause of his choking experiences remained unchanged. Adam also identified he had become increasingly self-critical, so his self confidence had lowered to such an extent that he no longer had expectations of success, "It's got so bad now that...if I do hit the green, you will notice the relief". Consequently, he was displaying a concerning level of despondency toward the sport, "To face myself and say 'you're not actually good at this' is shattering. The burden of thinking about that shot you can't hit is like Chinese torture with a dripping tap".

Chris had received extensive coaching during the preceding season and thought he was playing better as a result. His self-confidence had risen but he acknowledged that it was still "fragile". He continued to choke occasionally at the beginning of tournaments as this was the point of the game when he experienced higher levels of distraction, debilitating anxiety and lower perceived control. As a consequence of the preintervention meetings, the need to enhance the participants' self-confidence, focus, anxiety management and perceived control to prevent choking remained unchanged, as did the intervention designed to achieve this. However, it had identified the need to prioritize Adam's lack of self-confidence.

Table 1 A Summary of the Intervention Delivered to Each Participant Throughout the Ten-Month Season

Timing of intervention	Component of intervention offered to participant	Purpose of intervention component	
		Adam	Chris
<i>Preseason</i>		Adam	Chris
	Reflective diary	To enhance self-confidence and motivation.	To maintain self-confidence and enhance focus.
	Pre shot routine (with imagery and swing feel)	To enhance focus, anxiety management and self-confidence.	To enhance focus, anxiety management and perceived control.
	Simulated training	Not offered	To enhance anxiety management, focus and perceived control
<i>Off-season</i>	Imagery training	To enhance focus and self-confidence	To enhance focus and self-confidence
	Simulated training	To enhance anxiety management, focus and perceived control	Offered preseason
<i>Competitive season—early phase</i>	Imagery training	To enhance focus and self-confidence	To enhance focus and self-confidence
	Cognitive restructuring	To enhance self-confidence.	Not offered
<i>Competitive season—mid phase</i>	Post shot routine (process and neutral orientated)	Not offered	To enhance focus
<i>Competitive season—end phase</i>	Exposure to competitive pressure	To enhance anxiety management	To enhance anxiety management

Introduction to the Intervention (December-January)

The initial strategies selected for Adam were chosen to increase his confidence so that the probability of choking was decreased (Otton, 2009), and his motivation toward the game was increased (Vealey & Chase, 2008). In addition, I asked him to record in a reflective diary all his past achievements and to reflect positively on all practice sessions/performances he completed throughout the season. There is considerable support for the role of performance accomplishments in developing confidence (see Short & Ross-Stewart, 2009) so it was important for Adam to consider his successes, especially in light of his tendency to focus on his failures. I also asked that he noted any mistakes he made during practice/performance, but to state what could be learned from them. Reflecting positively on negative events in this way can encourage progression through experience, develop facilitative anxiety

(Hanton, Cropley, & Lee, 2009) and prevent the lowering of confidence through 'mulling over' negative experiences (Knowles, Gilbourne, Borrie, & Nevill, 2001).

Adam reported that he tended not to follow a routine before shot execution, so I introduced him to a preshot routine (PSR). We agreed it would contain a practice swing and visualization of the shot (i.e., the trajectory of the ball toward the target). I considered this strategy important for Adam as a PSR is known to enhance attentional focus (e.g., Czech, Ploszay, & Burke, 2004), reduce the impact of distractions (Shaw, 2002), promote positive anxiety symptom interpretation (Thomas, Hanton, & Maynard, 2007) and critically, encourage a more confident state before shot execution (Singer, 2002). Adam had suggested that a 'swing feel' during his pressurized performances was effective so we also included it within his PSR. As focusing on the explicit technique of a skill may encourage choking via self-focus (Beilock & Gray, 2007), I ensured that the swing feel was holistic rather than technically specific (see Hill et al., 2010a). In Adam's case, it was a generic kinesthetic sensation in his back and shoulders, so I was confident that it would encourage Adam to focus on task-relevant information without inducing self-focus and damaging the performance (see Kingston & Wilson, 2009).

Similarly, the initial strategy offered to Chris was a PSR as he only used a routine intermittently and inconsistently. Chris recalled that his good performances under pressure were also associated with a swing feel and an image of the target, "I can see the target in my mind and then I feel like I am stretching when I swing... So my thought is to get in that position and I don't have to think about anything else". We agreed he should continue to use his normal PSR (i.e., practice swings and identify target) and incorporate an image of the shot trajectory and a holistic swing feel. I explained to Chris that this type of PSR should improve his anxiety management, raise his perceived control and address his poor focus by encouraging a process-orientated approach during skill execution (see Moran, 2009). I then asked Chris to practice this PSR within simulated training conditions in which he increased the perceived pressure. Finally, I also asked Chris to use a diary to reflect positively on his past achievements and his future performances to maintain his self-confidence. Specifically, I asked him to reflect on how well he had remained focused on the process (i.e., PSR, swing feel and imagery) to reduce distraction.

Off-Season (January-March)

As the off-season progressed I met with both Adam and Chris who were practicing regularly and playing intermittently in noncompetitive games. Both participants had found the intervention difficult to implement and counter-productive toward their performance, with imagery proving particularly problematic. Adam explained that, "I do not have a precise [visual] image and it takes me too long to try and get it right before a shot...so I find it distracting". It became apparent that both Adam and Chris were attempting to include too much detail into their image, so I reiterated I had only asked them to see the shape/trajectory of the shot. This incident highlighted the need for me to explain the strategies and their purpose in far more detail. Consequently, I restated the precise image (i.e., shot trajectory) that I preferred them to adopt and explained that it was intended to increase their confidence (Short, et al., 2009) and improve their focus. I also clarified that in time, the image could encourage an external focus before shot execution (i.e., a focus on the effect in the environment that is produced as the result of body movement), which should

encourage optimal performance under pressure (Wulf & Jiang, 2007; Perkins-Ceccato, Passmore, & Lee, 2003). I asked both Adam and Chris to persist with the imagery and offered them various scripts based on contemporary literature (e.g., Short, Monsma, & Short, 2004) that were designed to improve their imagery ability.

I monitored the participants' progress by brief phone calls and emails throughout the remainder of the off-season, and as the intervention was becoming more embedded I asked Adam to use simulated practice to slowly increase the level of pressure he placed on himself. As I had done with Chris, I suggested he used the PSR and reflective diary to adopt and reinforce a process-oriented focus, as this would help him maintain a sense of perceived control and manage the increasing levels of anxiety (Moran, 2009). As the season approached Adam acknowledged (by phone) that the reflective diary was starting to have an impact, despite his initial concerns:

I was thinking that this [reflective diary] had nothing to do with anything. But, [after a game] I only used to think about the bad shot. It has made me think 'I did do good'. It was reinforcing the fact that I was getting better and learning to deal with pressure.

Chris became more committed to the PSR, process-orientated approach and simulated practice as the off-season progressed, but remained reticent about the reflective diary. We talked on the phone about the critical events (e.g., good and bad shots/performances) noted in his diary, and by doing so he realized that he had focused on the negative aspects of his performance and had not acted on the areas of his game that needed improvement, "I'm just looking here [at the reflective diary] and I can see I have mentioned the same things a few times and haven't taken it on board. I am also always thinking initially...what was bad". Chris assured me that he would complete the diary more appropriately thereafter.

At the end of the off-season Adam and Chris stated (via phone) that the intervention was beginning to impact positively on their psychological state and their overall game. The following extract from Adam's reflective diary summarized his perceptions:

During today's game I was left with a downhill chip over a mound. The outcome of the shot did cross my mind and there was a sense of, 'I need to hit this shot to prove to myself that I am good'. Then I thought, 'what if I fluff it'. I told myself to stick to my routine. I saw the shot and tried to feel the swing. I played the shot really well and felt like I had completely smashed a massive mental barrier.

Competitive Season-Early Phase (April-May)

As we entered the competitive season I met with Adam and Chris who were looking forward to the season, but admitted that imagery remained a problem. It became apparent that they had improved the visual aspect of their imagery somewhat, although the vividness and controllability of their image remained erratic. Both were able to use imagery to establish briefly an external focus during their PSR, which was a significant improvement. Importantly, this image was able to trigger a kinesthetic image of their swing feel that is likely to have a positive impact on their confidence and anxiety (Monsma & Overby, 2004). I encouraged them to continue practicing their imagery scripts as their imagery should have an increasing impact

on performance. Adam thought the intervention was increasingly affecting all four key psychological concepts (i.e., self-confidence, focus, anxiety management and perceived control) and that despite their recent introduction, a process-orientated approach and simulated training were particularly effective:

I used to care so much about hitting it close. Now I imagine a brick wall down my left side. I chip the ball and can't see where it's going. So there is no point in worrying about the outcome. I just focus on the process. As for the [simulated] practice...I would start off chipping from a fluffy lie, then a patch of mud, then a lie that I would have on the course. The pressure would start to build, and I got confidence from it.

However, Adam contacted me a few days after our meeting with an e-mail that demonstrated the fragility of his psychological state, "I hit a few bad shots and when I lay in bed that night, my heart raced. I could only see the bad shots. I woke up the next day feeling that all the progress I'd made was for nothing". I responded to Adam via e-mail to reassure him that with continued practice he would gain control of his imagery. I explained Progressive Muscular Relaxation (Jacobsen, 1938) which I suggested could be used to regain control over the somatic anxiety he was experiencing off the golf course. Thereafter I indicated that in time, he could use a shortened version of PMR to further enhance his anxiety management while performing (see Gallucci, 2008 for a review). A few days later I phoned Adam to explain cognitive restructuring (CR) as it was important to address the negative thoughts and images that were damaging his confidence. Moreover, I explained that used in conjunction with relaxation techniques, CR can increase the likelihood of interpreting his anxiety as facilitative (Fletcher & Hanton, 2001). Although CR can involve the replacement of negative thoughts with positive ones, it became evident that this would have been inadvisable as Adam explained, "If I say 'I am going to fat it' [miss-hit it] and then I said, 'oh stop it, you are going to rip it [high quality shot]' ...being all positive, it's the biggest waste of time". Instead, I advised Adam to rationalize the negative thought and image, and then replace it with a functional thought related to his process-orientated approach:

If you think you will hit a bad shot, then accept it. Yes, you could. But you have only done so in the past because you have used the wrong psychological strategies. Think to yourself, 'If I attend to my PSR, use my swing feel and send the ball to the visualized target, it will get the job done'. You have proved to yourself that by focusing on your processes you hit good shots, so you are not being overly positive or lying to yourself.

During our face-to-face meeting, Chris identified that the intervention was having a, "small" effect on his focus, anxiety management and perceived control but that his raised confidence and current good performances were a result of his technical swing changes. He did admit that the strategies were responsible for maintaining his performance when he was swinging poorly, "In my last game I didn't feel in control of my swing, but I felt I was able to score better than normal. I just re-grouped by focusing on my processes". Although Chris was attributing his enhanced performance to the technical changes, extracts taken from his journal did indicate that the intervention may have been having more of an impact than he was suggesting or aware of:

I felt that all constructs [confidence, focus, anxiety management and perceived control] came on today. I was slightly anxious over certain shots, but played those well by using the PSR and not worrying about the outcome. Perceived control remained good as I did not let the missed putts effect me.

Soon after our meeting, Chris explained by e-mail that he was changing jobs and would be working in a different region where his professional tournaments began earlier in the year. His first ‘important’ tournament was within two weeks of the e-mail and although I was unsure whether he was prepared fully to compete in such pressurized events, he was excited about the opportunity to test himself.

Competitive Season-Mid Phase (June)

Midway through the season I met with Adam to discuss his recent competitive performances and he reported that when used alongside the other strategies, CR had proved to be valuable:

The first thing that comes to mind over a shot is, ‘this could go wrong’. If I try to ignore it then it would be lying to myself. I say, ‘well yes it could go wrong but start your routine and it will be fine’. The process of the routine is stronger than the thought of fating [miss-hitting] it.

Adam also noted that the reflective diary continued to enhance his confidence, “When I write things down, I see that the things which have contributed to a bad shot are getting less...so, I now go on the course feeling as though I can play well”.

At this point I also met with Chris who was satisfied with his recent performances despite having to play in important tournaments earlier in the season than planned. However, he explained that as his self-confidence was higher, his expectations were also more positive. Thus, each time he hit a poor shot he responded with a higher level of self-criticism, increased distraction and concerns regarding his technique, “Because I am standing over the ball expecting to hit a good shot... I get so annoyed when it’s bad. I’m then thinking, ‘why’ over the next one and making alterations in my swing”. By having an outcome-focus (albeit positive) alongside thoughts regarding technique, Chris was more likely to choke than excel under pressure (Beilock & Gray, 2007). Therefore, I reinforced the need to focus on the process and explained the adoption of ‘neutral’ goal expectations when playing:

There is no point being positive or negative on the course. Thinking about getting it close or what happens if you miss, isn’t going to get you hitting the shot properly. [Instead], focus on executing your processes. Avoid having expectations relating to the shot outcome at all.

I subsequently asked Chris to use a postshot routine that analyzed whether he had adhered to a process and neutral approach during the shot execution. It was intended that this would reinforce neutral goal expectations and enable him to evaluate/correct his processes after a poor shot, rather than the technique. In turn, it was intended that Chris would experience enhanced confidence, focus, anxiety management and perceived control that can arise from adopting a neutral, process based pre- and postshot routine (Hill et al., 2010a). At the end of the month I spoke

(by phone) with Chris and he reported improvements in his performances and self-management on the course, “I had no rhythm at a recent event, but tried to accept the score and focus on executing the processes. Even if I play badly, I can manage myself better by just staying neutral and focusing on the processes”.

Competitive Season-Late Phase (July-August)

As the season progressed, I perceived that Adam and Chris were coping better with pressure, and at this point neither had choked. However, they were about to participate in a tournament that they both identified as the most important of the season. Unfortunately, both players failed to make the ‘cut’ and did not qualify for the final two rounds. Despite their disappointment they reflected positively on the experience. For example, Chris explained during a phone call that:

It was tough and I really ground out a score. I had a great swing feeling. I managed myself excellently as a result. My confidence was high...and I controlled my anxiety better than ever by just going back to my PSR.

Although Adam played poorly, he stated (via a phone call) that he had not choked and was pleased to have enjoyed the experience of playing under pressure, “Two years ago I turned up to the Open and felt sick in the car park, and I was just caddying! Now, when I saw the leader boards I thought, this is brilliant. This is where I belong”. Furthermore, Adam reported within his reflective diary that despite his disappointing score, he felt that he had managed his anxiety:

On the second hole, I had a bunker to play over. A few months ago I would have pulled out my putter, aimed for the green and accepted a bogey. That wasn't good enough. I got my 56 degree [wedge], and felt the shot. I saw where I wanted to send the ball. I put 100% trust in my routine...I thinned it through the back into the long stuff! Only joking, I hit the perfect shot and tapped it in for a par.

It was reassuring that both participants were demonstrating a tendency to reflect positively on their performances, however it was important to examine why their overall score had been poor. In Adam's case he had two bad holes that were caused by poor decision making. The most critical occurred on the eighteenth and was described within his reflective diary, “I knew the ball was too far back in my stance but I hit it anyway. This was the worst mistake of the day and could have been avoided if I had walked away. My tee shot finished in the *****[expletive]”. When we analyzed further this incident (via a phone call), Adam acknowledged that he was highly anxious and rushed the shot to get it “over and done with”. As avoidance behaviors are associated with choking (Jordet & Hartman, 2008), I asked Adam to ensure that he completed the PSR over each shot, regardless of the situation.

Chris's disappointing score had also been a result of poor decision making, but in this case it was through inappropriate preparation. He did not play the latter holes during his practice round and as a result selected the wrong club to play on the seventeenth. Chris regretted this decision but dismissed the lack of preparation as, “one of those things”. When I spoke to him a few days later (by phone) I

did not mention self-handicapping directly, but my line of questioning was aimed at revealing whether he had undermined his event preparation consciously or unconsciously to protect his ego (see Gallucci, 2008). Although Chris once again dismissed his lack of preparation as, “out of character”, I decided to remain aware of any behavior that could indicate self-handicapping.

Competitive Season-End Phase (Late August-Early September)

Near the end of the season, I arranged to play a round of golf with Adam and Chris to complete participant observation. Unfortunately, I only played with Adam as Chris had chosen to play in a European Tour qualifying tournament instead. Adam did not play well and was rather despondent when we spoke afterward. Within his reflection diary, he indicated that the evaluation apprehension experienced from my presence had elicited very high levels of debilitating anxiety, although he thought he had coped adequately with the most pressurized moments of the game:

The pitch on [hole] three was significant, as I knew this was what she [lead author] was waiting to see. One year’s work boiled down to this one shot. I went through my routine and became so engrossed with the process, I didn’t know she was there or what she was thinking. It felt great and the shot looked great.

After reading this extract, I was pleased the intervention was impacting on his skill execution, but concerned with the level of importance he placed on certain shots. I emailed Adam regarding this issue and he accepted that he lacked perspective at times. As a lack of sport/life perspective has been related to choking (Hill et al., 2009), I suggested he used CR in an attempt to rationalize such thoughts in the future.

Meanwhile, I received an e-mail from Chris who identified that he had failed to qualify for the European Tour event, because of a missed short putt:

On that putt, there were loads of people around and I thought, ‘just get it in’, then I don’t have to go through everything [PSR] and deal with the pressure for longer. But, I missed it. Standing over the next tee shot, I was so annoyed that I put it into the deep rough.

I found it interesting that like Adam, Chris had experienced avoidance behaviors within an intensely stressful situation that had resulted in a very poor shot. So, it was necessary to also reinforce with Chris the importance of remaining focused on the completion of the PSR over each shot. I felt it was also essential that Chris kept exposing himself to tournaments of this stature, as gaining experience of performing under pressurized conditions is likely to improve his ability to cope with anxiety (Mellalieu et al., 2006).

The final event of the season was perceived by Adam and Chris to be of high importance, and as they were playing together I used this opportunity to observe them. I noted that Adam appeared to rush his PSR and choke during the early holes, although he did recover midway through the game. In contrast, I perceived that Chris exuded confidence and performed well until the final three holes. At this point his swing became faster and the shot outcome was poor. I spoke to both participants

directly after the game and Adam was particularly despondent. He admitted that he had choked and had adopted negative thought processes at the beginning of the round. He explained, “I was shocked by my first tee nerves. I didn’t feel in control. I hit two horrific shots and then was standing on the green thinking, **** [expletive], what now”. Adam explained that it was the first competition he had played in for a while, and he felt under prepared for and surprised by the anxiety he felt on the tee, “My focus wasn’t fully there...it was on the unexpected anxiety. I suggested that Adam attempted to increase the perceived pressure within simulated practice and play in events that induced anxiety more often. I also asked him to imagine himself coping with unexpected and high levels of anxiety within a range of situations that may enable him to become more prepared, confident and able to perform under these conditions (Short et al., 2002).

Chris was satisfied with his overall performance within this event and his psychological approach during the game:

I did feel nervous on the first tee which isn’t unusual, but just went through my routine. I have become really neutral on the course and just go through my processes on each shot. I missed a few putts but wasn’t worried as I hit them well.

I asked him to describe his thought processes during the final few holes where his performance deteriorated. Chris explained that, “I was trying to hit some spectacular shots as I was thinking about making eagles [two under par] and birdies [one under par]. This response was somewhat disappointing as I had emphasized throughout the season the importance of remaining focused on the processes. I felt the need re-state the value of this approach:

You seem to think by saying, ‘focus on the process’, I am not asking you to strive for birdies and eagles. It is by focusing on the process that you are ensuring the best opportunity to get them. By focusing on the importance of getting the birdies you under-perform or choke.

After the conversation, I reflected on a slightly disappointing few weeks, for Adam had choked and Chris had not fully embedded and/or understood the strategies as intended.

End of Season Reflection (Late September)

At the end of the season I met with each participant to reflect on their experiences. I spoke with Chris first and he considered that his season had been, ‘successful’ as he had not choked. We discussed at length the scores and shots that he believed were below expectations and he maintained that each poor performance was not a choke, “[Unlike a choke] I wasn’t as nervous. I was in control. I thought and expected to hit a good shot. I just didn’t because it was either a bad decision, a really tricky shot, or I had just lost my focus.” This would appear to confirm the need to evaluate an athlete’s cognitions and emotions that occur before skill execution, before assuming that their drop in performance is a choke (Hill et al., 2009, 2010b). Chris thought his technical swing changes were primarily responsible for his improved performance under pressure but suggested that the psychological

intervention had contributed, “It took about a month and a half to get comfortable with it [the intervention], then when it was embedded it began to have a bit of a positive affect”. Overall, Chris perceived that his mental toughness had been enhanced and explained that, “To me, mental toughness is resilience. To hit a bad shot and then hit a good next one. I now manage myself better by focusing on the PSR processes and remaining neutral”.

Chris recognized that his confidence had risen substantially throughout the season, though attributed this to his technical changes. He did admit however that the swing feeling and reflective diary had played a small role:

[Because of the reflective diary] I always think positively first and then work out what I need to put right. It’s good for recovering from poor performances as I make sure I take positives from the game. [And], if I can get the swing feeling I know I will hit a good shot. It gives me confidence.

Chris’s lack of appropriate focus during skill execution had been a priority for the intervention but as the strategies had increased distraction initially, it did cause Chris to reconsider their use. This reinforces the suggestion that the introduction of an intervention often leads to distraction in the short-term (Foster, Weigand, & Baines, 2006), and so practitioners need to support their athletes through this transition. In addition, researchers should only evaluate the impact of psychological strategies once they have been embedded fully. Nevertheless, Chris acknowledged that the intervention had impacted more on his focus than any other psychological construct, “The PSR has helped me focus. If I hadn’t focused on it [the PSR], I would have focused on my swing technique or where the ball needed to go... which wasn’t good”. He also noted that by the end of the season the PSR had begun to encourage automaticity of his skill execution that in time, should encourage a higher standard of performance under pressure (Abernethy, Maxwell, Masters, Van Der Kamp, & Jackson, 2007).

We moved on to discuss the impact of the intervention on Chris’s anxiety management and he identified that the PSR, process-focused approach and swing feel contributed to his maintained performance while anxious, “I am still anxious [but] doing my PSR, focusing on my swing feel...focusing on my processes, distracts me from the anxiety”. He commented that he had not applied the intervention to his putting and so his anxiety continued to affect detrimentally this aspect of his game. I was concerned and surprised that he had not applied the intervention throughout the game, although he tried to account for this by stating, “It’s because I am still working on the stroke [the technique] so I haven’t got a feel or routine yet”. I wondered whether Chris’s tendency to make unnecessary technical changes was another demonstration of self-handicapping behaviors and although it is an understandable method of protecting his self-esteem (Gallucci, 2008), I would argue it had become a limiting factor in his development.

The final psychological construct we discussed was perceived control, which Chris recognized had risen from using a process-focused approach and a swing feel, “I am more certain about the outcome when I focus on the process and then get the swing feel”. We ended the meeting by discussing disappointing elements of his season and he identified poor scoring. Chris explained that this may have been a result of his tendency to make technical changes during the season, “I am a perfectionist though. I can’t walk away until I have finished working on my swing

and I think it's right". As a result, I sensed that the impact of the intervention may have been tempered further by his maladaptive perfectionism that had led to continual technical alterations (see Frost, Marten, Lahart, & Rosenblate, 1990). Indeed, his perfectionism may also have been a contributory factor to his previous choking episodes and his continued disappointing performance scores (see Gucciardi et al., 2010).

Adam perceived that the intervention had impacted substantially on his game, "I am almost starting to enjoy playing under pressure". He explained, "I can't see myself at the point when I am going to choke anymore. I don't have to protect myself from hitting shots that I used to choke on. I just go and play". We discussed the fragility of his psychological state at the beginning of the year and the choking episode he experienced near the end of the season, but he reflected positively on them both by explaining that, "Initially it [the intervention] didn't work. But I knew I just had to give it more time. With regards to that recent choke, well...I actually enjoyed it [the event], but was not in control. I just need more competitions to get more comfortable with that kind of pressure". As such, although Adam had choked during the season it would appear that the intervention had enabled him to reduce its occurrence.

Adam thought that his increased confidence was the main reason he was able to perform more effectively under pressure, "It [self-confidence] has increased massively. Not just in golf but in everything I do because I am putting myself in difficult situations and coming out of it". When asked to explain how his confidence had increased he explained that, "It's a combination of all of the [psychological] strategies. The strategies are like the cogs of a clock. If you take one out, it doesn't work". He also acknowledged that the rehearsal of the strategies within simulated practice and the reflective diary had been particularly effective:

[As a result of simulated practice] I'd go out on the course, and think... 'well I can hit this one'. Then the diary helped me reflect on a good shot and see other ways in which I could have played the bad shots. It made me man up a bit and stop being such a pansy!

When asked to compare his current level of confidence with that of the past, I was shocked by Adam's reply:

All I have ever wanted to do is play sport. If I was no good at sport, then I was nothing...I took up golf. It was going great...then, I struggled. To be no good at the one thing I thought I was best at, is heartbreaking. All I did every night was beat myself up. It wasn't worth being here if I wasn't good at golf. Life wasn't worth living...Now I can play under pressure, and it feels great!

Although the extant literature has identified the impact of choking on performance levels (see Beilock & Carr, 2007), little attention has been paid to the psychological consequences for an individual who chokes. It would appear from Adam's experience that this area of applied sport psychology requires consideration.

The remainder of the interview attempted to establish whether the intervention had improved Adam's focus, anxiety management and perceived control. He suggested that although his focus had improved, it was the aspect of his game that remained vulnerable to the effects of pressure. He explained that the PSR and

swing feeling had been responsible for the improvement as, “There is so much that goes on in my head that it’s easier to stand over the ball and think about the feeling or the process instead”. Adam continued by discussing the level of anxiety he now experienced under pressure and although the intensity remained high, he perceived the PSR had helped him control the symptoms, “I still have the ability to get really nervous, but I can handle it. I just focus on my routine and that allows me to deal with it because the routine takes over from the nerves”. Interestingly, Adam recognized that the duration of his PSR would lengthen as the amount of anxiety increased. This allowed him to gain perceived control of his anxiety and supports the suggestion that the behavioral consistency of a preperformance routine is far more important than its temporal consistency (Lonsdale & Tam, 2008). Adam also noted that the introduction of CR midway through the season had impacted on his anxiety management because it increased his sense of control over the shot, “It [CR] gives you acceptance. You accept that it could go wrong, but if you tell yourself to ‘put the right swing on it, go through the processes’, it’s not going to”. Finally, he suggested that his perceived control had improved noticeably throughout the season as a result of the PSR and swing feel:

If I have gone through my routine, I then focus on the swing feeling. I think... well I have done everything I can control now, I have ticked all the boxes. There is no chance that it could go anywhere other than where I wanted it to.

We concluded the interview by reviewing disappointing elements of the intervention and like Chris, he identified that his event scores had been disappointing, “This has been the best season so far, but not score-wise. In practice I am better, my swing is better, I am hitting the ball better, I can hit more shots. The scores haven’t happened in competition yet”. Nevertheless, Adam was not concerned particularly about this and stated that, “I just need more competitions to improve again. I am expecting that I will improve my scores then”.

Summary and Conclusion

The study has demonstrated that an intervention designed to alleviate choking has effectively reduced the number of choking episodes experienced by two elite golfers throughout a competitive season. The participants perceived that choking had been minimized as a result of their enhanced self-confidence, focus, anxiety management and perceived control. The strategies used within the study were collectively responsible for this improvement, emphasizing the need to use evidence-based interventions designed to address the specific needs of an athlete population (Thomas et al., 2009).

Both participants considered the PSR to be important in the prevention of choking, for it increased their self-confidence and perceived control, but more particularly, their focus and anxiety management. This finding supports the belief that a PSR can enhance pressurized performance (Czech et al., 2004) and play a role in alleviating choking (Mesagno et al., 2008). The participants also recognized that the holistic swing feel was a key element of the PSR, as it promoted a process-focused approach and prevented them from thinking about the explicit components of the skill and outcome of the task. As a result their focus, anxiety management,

perceived control and performance was enhanced. This corroborates the work of Gucciardi and Dimmock (2008) who concluded that a swing feel may act as an effective strategy for the prevention of choking. Simulated training was perceived by the participants to be an effective method for increasing confidence, focus and anxiety management. Both participants thought that the strategy contributed to the prevention of choking by providing them with the experience of pressurized performance. Gaining experience in this manner is associated with improving athletes' ability to cope with pressure as they learn to develop appropriate psychological skills (Mellalieu, et al., 2006). This strategy was particularly valued by the two participants as they were able to embed their taught strategies under a level of pressure which they gradually increased, without exposing themselves to the psychologically damaging effect of failing during competition.

Although CR was only used by one participant (Adam), he identified that it had impacted considerably on his confidence. In this case, the strategy was only effective when the irrational and negative thought was replaced by a rational process-related thought rather than a positive one. Far more research is required, but this indicates that positive self talk (see Hardy, 2006) may not be an effective tool to use with all athletes who choke. A reflective diary was not among the strategies suggested by Hill et al. (2010a), but was introduced to the study in response to the particular needs of the participants. By reflecting on all performances in a positive and constructive way, Adam and Chris were able to maintain and enhance their confidence which was perceived to impact positively on their choking behavior. Interestingly, both participants under-estimated the value of the diary and their adherence to the strategy was poor initially. Thus, practitioners may need to educate their clients as to the potential impact that reflection can have on levels of confidence, motivation and empowerment (Hanton et al., 2009).

The most troubling, but arguably significant finding of the study was the consequence of choking under pressure on Adam's well-being. The data indicates that Adam may have been questioning and/or losing his athletic self identity as a result of failing to achieve his sporting goals. Although research regarding athletic identity is largely restricted to the transition from elite sport participation into retirement (e.g., Warriner & Lavalee, 2008), it does highlight that a range of negative psychological responses (e.g., turmoil, identity confusion, and a lack of direction) are associated with a loss of sporting identity. Hitherto, the choking literature has only paid attention to the damaging effect of choking on performance, and so it is necessary to ascertain the potential impact that choking can have on athletes' self identity and well-being.

Overall, the participants suggested that the intervention had enhanced their psychological approach under pressure and alleviated their choking, but the extent of the impact differed. It is likely that Adam benefited more because there was greater 'room for improvement' with regards to his psychological state. The extent of his despondency at the beginning of the season may also explain his greater commitment to the intervention. Yet, it is also possible that other factors contributed to the intervention having a lesser effect on Chris. Firstly, he did not embed all of the strategies as intended which was due in part to my assumption that he had been applying the strategies appropriately. This serves to reinforce the need for practitioners to not only evaluate the impact of a strategy, but to also monitor whether it has been used correctly. Moreover, it is possible that using phone calls

and e-mail exchanges to deliver and clarify aspects of the intervention, may have led to Chris's misunderstanding of particular strategies. Therefore, practitioners should endeavor to introduce and explain fully the intervention to the athlete via face-to-face meetings. Chris also demonstrated that other psychological variables including perfectionism and self-handicapping may have limited the impact of the intervention. Consequently, additional research is required to understand how they and other moderators impact on choking, so that interventions can be modified to address such variables.

This action research study has enabled a detailed examination of an intervention designed to alleviate choking and provides practitioners with information that can be used with their athletes. It also provides researchers with further evidence for the cause, moderators and consequences of choking. However, it is essential that research is completed on a larger sample of participants and through a broader range of sports. The challenge therefore, is to complete a larger scale examination of choking on athletes who may not remain in their sport over an extended period of time. For example, within the time-frame of one competitive season, four of the six elite golfers who were invited to participate in this study had chosen to withdraw from their sport entirely, or perform at a lower standard. It is also important that future research compliments the qualitative approach of this study, by measuring objectively the impact of the intervention on the choker and their performance. Although Adam and Chris were required to discuss and/or record their experiences soon after each tournament or event, it is important to recognize that the qualitative methods used within this study remain vulnerable to bias and "expert induced amnesia" (see Beilock, Wierenga, & Carr, 2003), especially as the participants were required to recollect complex cognitive processes associated with distraction. In addition, the full impact of any psychological training is likely to take longer than one season (Hardy, Jones, & Gould, 1996), and thus it would be advantageous to examine whether the application of this intervention over a longer period of time could encourage chokers to excel under pressure, rather than just avoid the choke. Finally, it may be beneficial to explore the mechanism of choking through other theoretical frameworks. In particular, the Cusp Catastrophe Model (CCM; Hardy, 1990) offers an intuitively appealing account of choking, as it does provide an explanation for the significant/catastrophic drop in performance associated with a choke (Hill et al., 2009). According to the CCM, the interactive effects of cognitive anxiety, physiological arousal (Hardy, 1990), effort (Hardy, Beattie, & Woodman, 2007) and self-confidence (Beattie & Davies, 2010) may influence the likelihood of a catastrophic performance failure, that could include the choke. Thus, more research regarding a potential relationship between the tenets of CCM and the choking phenomenon is required.

References

- Abernethy, B., Maxwell, J.P., Masters, R.S.W., Van Der Kamp, J., & Jackson, R.C. (2007). Attentional processes in skill learning and expert performance. In G. Tenenbaum & R.C. Eklund (Eds.), *Handbook of sport psychology* (3rd ed., pp. 245–263). Hoboken, New Jersey: Wiley & Sons.
- Baumeister, R.F. (1984). Choking under pressure: Self-consciousness and paradoxical effects of incentives on skilful performance. *Journal of Personality and Social Psychology*, *46*, 610–620.

- Baumeister, R.F., & Showers, C.J. (1986). A review of paradoxical performance effects: Choking under pressure in sports and mental tests. *European Journal of Social Psychology, 16*, 361–383.
- Beattie, S., & Davies, M. (2010). A test of engagement versus disengagement in catastrophe models. *The British Journal of Psychology, 101*, 361–371.
- Beilock, S.L., & Carr, T.H. (2001). On the fragility of skilled performance: What governs choking under pressure. *Journal of Experimental Psychology, 130*, 701–725.
- Beilock, S.L., & Gray, R. (2007). Why do athletes choke under pressure? In G. Tenenbaum & R.C. Eklund (Eds.), *Handbook of sport psychology* (3rd ed., pp. 425–444). Hoboken, New Jersey: Wiley & Sons.
- Beilock, S.L., Wierenga, S.S., & Carr, T.H. (2003). Memory and expertise: What do experienced athletes remember? In J.L. Strakes & K.A. Ericsson (Eds.), *Expert performance in sport* (pp. 295–320). Champaign, IL: Human Kinetics.
- Castle, A. (1994). Action research for developing professional practice. *British Journal of Therapy and Rehabilitation, 1*, 155–157.
- Clark, T.P., Tofler, I.R., & Lardon, M.T. (2005). The sport psychiatrist and golf. *Clinics in Sports Medicine, 24*, 959–971.
- Czech, D.R., Ploszay, A., & Burke, K.L. (2004). An examination of the maintenance of pre-shot routines in basketball free throw shooting. *Journal of Sport Behavior, 27*, 323–329.
- Elliot, J. (1991). *Action research for educational change*. Milton Keynes: Open University Press.
- Elliot, J. (2007). Assessing the quality of action research. *Research Papers in Education, 22*, 229–246.
- Evans, L., Fleming, S., & Hardy, L. (2000a). Situating action research: A response to Gilbourne. *The Sport Psychologist, 14*, 296–303.
- Evans, L., Hardy, L., & Fleming, S. (2000b). Intervention strategies with injured athletes: An action research study. *The Sport Psychologist, 14*, 188–206.
- Eysenck, M.W., & Calvo, M.G. (1992). Anxiety and performance: The Processing Efficiency Theory. *Cognition and Emotion, 6*, 409–434.
- Fletcher, D., & Hanton, S. (2001). The relationship between psychological skills usage and competitive anxiety responses. *Psychology of Sport and Exercise, 2*, 89–101.
- Foster, D.J., Weigand, D.A., & Baines, D. (2006). The effect of removing superstitious behavior and introducing a pre-performance routine on basketball free throw performance. *Journal of Applied Sport Psychology, 18*, 167–171.
- Frost, R., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive Therapy and Research, 14*, 449–468.
- Gallucci, N.T. (2008). *Sport psychology: Performance enhancement, performance inhibition, individuals and teams*. New York: Psychology Press.
- Gladwell, M. (2000). The art of failure. *New Yorker (New York, N.Y.)*, 21, 84–02.
- Gucciardi, D.F., & Dimmock, J.A. (2008). Choking under pressure in sensorimotor skills: Conscious processing or depleted attentional resources? *Psychology of Sport and Exercise, 9*, 45–59.
- Gucciardi, D.F., Longbottom, J.L., Jackson, B., & Dimmock, J.A. (2010). Experienced golfers' perspectives on choking under pressure. *Journal of Sport & Exercise Psychology, 32*, 61–83.
- Hanton, S., Cropley, B., & Lee, S. (2009). Reflective practice, experience, and the interpretation of anxiety symptoms. *Journal of Sports Sciences, 27*, 517–533.
- Hanton, S., Cropley, B., Neil, R., Mellalieu, S.D., & Miles, A. (2007). Experience in sport and its relationship with competitive anxiety. *International Journal of Sport and Exercise Psychology, 5*, 28–53.
- Hardy, L. (1990). A catastrophe model of anxiety and performance. In J.G. Jones & L. Hardy (Eds.), *Stress and performance in sport*. Chichester, UK: Wiley.
- Hardy, J. (2006). Speaking clearly: A critical review of the self talk literature. *Psychology of Sport and Exercise, 7*, 81–97.
- Hardy, L., Beattie, S., & Woodman, T. (2007). Anxiety-induced performance catastrophes: Investigating effort required as an asymmetry factor. *British Journal of Psychology, 98*, 15–31. doi:0.1348/000712606X103428

- Hardy, L., Jones, G., & Gould, D. (1996). *Understanding psychological preparation for sport: Theory and practice of elite performers*. Chichester, UK: Wiley & Sons.
- Hill, D.M., Hanton, S., Fleming, S., & Matthews, N. (2009). A re-examination of choking under pressure. *European Journal of Sport Science*, 9, 203–212.
- Hill, D.M., Hanton, S., Matthews, N., & Fleming, S. (2010a). A qualitative exploration of choking in elite sport. *Journal of Clinical Sports Psychology*, 4, 221–240.
- Hill, D.M., Hanton, S., Matthews, N., & Fleming, S. (2010b). Choking in sport: A review. *International Review of Sport and Exercise Psychology*, 3, 24–39.
- Hoigaard, R., & Johansen, B.T. (2004). The solution-focused approach in sport psychology. *The Sport Psychologist*, 18, 218–228.
- Jackson, R.C., Ashford, J.J., & Norsworthy, G. (2006). Attentional focus, dispositional reinvestment and skilled performance under pressure. *Journal of Sport & Exercise Psychology*, 28, 49–68.
- Jacobson, E. (1938). *Progressive relaxation*. Chicago: University of Chicago press.
- Jordet, G., & Hartman, E. (2008). Avoidance motivation and choking under pressure in soccer penalty shootouts. *Journal of Sport & Exercise Psychology*, 30, 450–457.
- Kellmann, M., & Beckmann, J. (2003). Research and intervention in sport psychology: New perspectives for an inherent conflict. *International Journal of Sport and Exercise Psychology*, 1, 13–26.
- Kingston, K.M., & Wilson, K. (2009). The application of goal setting in sport. In S.D. Mellalieu & S. Hanton (Eds.), *Advances in applied sport psychology: A review* (pp. 75–123). Oxon: Routledge.
- Knowles, Z., Gilbourne, D., Borrie, A., & Nevill, A. (2001). Developing the reflective sports coach: A study exploring the processes of reflective practice within a higher education coaching programme. *Reflective Practice*, 2, 185–207.
- Lam, W.K., Maxwell, J.P., & Masters, R.S.W. (2009a). Analogy learning and the performance of motor skills under pressure. *Journal of Sport & Exercise Psychology*, 31, 337–357.
- Lam, W.K., Maxwell, J.P., & Masters, R.S.W. (2009b). Analogy versus explicit learning of a modified basketball shooting task: Performance and kinematic outcomes. *Journal of Sports Sciences*, 27, 179–191.
- Lonsdale, C., & Tam, J.T.M. (2008). On the temporal and behavioral consistency of pre-performance routines: An intra-individual analysis of elite basketball players' free throw shooting accuracy. *Journal of Sports Sciences*, 26, 259–266.
- Masters, R.S.W., Polman, R.C.J., & Hammond, N.V. (1993). Reinvestment: A dimension of personality implicated in skill breakdown under pressure. *Personality and Individual Differences*, 14, 655–666.
- Maxwell, J.P., Masters, R.S.W., & Eves, F.F. (2000). From novice to no know-how: A longitudinal study of implicit motor learning. *Journal of Sports Sciences*, 18, 111–120.
- McNiff, J. (2001). *Action research: Principles and practice* (2nd ed.). London: Routledge.
- McNiff, J., & Whitehead (2006). *All you need to know about action research*. London: Sage publications.
- Mellalieu, S.D., Hanton, S., & Fletcher, D. (2006). A competitive anxiety review: Recent directions in sport psychology research. In S. Hanton & S.D. Mellalieu (Eds.), *Literature reviews in sport psychology* (pp. 1–45). New York: Nova Science Publishers.
- Mesagno, C., & Mullane-Grant, T. (2010). A comparison of different pre-performance routines as possible choking interventions. *Journal of Applied Sport Psychology*, 22, 343–360.
- Mesagno, C., Marchant, D., & Morris, T. (2008). A pre-performance routine to alleviate choking in “choking-susceptible” athletes. *The Sport Psychologist*, 22, 439–457.
- Mesagno, C., Marchant, D., & Morris, T. (2009). Alleviating choking: The sounds of distraction. *Journal of Applied Sport Psychology*, 21, 131–148.
- Monsma, E.V., & Overby, L.Y. (2004). The relationship between imagery and competitive anxiety in ballet in ballet auditions. *Journal of Dance Medicine and Sciences*, 8, 11–18.
- Moran, A. (2009). Attention in sport. In S.D. Mellalieu & S. Hanton (Eds.), *Advances in applied sport psychology: A review* (pp. 195–220). Oxon: Routledge.

- Mullen, R., Hardy, L., & Tattersall, A. (2005). State anxiety and motor performance: Testing the conscious processing hypothesis. *Journal of Sports Sciences, 18*, 785–799.
- Ottom, M. (2009). Choking vs. Clutch performance: A study of sport performance under pressure. *Journal of Sport & Exercise Psychology, 31*, 583–601.
- Oudejans, R.R.D., & Pijpers, J.R. (2009). Training with anxiety has a positive effect on expert perceptual-motor performance under pressure. *Quarterly Journal of Experimental Psychology, 62*, 1631–1647.
- Patton, M.Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). London: Sage.
- Perkins-Ceccato, N., Passmore, S.R., & Lee, T.D. (2003). Effects of focus of attention depend on golfers' skill. *Journal of Sports Sciences, 21*, 593–600.
- Poolton, J.M., Masters, R.S.W., & Maxwell, J. (2006). The influence of analogy learning on decision making in table tennis: Evidence from behavioral data. *Psychology of Sport and Exercise, 7*, 677–688.
- Reason, P., & Bradbury, H. (2007). *The sage handbook of action research: Participative inquiry and practice*. London: Sage Publications.
- Shambrook, C., & Bull, S.J. (1997). Perceptions of the sport psychologist: A consideration of influences upon adherence to mental skills training programmes. In R. Lidor (Ed.), *Innovations in sport psychology: Linking theory and practice* (pp. 620–622). Netanya, Israel: The Wingate Institute for Physical Education and Sport.
- Shaw, D. (2002). Confidence and the pre-shot routine in golf: A case study. In I. Cockerill (Ed.), *Solutions in sport psychology* (pp. 108–119). London: Thomson.
- Short, S., Bruggeman, J.M., Engel, S.G., Marback, T.L., Wang, L.J., Willadsen, A., et al. (2002). The effect of imagery type and imagery direction on self-efficacy and performance on a golf-putting task. *The Sport Psychologist, 16*, 48–67.
- Short, S.E., Monsma, E.V., & Short, M.W. (2004). Is what you see really what you get? Athletes' perceptions of imagery's functions. *The Sport Psychologist, 18*, 341–349.
- Short, S., & Ross-Stewart, L. (2009). A review of self-efficacy based interventions. In S.D. Mellalieu & S. Hanton (Eds.), *Advances in sport psychology: A review* (pp. 221–280). London: Routledge.
- Singer, R.N. (2002). Pre-performance states, routines and automaticity: What does it take to realize expertise in self-paced events? *Journal of Sport & Exercise Psychology, 24*, 359–375.
- Sparkes, A. (1991). Curriculum change: On gaining a sense of perspective. In N. Armstrong & A. Sparkes (Eds.), *Issues in physical education* (pp. 1–19). London, UK: Cassell.
- Thomas, O., Hanton, S., & Maynard, I. (2007). Anxiety responses and psychological skill use during the time leading up to competition: Theory to practice I. *Journal of Applied Sport Psychology, 19*, 379–398.
- Thomas, O., Mellalieu, S.D., & Hanton, S. (2009). Stress management in sport: A critical review and synthesis. In Mellalieu, S.D., & Hanton, S. (Eds.), *Advances in applied sport psychology: A review* (pp.124, 161). Oxon: Routledge.
- Vealey, R.S., & Chase, M.A. (2008). In T.S. Horn (Ed.), *Advances in sport psychology* (3rd ed., pp. 65–98). Champaign, IL: Human Kinetics.
- Wang, J., Marchant, D., & Morris, T. (2004). Coping style and susceptibility to choking. *Journal of Sport Behavior, 27*, 75–92.
- Warriner, K., & Lavalee, D. (2008). The retirement experiences of elite female gymnasts: Self identity and the physical self. *Journal of Applied Sport Psychology, 20*, 301–318.
- Willig, C. (2008). *Introducing qualitative research in psychology*. New York: McGraw-Hill, Open University Press.
- Wilson, M., Chattington, M., Marple-Horvat, D.E., & Smith, N.C. (2007). A comparison of self-focus versus attentional explanations of choking. *Journal of Sport & Exercise Psychology, 29*, 439–456.
- Wulf, G., & Jiang, S. (2007). An external focus of attention enhances golf shot accuracy in beginners and experts. *Research Quarterly for Exercise and Sport, 78*, 384–389.