Original Article

Cognitive behavioural intervention for the golf yips: A single-case design

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Although considered rare, the golf yips are highly distressing and are difficult to understand or to treat. Based on the best-available evidence from existing literature, a longitudinal single-case design was employed to evaluate a formulation-based psychological intervention with an experienced male golfer. The 10-hour cognitive behavioural intervention was administered jointly by a golf coach and a sport psychologist. Results indicated a statistically significant improvement in golf chipping performance during the intervention and follow-up phases, together with a 50 per cent reduction in the golf yips, attributed to an improved pre-performance routine and enhanced concentration. The single-case research design indicates that the golf yips can be ameliorated by psychological means under routine coaching conditions.
Keywords: *pre-performance routine; dystonia; choking; formulation.*

GOLF IS RENOWNED for its psychological challenges, in particular the need for a steady hand and keeping one's nerve for shots around the green. Regardless of expertise, many golfers (Smith et al., 2000) experience the 'yips', especially when playing a short approach shot or a putt (also referred to as 'twitches', 'jerks', 'freezing' or 'jitters'). The yips are an involuntary jerk normally occurring mid-movement during the execution of a fine motor skill, but can also manifest as an inability to initiate the club's movement. The movement problem is isolated to one limb or extremity and the effect causes a breakdown in the normally smooth movement pattern (Sachdev, 1992). Other people can be affected by the yips: according to Hunter (1978), 55 occupations have been affected, such as locksmiths, dentists and hairdressers. The estimated prevalence of the yips in golf varies greatly. For example, McDaniel, Cummings and Shain (1989) distributed a 69-item questionnaire to 1050 golfers in an effort to define the problem more clearly, reporting that 28 per cent of all male respondents to their questionnaire survey reported experiencing the yips. Additionally, Marquardt (2009) cited research by the Mayo Clinic indicating that more than 30 per cent of golfers experience the yips (Smith et al., 2000), adding an average 4.7 strokes per round. The same study also reported that 52 per cent of all respondents with a low golf handicap had experienced the yips. Many famous cases exist in golf where a leading professional has also suffered (e.g. Hogan; Langer; Snead; Armour; Watson). In fact, it is Armour who is credited with coining the term 'the yips' which appeared in his instruction book (Armour, 1953). The suffering can be so intense that some players' careers have ended prematurely. For example, Australian golfer Brett Ogle is on record as saying that it drove him to retire early (Centenera, 2014). Some players who have had the yips have worked around the problem, for example, by using a putter that can be anchored into their body, but this style of shot has been prohibited by the rules from 2016 ('Rules and Amateur Status,' 2014). So the current 'solution' available to players is about to become illegal, making other solutions more pressing.

In terms of understanding the yips, some researchers argue for a neurological basis, considering the yips to be a focal dystonia

(a neurological problem or motor impairment where involuntary muscular movements occur in certain limbs, due to misfiring neurons in the sensorimotor cortex, like cramping or tremors). In turn, the misfiring is thought to arise from overuse of a physical movement (as in musician's or writer's cramp: Donaldson et al., 2012; Klawans, 1996; Sachdev, 1992). Whilst such organic accounts of the yips may acknowledge that anxiety plays a role, Donaldson et al. (2012) suggested that attempts to explain such 'occupational cramps' psychologically were fundamentally flawed. Similarly, Marquardt (2009) has questioned the use of the focal dystonia diagnostic category, because the yips do not represent a complete breakdown of movement. For example, a golfer can putt a ball from various distances using the same basic movement (only invoking slight change in the amplitude of the stroke to change the speed of the ball), but the yip will only be present during the short putt. Presumably a focal dystonia sufferer would experience a problem with all putt-related movements. A neurological explanation is also flawed because it does not explain why some golfers only yip under pressure (i.e. situational dysfunction), associated with predictable psychological changes. For instance, Smith et al. (2000) stated that 'Golfers affected by the yips had a faster mean heart rate, increased electromyogram activity patterns, exerted more grip force than non-effected golfers, and had a poorer putting performance' (p.423), concluding that performance anxiety was a key factor in the yips. This elevated anxiety in yips sufferers suggests that stressors may cause this phenomenon, rather than a neurological disorder (Wulf, 2007). Other psychological factors that are thought to contribute to the yips include worrying thoughts (e.g. catastrophising about an embarrassing failure; Baumeister & Showers, 1986); distractions and poor focusing (e.g. attending to irrelevant cues; Gallwey, 1979); and maladaptive coping (e.g. conscious processing; Masters, 1992). Individually, these can cause a temporary regression to an earlier stage of learning (Pijpers et al., 2005). The conscious processing hypothesis and the associated theory of reinvestment (Masters, 1992) posit that the player who yips 'reinvests' cognitive effort into explicit rules regarding the execution of the task. This availability of explicit knowledge may only be available to performers who learned the task by following explicit instructions in the first place. This research from conscious processing suggests that performers who learn implicitly rather explicitly will be less prone to severe performance breakdown under pressure, and may partly explain why some golfers yip. According to Masters, the 'reinvestment of controlled processing in automatic skill may explain choking, and indeed, may explain more severe forms of choking such as 'dartitis' or the feared yips' (Masters, 1992, p.345).

Collectively, the above psychological factors can combine within a vicious cycle that starts with the perception of a problem, leading to heightened anxiety, over-control (e.g. excessive monitoring, and cognitive or physical interference with the movement; Marquardt, 2009). Expressed differently, the net effect could be to alter the open loop control system (i.e. no feedback and automatically controlled) of the skill to a closed loop control system (i.e. concurrent monitoring and conscious processing), resulting in yipping. This is because attempting to manually control multiple degrees of freedom may be too difficult for the individual (i.e. cognitive overload), and a poorly coordinated movement may result (e.g. a yip). According to Schmidt and Wrisberg (2000), an open loop system 'faithfully carries out the instructions without modification' (p.126). These features indicate that the yips might be a form of psychological 'choking' (i.e. generally decreased motor performance in sports due to increased performance anxiety, resulting in a disconnection from the movement; Marquardt, 2009). Over time, such psychological factors can become associated with a motor

performance, ingraining the vicious cycle as a habit disorder: detailed kinematic movement analysis of the putting stroke of 264 amateur golfers 'does not support a neurological disease… (indicating rather) …a learned disorder' (Marquardt, 2009, p.73 & p.78). A further reason to question that the yips are due to a neurological problem (i.e. a focal dystonia) is the incidence of yipping reported by golfers (e.g. Smith et al., 2000, suggest 30 per cent are affected), which is far higher than the prevalence of focal dystonia in the general population (three in 10,000). We assume that the difference is due to the rarity of a dystonia (i.e. misfiring neurons), by comparison to the common nature of psychological factors like worrying thoughts, distractions and maladaptive coping. Perhaps because of the ubiquitous nature of such psychological factors, Marquardt (2009) concluded that the yips were a normal phenomenon in golfers.

A final reason to entertain a non-organic basis for the yips is that psychological interventions which target re-learning have been effective, succeeding in short periods (as summarised below). This is hard to explain neurologically, as is the situational and temporal variability (i.e. problems may only emerge in a specific context, accompanied by etiological psychological features). To illustrate, golfers typically only experience the yips for shots that are perceived as 'easy'. For example, chipping is often affected by the yips but requires one of the shortest (and, therefore, mechanically simplest) swings in golf. The yips may also disappear if the ball is fixed to the ground, or if the hole is replaced with some other target (Marquardt, 2009).

Logically, it is, of course, possible that both explanations are in part valid, with both neurological and psychological factors contributing to the yips. For example, a mild dystonia like a tremor may trigger a vicious psychological cycle. Another possibility is that each plays a dominant part in particular instances or aspects of performing a motor movement. Alternatively, Smith et al. (2000, 2003) have suggested that the yips are on a continuum between dystonia and choking. They categorise the yips as type 1 (dystonia) or type 2 (choking). The distinction they offer is that the dystonic sufferer has the yips all the time and is not affected by competitive pressure, whereas the choking yipper only experiences the yip once there is competitive pressure (e.g. an audience or competition context). Stinear et al. (2006) similarly distinguished between yippers, describing one type as having impaired movement initiation, and the other related to performance anxiety. Therefore, it appears that the precise aetiology of yipping is unclear and a subject for further research, but that psychological factors are influential. Bawden and Maynard (2001) concluded from their cricket bowling yips study that the yipping problem was similar to a severe form of choking, so it seems that psychological factors play a part in at least exacerbating, and possibly in causing the problem. This understanding provides a rationale for psychological intervention.

Psychological interventions have addressed many of the factors noted above. For instance, difficulties with worrying have been tackled successfully by solution-focused guided imagery (Bell, Skinner & Fisher, 2009; Bell & Thompson, 2007). The imagery involved the player trying to remember when the problem did not exist, then imagining putting without the problem, and then dealing with the subsequent reactions of people who would notice the change. Rebuilding smooth movement is a feature of Marquardt's (2009) behavioural approach, which is based on success in treating writer's cramp (Mai & Marquardt, 1994). In essence, this approach firstly establishes what an individual can perform without yipping, which can be a very short stroke with a ball, or swinging the putter without a ball being present. Gradually the skill is then built up, using the initial yip-free level as a reference point. When yipping is encountered, going back to the previous successful step preserves movement, and at some point the next level

will be attempted again, until the player incrementally increases the movement complexity, reaching normal levels. Difficulties with focussing have been addressed through developing pre-performance routines. According to Mesagno, Marchant, and Morris (2008), individuals susceptible to choking improved their performance under pressure by 29 per cent, after adopting a personalised pre-performance routine. This seemed to work by distracting the performer from the normal choking response, whilst shifting attention to task relevant cues. A variation on this theme is to distract golfers from their unhelpful thinking. Land and Tenenbaum (2012) compared 20 skilled and 24 novice golfers whilst putting under pressure. They also compared a task-irrelevant task (letter generation: participants speak aloud a random letter each time they heard an auditory signal) with a golf-specific task (attending to the moment of striking the ball, saying the word *hit* out loud at impact). Both tasks prevented choking under pressure, but only in the skilled golfers. According to the authors 'the cognitive demands of the secondary task… prevented a disruption of automaticity by consuming attentional resources and diverting focus away from skill execution' (p.315). A related intervention is to encourage golfers to adopt an external focus of attention as they perform the swing, that is, the player may attend to the clubs movement for the duration of the swing. This external focus (i.e. observable movements) involves attending to the effects of a movement on the environment, as opposed to an internal focus on perceived body movements (e.g. the feelings associated with the movement of the golf club; Wulf, 2007). Lawrence et al. (2012) used kinematic movement analysis to study the effect of an external focus of attention on novice golfers making a short putt from 2.5m. The golfers were given instructions that either involved how to move their body (internal focus) or how the putter should move (external focus) They found that all groups (internal focus, external focus and control) improved with practice (each participant completed 400 trials), but that the control group performed worse under anxious conditions (25 per cent or greater decrease in putts holed), whilst the internal and external focus groups were able to maintain their improvement under these high anxiety conditions. These results were interpreted as evidence that an appropriate focus of attention can prevent choking in novice golfers, and that these two forms of focusing attention may operate on different factors in a complementary way (i.e. an external focus may inhibit the breakdown of automaticity, whereas an internal focus may distract the player from pressure by maintaining a self-focused condition).

In summary, there have been some promising psychological interventions for the yips in golf, but research is sparse, and there are as yet no established interventions for the yips (Marquardt, 2009). The purpose of the present study was to contribute to the knowledge base by studying the performance of a chip shot in golf, utilising a single case design. In particular, drawing on the above literature, we sought to evaluate the effect of a personalised PPR (and, therefore, control of attention) on the frequency and magnitude of the chipping yips. We adopted an experimental approach, both in terms of our research design and in relation to a trial and error, empirical process, successively building on what worked for the participating player. A core part of the empirical process was the use of case formulation, an established and fundamental aspect of clinical psychology practice, with a recognised role to play in sport psychology (Gardner & Moore, 2005). We hypothesised that improved attention, through adherence to a formulation-based and personalised pre-performance routine, would reduce the frequency and severity of the participant's chipping yips.

Method

Participants

The golfer was a 52-year-old male who had been playing golf for 22 years. At the time of the study he was participating in weekly competitions at his golf club, with a handicap of 14. He agreed to participate in the present study because he was already receiving coaching from the second author, but was not making progress with the yipping problem (i.e. we used convenience sampling). The second author had identified the involuntary movements synonymous with yipping during the coaching sessions. Specifically the participant's yipping involved a sudden and involuntary jerk during the performance of a chip shot (just before impact with the ball), with the player's arms then temporarily freezing just after contact with the ball. He directed his own business and as indicated by his replies to The Psychological Mindedness Questionnaire (Conte et al., 1990), he had a positive attitude to new learning, being willing to talk, having good access to his feelings, a commitment to change, and an interest in behaviour.

The golf coach was a 41-year-old male, was a PGA qualified coach at level 3, with 20 years' experience and a Master's degree in the psychology of sport and exercise. He was also a part-time lecturer in applied sport psychology. This was his first substantive collaboration with a sport psychologist.

Design

A single-case AB experimental research design was employed, in which a two baseline assessments (the control phase) were followed by the intervention phase and a three-month follow-up assessment. This methodology is recommended for small sample studies concerned with interventions (Barker et al., 2013). We administered all instruments and assessed chipping performance twice in the control phase, at the midpoint (the intervention phase) and at the end of the intervention (follow-up phase). The selection of the instruments was intended to assess relevant thoughts, feelings and behaviours, as indicated by the formulation (as set out in Figure 1).

Measures

Pre-performance routine (PPR) checklist. We used a personalised checklist to assess the participant's adherence to his PPR. This checklist was developed by interviewing the golfer about the steps that he wished to take in executing a chipping stroke. The checklist specified the observable steps in performing the chip shot PPR and was completed by DM on the putting practice green. In addition to helping to develop the PPR, the checklist was also used to assess adherence to the PPR at the baseline phases (when there was a shorter, more rudimentary PPR) and at the subsequent phases. Table 1 (overleaf) sets out the PPR steps that the golfer sought to take by the end of the intervention.

Direct observation of chipping performance ('Radial assessment'). GM led an assessment of: (a) Chipping accuracy, determined through 20 consecutive chipping shots of varied distances and positions (mean length was 15 yards), with accuracy measured by how close, in yards, each chip was from the hole. This measurement of performance accuracy was assessed on the practice green by GM. GM also assessed (b) the presence of a yipping action (judged as present or absent); and (c) the correctness of the contact on the club (i.e. how close to the sweet spot the ball was struck: a ball that is not struck properly tends to produce an unpredictable shot and a distinctive sound). This procedure was carried out twice in the control phase, at the intervention phase, and at the follow-up phase.

The Psychological Mindedness Scale (Conte et al., 1990). This is a 45-item questionnaire, designed to measure an individual's suitability for a psychological intervention. Items are in a self-report format, rated from 'strongly agree' to 'strongly disagree' and are weighted 4,3,2,1, respectively.

Figure 1: Cognitive-behavioural formulation of the participant's chipping yips.

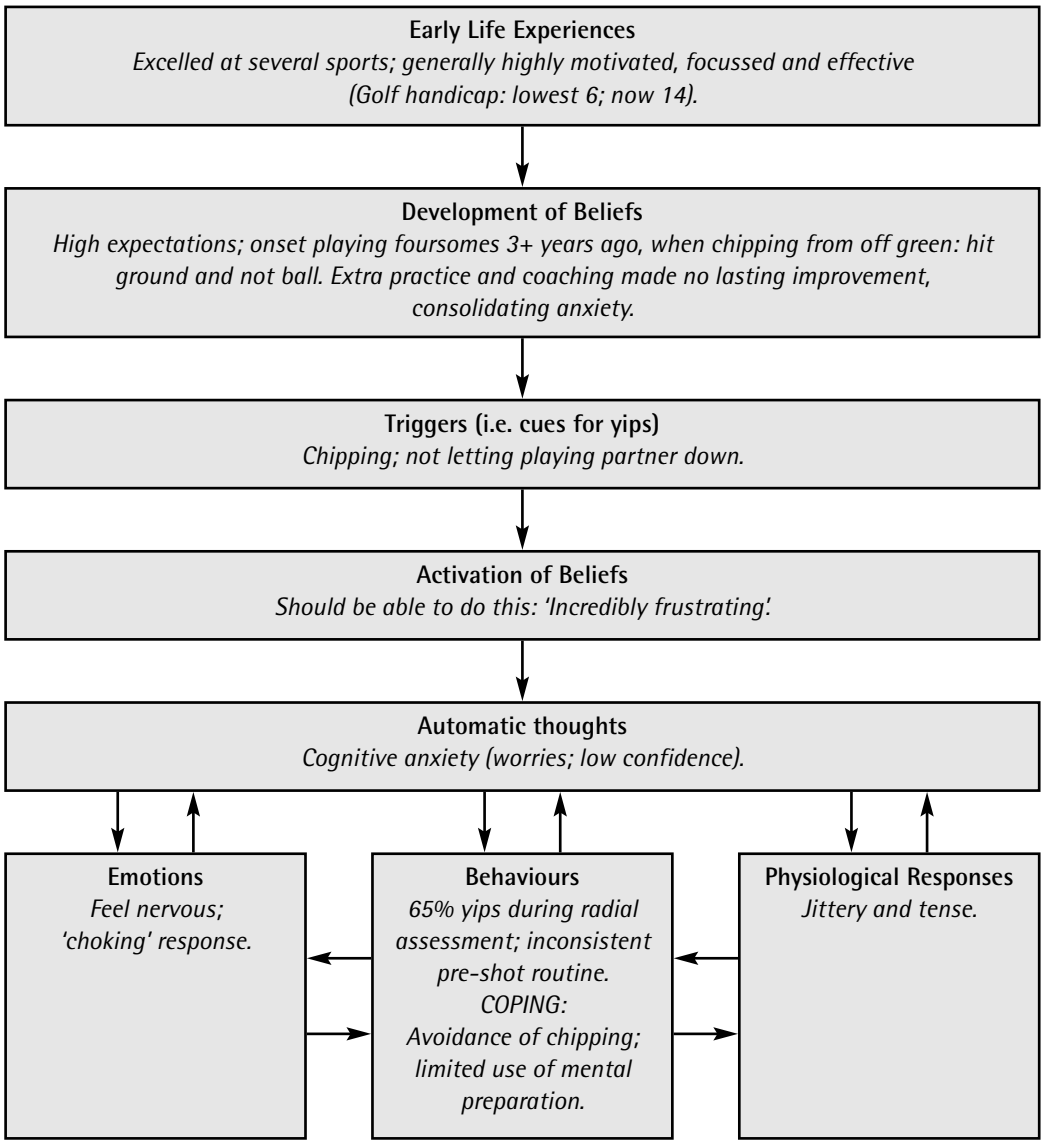


Table 1: The pre-performance routine that was developed and rehearsed with the participant.

	Steps in pre-performance routine
1	Balance (Shuffle; feel muscular tension in legs)
2	Practice swing 1
3	Glance at hole
4	Practice swing 2 (Smooth swing: feel in arms)
5	Glance at hole
6	Step up to ball (Get into stroking position)
7	Glance at hole
8	Relax right hand ('Let it drop')
9	Practice swing 3
10	Strike ball

General Health Questionnaire (GHQ; Goldberg, 1992). This was used as a screening instrument, included to exclude significant psychological distress (depression or anxiety) at the outset which otherwise may have been an undetected contributory factor in the participants condition or may have contra-indicated the study. This short version consists of twelve items, with four response options, from 'much less than usual' to 'much more than usual' (e.g. 'being able to concentrate on whatever you're doing?'). The replies are scored as one, if falling in the 'more than usual' or 'much more than usual' ratings, yielding a score range of 0 to 12. High scores indicate psychological distress worthy of a professional consultation (i.e. a score of six or more).

Bangor Sports Psychological Skills Inventory (BSPSI; Nelson & Hardy, 1990). Pre-intervention and post-intervention trait psychological skill levels were measured with this instrument. This is a 35-item self-report questionnaire, divided into seven factors that capture mental skills in sport, as illustrated in Figure 2, selected as a user-friendly tool (e.g. affords vivid feedback) and because it provides a general summary of psychological skills in sport. For example, the 'imagination' factor contains items like 'I can rehearse my sport in my mind' and 'I rehearse my skills in my head before I use them'. Scoring is based on the extent with which the respondent agrees with such statements, ranging from one ('Strongly agree') to six ('Strongly disagree'), giving a score range of 35 to 245. Cronbach's alphas for all seven subscales exceeded 0.78 (Nelson & Hardy, 1990). As indicated by Figure 2, the greater the self-reported mental skills, the higher the score. It was administered at the end of each phase.

Athlete Satisfaction Questionnaire & Consultant Evaluation Form (Gould et al., 1991). At the follow-up assessment point, these one-page questionnaires invited feedback from the athlete on the service provided by the coach, and from the coach regarding the service provided by the psychologist (respectively). The items asked about inter-personal effectiveness (e.g. 'easy to relate to'), competence (e.g. 'good knowledge') and effectiveness (e.g. 'helped me overcome problems'). Each item was responded to on a five-point Likert scale, ranging from strongly disagree to strongly agree, giving a score range of 17 to 85.

Procedure

The information from the above measures was combined with interview information to develop a formulation of the participant's yipping. The initial observation of the participant chipping showed a high percentage of shots (65 per cent) had involuntary movements from the player's arms and hands, detected by both the coach and the participant. Figure 1 illustrates this formulation, which indicated a fundamental problem with narrowed and negative concentration, corresponding to the 'choking' response (Philippen & Lobinger, 2012). Our intervention encouraged the participant to learn alternative ways of thinking about the chipping shot, alongside other specific techniques (listed below), so as to overcome the problems noted within the formulation. Table 1 summarises the main PPR intervention, which was guided by this formulation. In general terms we challenged the participant's chipping-related irrational or exaggerated beliefs, like catastrophic worrying about letting his playing partner down. During the intervention these were replaced by more relevant thoughts, in part as a result of applying the PPR. In this way, the vicious cycle of such negative thinking, associated emotions (e.g. frustration), behaviours (e.g. inconsistent pre-performance routine) and physiological responses (e.g. jittery and tense) was gradually reduced replaced by a virtuous cycle of more adaptive coping. The following specific intervention elements were applied:

Automatic (negative) thoughts: Instillation of positive instructional self-talk during the execution of the shot and growing self-efficacy, through structured practice and positive feedback from the coach and psychologist. In particular, just prior to shot execution we extended the participant's existing repertoire of effective positive motivational self-talk from other golf shots to chipping (e.g. 'stay focussed'; 'keep it going'). This was in keeping with Marquardt's logic of building on strengths (Marquardt, 2009).

Attention control: There was also a collaborative development of a PPR, one that was consistently applied (the sports psychologist observed and encouraged adherence to the PPR, using a checklist). As part of this process we encouraged the golfer to emphasise process (high fidelity adherence) over outcome, so reducing the pressure on success in terms of outcomes (i.e. not yipping; getting the ball close to the pin). Drawing out the analogy with work was also helpful, as he firmly believed in a 'light touch' as a boss, so we tried to extend that to his chipping. Another facet of the intervention was self-disclosure, in that both the coach and the psychologist tried to normalise yipping and choking by openly recounting their own experiences of similar difficulties (including experiences of applying successful coping strategies).

Coping behaviours: Enhanced coping was achieved partly by developing successful ways of concentrating. In particular, the PPR incorporated five psychological techniques (i.e. goal setting, pre-performance routines, centring, mental rehearsal, and instructional self-talk) which have been associated with improving athletes' attentional skills (Moran, 1996). In relation to these five techniques, we experimented with a wide range of foci, such as feeling the weight or movement of the club, as this emphasis on an external focus of attention is associated with improved performance (Wulf, 2007). We also tried different forms of confidence-building, through adopting an anxiety hierarchy (e.g. by starting with the easiest challenge, where the ball to be chipped was sitting up in the grass; and by keeping the hole very close, so a short swing could be utilised). Once the golfer felt psychologically comfortable through this process of graded exposure to his feared yip, and was performing relatively well in the golf chip (i.e. the amount of involuntary movements were greatly reduced; greater accuracy and control), we consolidated the preferred foci (see Table 1). This is partly what we mean by an experimental approach: a trial-and-error exploration of promising techniques.

We also worked on the PPR as a behavioural chain, to de-emphasise the ball-strike or shot outcome (i.e. proximity of shot to the hole). Instead, we emphasised giving equal value to all PPR steps: they were all essential parts of the chip shot. To heighten awareness of these steps we encouraged the participant to utilise various images, visualisation of success, and instructional self-talk. We also encouraged adherence to the PPR during the concurrent competitive (and practise) golf rounds, something we checked verbally with the participant at each session.

Physiological responses: Although we experimented with breathing exercises (e.g. slowing the breathing to control anxiety), the main effect on the participant's muscular tension and general over-arousal was achieved indirectly by improved his attention and concentration, through improvements in the above areas (especially the PPR).

Results

Pre-performance routine (PPR) checklist

At the initial baseline assessment the golfer had a five-step PPR with poor adherence (40 per cent). Over time the PPR became more detailed and at the follow-up assessment there was complete (100 per cent) adherence to the carefully developed 10-step PPR (Table 1). Also, the participant indicated that the initial negative thinking (e.g. 'Don't thin this' and having a 'negative mindset') was replaced with concentration on the PPR. During the execution of the shot the player also engaged in instructional self-talk.

Direct observation of chipping performance (Radial error assessment)

As summarised in Table 2, at the first baseline, the mean distance of the 20 chips from the hole was 3.2 yards (*SD*=2.07; range: 1–6).Yips were observed on 65 per cent of these chips. By the second baseline there was a slight deterioration in performance, with a mean distance of 4.4 yards (*SD*=3.77; range: 1–14). Yips occurred on 70 per cent of chips. After the intervention there was little improvement, with a mean proximity of 3.5 yards (*SD*=2.61; range: 0–9), with yips on 65 per cent of chips. However, by the follow-up assessment three months later there was a statistically significant improvement, with a mean proximity of 1.8 yards (*SD*=1.3; range: 0–6). Yips were also much less frequent, occurring on only 15 per cent of chips. Statistical comparisons of these data (Wilcoxon) indicated that there had been no change during the one-month baseline period (Z=0.74, p=.46), but that there was a statistically significant improvement after the intervention, when compared with the first baseline assessment (Z=2.50, p=.01). There was a further statistically significant improvement by the follow-up assessment point, compared to the intervention phase (Z=2.20, p=.03).These data indicate that there was no improvement during the one-month baseline period, but that there was a statistically significant improvements in the subsequent phases.

General Health Questionnaire

All 12 replies were answered as either 'not at all' or 'same as usual', generating a score well below the threshold (i.e. 6 or higher), indicating no mental health problems to contra-indicate the participant's involvement in the study.

Bangor Sports Psychological Skills Inventory

Figure 2 summarises the golfer's data from the first baseline (in dark grey) and following the intervention phase (in light grey). It can be seen that the second, lighter profile is improved and generally more balanced, with better self-reported confidence and motivation. Perversely, only concentration was rated lower following the intervention, which may be due to heightened awareness of this faculty, since the other indicators suggest improved concentration.

Table 2: Descriptive statistics for the direct observation of chipping performance (the 'radial error assessment'). Values are the distance in yards from the hole that the ball was observed to come to rest in each of 20 trials.

Observation	First baseline	Second baseline	First intervention	Follow-up
1	6	1	1	1
2	6	2	3	1
3	2	2	4	0
4	4	12	4	2
5	1	4	2	4
6	1	3	2	2
7	6	2	3	2
8	1	3	1	1
9	1	2	5	1
10	1	4	9	1
11	5	5	9	2
12	6	4	6	2
13	3	11	0	1
14	1	14	2	1
15	2	4	3	2
16	3	1	7	1
17	6	1	4	6
18	4	5	2	2
19	4	6	1	2
20	1	1	1	1

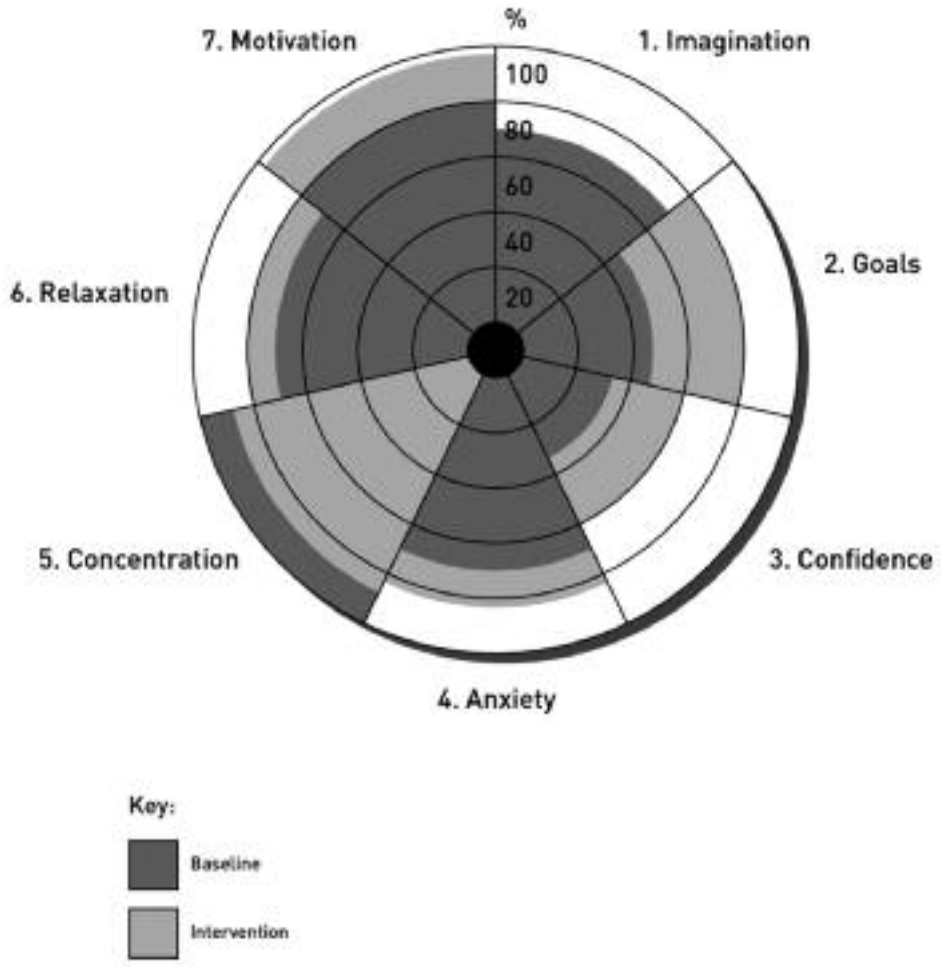
Athlete Satisfaction Questionnaire & Consultant Evaluation Form

The golfer was highly satisfied with the coach's input, equating to 88 per cent approval; no items were rated less than 4 out of 5. The golfer noted how the intervention improved once his yipping was properly understood. The coach also rated the psychologist's input favourably (95 per cent overall), with only two items rated less than 10 out of 10 (i.e. rated 8).

Discussion

The results of this study indicate that there were no subjective or objective changes in the participant's yipping during the baseline period, suggesting that there was no ongoing change process. Following the intervention phase, the subjective data indicate improvements in the golfers mental skills (i.e. the BSPSI: Figure 2), associated with minor improvements in chipping during the radial assessment. Following a further three-month period the objective changes also indicate improvements, with significantly better scores for the PPR, yipping and chipping performance. This lag effect may be due to the gradual nature of the learning process. It appears that the intervention effectively overcame the yipping problem by re-training the golfer in positive forms of concentration (i.e. instead of worrying about past or future

Figure 2: Psychological skills profile for the golfer before (baseline, in dark grey) and after the intervention (in light grey).



events, he maintained attention in the present, attending better to relevant cues). This approach, and its delivery, was rated as highly satisfactory by both golfer and coach.

These positive results are consistent with those reported above (e.g. Bell, Skinner & Fisher, 2009; Marquardt, 2009; Messagno et al., 2008), adding further evidence that a psychological intervention can ameliorate the distressing and disabling problem of the yips. The intervention package is similar to established coaching methods, such as 'deliberate practice'. The theory of deliberate practice suggests that skills will develop when the training activities designed to improve performance are correctly followed (Ericsson, Krampe & Tesch-Romer, 1993). We believe that our intervention was a specialised version of deliberate practice, which normally includes the package of: support and encouragement; task analysis and goal-setting; graded tasks, mastered sequentially; concentration on critical aspects; feedback; and motivation (Ericsson, 2006). Specifically, an emphasis on the concentration element by encouraging and supporting adherence to the PPR, whilst also applying the other aspects in a personalised

fashion (e.g. task analysis, as in Table 1). Another feature of the present study was our emphasis on experimentation: we explored the effectiveness of deliberate practice at every session (e.g. trying out different foci, to seek the best approach for the participant). In theoretical terms, our tailored package of interventions may have inhibited the participant's cognitive anxiety, which had the potential to interfere with the performance of tasks by reducing his ability to ignore irrelevant cues (Eysenck & Derakshan, 2011).

Alternative interpretations can be placed on the data, and one is that the reported improvements were simply due to boosting the coaching (e.g. having both a coach and psychologist involved; the careful assessment process; other demand characteristics of the situation). Against this possibility, there was no change in yipping frequency or intensity during the baseline period, when these variables were present. This is supported by the results (i.e. PPR and psychological skills profile), which indicate that the assumed psychological mechanism of improved concentration was only activated during the intervention and follow-up phases. This explanation is consistent with the perceptions of the golfer, who attributed his improvement to the PPR, which we might regard as effectively providing the scaffolding for the other elements within the intervention package (e.g. worry control; instructional self-talk). This explanation of the results is also consistent with related research: other studies have demonstrated how a PPR can reduce a player's tendency to 'choke' under pressure (e.g. Mesagno et al., 2008).

Such confirmatory evidence should be weighed against the study's weaknesses. One criticism is that our experimental design phases were of unequal duration. This uneven spacing between sessions was due to the intervention of severe winter weather, which meant that for several weeks golf practise and competition were impossible (e.g. the practice facilities were under snow). A second weakness lies in our experimental use of multiple psychological techniques, within a personalised intervention package. This means that identifying precise mechanisms of change is impossible, making only general inferences plausible (i.e. that the overall positive effect of the intervention package was attributable to the participant's enhanced concentration strategies). This personalised intervention package represents one of the most striking differences between the present report and the literature reviewed above, which features relatively discrete techniques (e.g. solution-focused, guided imagery: Bell, Skinner & Fisher, 2009; Bell & Thompson, 2007). A related criticism is that our complex package is harder to train, deliver or evaluate. Perhaps the main limitation of this study is the sample size, in that generalisations cannot be made on the strength of one participant's experience. A further limitation may exist in our assessment of the client's anxiety. Although we measured trait anxiety with the BSPSI, we could have used a multi-dimensional instrument in order to separate the nature of the anxiety being experienced (i.e. cognitive, somatic) and utilise a state anxiety instrument, such as the CSAI-2R (Cox, Martens & Russell, 2003).

These considerations reduce our confidence in a precise causal interpretation. Future research might advantageously study the intervention process, alongside the present outcomes, so as to quantify exactly how it was introduced and the extent to which different elements of the package influenced improvement. Such micro-analyses can highlight critical episodes and provide insight into phenomena such as performance breakdown or 'sudden gains'. More sophisticated measurement would complement these study design enhancements.

In conclusion, as a ban looms on golf clubs that can be anchored into the player's body, it may be that in future even more golfers struggle with the yips. Psychological techniques that train golfers to concentrate more effectively appear to hold some promise in reducing such yipping.

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