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ARTICLE

The Effects of Self-Talk Cues on the Putting Performance of Golfers Susceptible to Detrimental Putting Performances Under High Pressure Settings

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This study examined the effects of a self-talk (ST) intervention on golfers and anxiety and the subsequent influence on putting performances. Seven amateur golfers with a history of anxiety when putting were divided into 3 groups (control, motivational ST, and instructional ST) and completed a 10-session ST intervention involving simulated putting. Ratings of anxiety as measured by the CSAI-2R (Cox, Martens, & Russell, 2003) were obtained pre- and post-intervention. Results indicate statistical significance between the three groups with improvements in the putting performance of the instructional ST group, followed by the motivational ST group, then the control group. There were, however, no significant changes in anxiety scores.

Keywords: self-talk, anxiety, yips, golf, performance

When athletes compete in their particular sports there is usually an intense desire to deliver a peak performance. A crucial aspect of competing in sport is the ability to perform optimally when placed under pressure (Mesagno & Mullane-Grant, 2010). Baumeister and Showers (1986) defined pressure as a concept with multiple aspects: desire for superior performance, contingency of rewards or punishments related to performance, the existence of competition, the presence of an evaluative audience, the extent to which performance is tied to the relevance of the

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ego, and finally, the possibility there will be no second chance. Due to the importance of performing at one's best, the relationship between pressure and performance has garnered a great deal of research attention (Gucciardi & Dimmock, 2008).

Choking Under Pressure

Lewis and Linder (1997) defined choking in sport as suboptimal performance under stressful circumstances, and Mesagno and Mullane-Grant (2010) defined choking as a significant deterioration in skill execution as a result of elevated anxiety levels leading to inferior performance. The consequences of choking under pressure can be spectacular and potentially damaging to athletes whose skills have appeared to temporarily desert them. One well known example of choking in sport is Greg Norman who failed to capitalize on a six-shot lead heading into the final round of the 1996 Masters (he ended up losing to Nick Faldo by five shots; Gucciardi, Longbottom, Jackson, & Dimmock, 2010).

There has been a great deal of research focused on the underlying components of the choking phenomenon. Gucciardi and Dimmock (2008) proposed two key explanations behind the concept of choking: distraction and self-focus. Both of these constructs can be identified as attentional theories according to Beilock and Carr (2001). According to Fitts and Posner (1967), the distraction model outlines decrements in performance being due to breakdowns in working memory. Pressure shifts attentional focus from performance-critical information to task-irrelevant cues (e.g., worrying about performance, being concerned with possible mistakes; Beilock & Carr, 2001). In addition, distraction theory outlines there may be a shift toward processing too much information that interferes with task-relevant cues. The original single-task performance develops into a dual-task operation whereby task execution and worrying compete for cognitive resources due to the focus shifting toward task-irrelevant cues (Beilock & Carr, 2001). Supporters of the self-focus model propose choking results from an athlete focusing on the execution of the task when there is an elevation in self-awareness and anxiety (Mesagno & Mullane-Grant, 2010). The automaticity of a task is temporarily lost because the procedural knowledge is disrupted due to the athlete becoming anxious and self-conscious. Beilock and Carr (2001) proposed high pressure conditions resulted in impaired performance due to the step-by-step monitoring process triggered by this sudden change in focus from trusting the automaticity of the learned skill to looking at the skill in minute detail. Baumeister (1984) proposed that individuals may be inoculated against choking in pressure situations if their levels of self-awareness are enhanced during practice sessions.

The Yips

Fine motor skills in golf such as putting execution can be severely affected by the influence of pressure and the results of these impaired performances are known as the "yips". The yips can be exhibited when a straight forward 3-foot putt to win a championship comes up short (Beilock, Kulp, Holt, & Carr, 2004). The yips are a term applied to uncontrollable jerks or tremors while executing a fine motor skill. McDaniel, Cummings, and Shain (1989) described some of the following terms

as being associated with yips-affected golfers: "waggles," "twitches," "jerks," "jitters," and "staggers."

The effects of the yips on performance can be severe. The loss of control primarily affecting the putting stroke has a significantly negative influence on golf performance, with professional golfers taking approximately 40% of their total strokes on the putting green (Alexander & Kern, 2005). Smith and colleagues (2000) hypothesized yips-affected golfers may add nearly 5 strokes to their scores over 18 holes of golf. The phenomenon of the yips during putting affects professional and amateur golfers similarly (Smith et al., 2000). Between 30% and 48% of amateur golfers have reported experiencing the yips during some point in their playing careers (Sachdev, 1992).

Although the research is divided as to which model best explains this phenomenon (Beilock et al., 2004), self-focus theories may provide a better explanation compared with distraction theories (Mesagno and Mullane-Grant, 2010). The theory being, the occurrence of the yips due to performance anxiety results in a shifting of the individuals focus inwards, which interferes with the automaticity of skill execution. It is possible yips-affected golfers may adopt further negative or maladaptive stress-coping strategies, such as resignation, self-blaming, and cognitive rumination than yips-unaffected golfers (Klämpfl et al., 2013).

Strategies for Evaluating the Yips

There have been a number of studies evaluating the exhibition of the yips and possible reasons for their presence. Gucciardi and colleagues (2010) undertook a study of 22 highly skilled golfers (i.e., handicaps of less than 5), evaluating qualitative characteristics associated with choking via either a focus-group or one-on-one interviews. Most golfers indicated the presence of anxiety as being helpful and necessary, but when participants reported choking under pressure, anxiety appeared to shift from being facilitative to performance to being debilitative. Participants reported a strong fear of failure and not wanting to let important people down such as a coach, family, and/or friends. Loss of attentional control was another subcategory that featured in the study, which was described as a loss of focus resulting from worrying about external distractions rather than on the processes required to perform. One golfer reported "thinking too much about the processes and losing the automaticity that is there when I'm shooting at my best" (Gucciardi et al., 2010, p.70).

Klämpfl and colleagues (2013) used a range of measures, including physiological, behavioral, and psychometric to identify significant differences between golfers with and without the yips. The researchers classified participants as being yips-affected if they exhibited perceptible twists while performing a one-arm putting pre-test in a laboratory on an artificial putting surface. Despite a battery of measures used in this study, there were limited results apart from the inferior putting performance of yips-affected putters compared with non-affected participants.

The performance of individuals experiencing yips-like symptoms can be severely impaired (Alexander & Kern, 2005). The aim of this study was to assess yips-affected golfers and the potential role reducing anxiety via self-talk (ST) strategies may have on improving putting performances.

Self-Talk

Hardy and Zourbanos (2016) described ST as statements, phrases, or cue words that are addressed to the self that might be said automatically or strategically, either out loud or silently, phrased positively or negatively, having an instructional or motivational purpose, an element of interpretation, and incorporating some of the same grammatical features associated with every day speech. In simple words, ST involves automatic thoughts or automatic reactions athletes have talking to themselves that are either positive (e.g., "I am driving the ball great") or negative (e.g., "I can't make any putts today"). But ST also can have the form of intentional cue words aimed at facilitating learning and enhancing performance. These cue words have usually been classified as either instructional (e.g., "Rock your shoulders when putting") or motivational (e.g., "Come on!") based on their expected outcomes. Taking into consideration the above, Theodorakis, Hatzigeorgiadis, and Zourbanos (2012) distinguished two main research paradigms: one addressing the effects of ST as a cognitive intervention strategy (e.g., the athletes before executing say to themselves specific cue words to enhance performance) and another seeking to describe and explore athletes' automatic ST (e.g., the coaches ask athletes to report the most frequent thoughts that they have during their golf rounds).

Recently, Latinjak, Zourbanos, López-Ros, and Hatzigeorgiadis (2014) distinguished undirected ST, that is, non-instrumental ST that comes to mind effortlessly, from goal-directed ST, which consists of statements that aim to solve a problem. More recently, Van Raalte, Vincent, and Brewer (2016) developed a sport-specific model of ST. In this model Van Raalte et al. (2016) identified (a) an intuitive type of ST (also called, System I processing) that comes to mind spontaneously, which represents the immediate reaction to a situation; and (b) a rational type of ST based on reason, which functions as a monitoring of thoughts and actions (also called, System II processing).

Taking into consideration the above theoretical frameworks that have been published in the last 5 years and the first studies of ST in sport that have been conducted between 1980 and 2000 (e.g., Highlen & Bennett, 1983; Mallett & Hanrahan, 1997; Theodorakis, Weinberg, Natsis, Douma, & Kazakas, 2000), we notice that ST research has increased and shifted to investigate why and how ST operates to help athletes enhance their performance (e.g., Galanis, Hatzigeorgiadis, Zourbanos, & Theodorakis, 2016).

Researchers have generally found positive ST to be beneficial to performance and negative ST to be detrimental to performance (Gould, Hodge, Peterson, & Giannini, 1989). Johnson and colleagues (2004) outlined positive ST to be characterized by benefits to: motivation, self-esteem, performance, and concentration. In contrast, negative ST is proposed to be: self-demanding, critical, and has a debilitating effect on performance because it cultivates anxiety and self-doubt. A study by Van Raalte and colleagues (1995) evaluated the effects on dart throwing performance using positive and negative ST strategies. They found participants who employed positive ST outperformed those participants who adopted negative ST strategies. The majority of the literature supports the concept of negative ST being detrimental to performance, although Van Raalte and Brewer (1994) postulated negative ST may actually motivate some athletes.

The ST meta-analysis conducted by Hatzigeorgiadis and colleagues (2011) found instructional ST was more effective than motivational ST for fine motor skills. Instructional ST included cues directed at focusing attention (e.g., "Putt toward the centre of the hole"), assisting with technique (e.g., "Follow through"), kinaesthetic qualities of a skill (e.g., "Smooth tempo"), or strategy (e.g., "Attack the flag stick"). While motivational ST included cues aimed at maximizing effort (e.g., "Give it everything"), creating positive moods (e.g., "I feel amazing"), constructing confidence (e.g., "I can achieve this"), and cues for psyching up the individual (e.g., "Let's do it"). Furthermore, Hatzigeorgiadis and colleagues (2014) found a combination of instructional and motivational ST for young swimmers resulted in an improvement in performances over a 10 week period. Although putting is a fine motor skill, the introduction of an instructional ST strategy for golfers may not be effective according to the Beilock and Carr's (2001) conscious processing hypothesis whereby expert performance may be compromised when movements are consciously controlled, interfering with automaticity.

However, the use of explicit cues in the form of instructional ST (e.g., "Rock your shoulders when putting"), that direct attention to the desired movement, may be beneficial for novice athletes' performance. Thus, it's always important to take into consideration the level of the athlete and the skill. For example, Wulf, Lauterbach, and Toole (1999) revealed that an external focused group (e.g., "Focus on the pendulum-like motion of the club when putting") enhanced the accuracy of the shots relative to an internal focused group (e.g., "Focus on the movement of your arms when putting"). In novices, given the lack of expertise, movements are effortful, thus when a new skill is learned, one's attention should be placed on the movement of the skill. Furthermore, Hatzigeorgiadis et al. (2011) suggested that ST cues should be selected from a designated list or created from individual preferences to be more effective than if participants are assigned cues. The flexibsility in the choice of ST cues was seen by participants as beneficial in providing them with a sense of independence and control.

Zourbanos, Hatzigeorgiadis, Bardas, and Theodorakis (2013) argued coaches who are planning to use ST should take into consideration athletes' individual differences. They suggested that in young athletes instructional ST in the form of external focused cues (e.g., "Focus on the ball as it rolls towards the hole") may be more effective than motivational ST (e.g., "I am driving the ball great") for novel tasks compared with learned tasks. ST should be practiced in a sport such as golf that contains such an array of fine motor skill movements. The coach together with the athlete must identify what they want to achieve with the use of ST. Then, they should choose the best possible simple ST cues for the specific situation or task. This selection should be made after they have practiced different ST cues and strategies.

Finally, regarding the functions of ST, Theodorakis, Hatzigeorgiadis, and Chroni (2008) explored the key mechanisms through which ST facilitated performance and they outlined five key components. They proposed ST can ameliorate performance by: increasing confidence, influencing effort, augmenting attentional focus, initiating automatic task execution, and finally, regulating cognitive and emotional reactions. Hatzigeorgiadis, Zourbanos, and Theodorakis (2007) found motivational ST was more effective in reducing anxiety than instructional ST. Because anxiety has been proposed to be a key component of the yips, using motivational ST may help reduce the occurrence of the yips in yips-affected individuals.

Importance of Self-Talk as an Intervention for the Yips

Golf is inherently a psychologically challenging game (Kirschenbaum, Owens, & O'Connor, 1998), largely due to the time delays between shots. A poor shot can be reflected upon for quite some time before the opportunity to make amends presents itself. During this rumination period golfers may undertake negative self-evaluations. Golfers often criticize themselves for carrying out substandard shots (e.g., "You suck!" or "That was such an easy putt I missed!").

The research points to the yips being a robust construct, one resistant to treatment and therefore possibly problematic for the duration of a player's career (Marquardt, 2009). There have been advances in the research on experiences of personal choking to indicate cognitions and feelings play a significant part in understanding momentary impairments of performance (Bordieri, Dixon, Loukus, & Bordieri, 2013). Philippen and Lobinger (2012) undertook qualitative research with 17 yips-affected golfers in an attempt to ascertain an understanding of their experiences of the yips by assessing the golfers' thoughts and feelings. The principal feelings reported by participants were: fear, anger, helplessness, and disappointment. The main thoughts of golfers when experiencing the yips included: worries about mistakes, loss of confidence in putting, and a focus on the outcome.

The purpose of this study was to evaluate the effectiveness of ST as an intervention strategy to reduce yips-like putting symptoms in golfers. Previous research has indicated anxiety plays an integral role in yips-like symptoms relating to fine motor skills such as putting. It is proposed motivational and instructional ST strategies will reduce levels of anxiety and result in improved putting performance. This study proposes the following hypotheses:

- Hypothesis 1a: The average putting performance of golfers after engaging in motivational or instructional ST techniques will improve from session 2 to session 10, in relation to the control group. Hypothesis 1b: The average number of putts successfully made during the putting simulation sessions, after engaging in motivational or instructional ST techniques, will improve from session 2 to session 10, in relation to the control group.
- Hypothesis 2: Golfers using motivational or instructional ST methods will report lower scores on the somatic anxiety sub-scale of the CSAI-2R (Cox, Martens, & Russell, 2003) from session 2 to session 10 compared with the control group.
- Hypothesis 3: Golfers using motivational or instructional ST methods will report lower scores on the cognitive anxiety sub-scale of the CSAI-2R (Cox, Martens, & Russell, 2003) from session 2 to session 10 compared with the control group.
- Hypothesis 4: Golfers using motivational or instructional ST methods will report higher scores on the self-confidence sub-scale of the CSAI-2R (Cox, Martens, & Russell, 2003) from session 2 to session 10 compared with the control group.

Method

Participants

Participants of the study were amateur golf members of the Indooroopilly Golf Club (IGC) and they were notified of the details of the study by way of an advertisement on the club's website. Participants were recruited if they met all three of the yips criteria as outlined by Smith and colleagues (2000). First, they were initially good putters before the onset of the yips. Second, the symptoms of the yips were episodic. Third, at some point since experiencing the yips they had attempted to change their putting grip or their actual putter. There were initially eight participants recruited from the IGC in Brisbane, Queensland, but one participant dropped out after session 3 resulting in four men and three women remaining.

Participants ranged in age from 51 to 81 years (M = 59.14). They had been playing golf for 10–35 years (M = 20.71) and their handicaps ranged from 5 to 27 (M = 17).

Ethical Clearance

The research ethics committee of The University of Queensland granted ethics approval to conduct the study. Participants were informed their involvement in the study was voluntary and they could withdraw from the research at any time. The participants were notified that all details relating to them would be de-identified to ensure confidentiality was maintained throughout the duration of the study.

Measures

Putting Performance. To evaluate putting performance a golf putting competition was created at the outdoor practice putting green of the IGC with putts attempted at 3 feet and 6 feet from the hole. The dependent variable for each session was the total of unsuccessful putts from the hole measured in centimetres. The total number of successful putts was the amount of putts that were holed and these were also recorded during each session.

Competitive Performance. Mid-point and End-Point Questionnaires. At the halfway point of the intervention, a questionnaire was completed by all of the participants with a view to ascertaining any potential changes in their putting performances to date. At the end of the final intervention session participants were provided with and completed end-point questionnaires. For the control group these were identical to the mid-point questionnaire while for the intervention groups the aim was to evaluate whether the ST strategies resulted in performance and perception changes.

Competitive State Anxiety Inventory. To measure state anxiety the Competitive State Anxiety Inventory (CSAI-2; Cox, Martens, & Russell, 2003) was used. This 17-item scale assesses state anxiety by evaluating three sub-scales: cognitive anxiety, somatic anxiety, and self-confidence. The internal consistency of Cox and Colleagues' (2003) scale was strong with the reported Cronbach alpha coefficient for cognitive anxiety being .83, somatic anxiety .88, and self-confidence .91.

Procedure

The study was conducted over 10 sessions: familiarization trial (session 1), ST intervention training (sessions 2–9), and final intervention trial (session 10).

Session 1—Familiarization Trial. After providing informed consent, participants were told that for the following 10 sessions their putting performance was to be evaluated by their voluntary involvement in a putting competition to establish the most proficient putter. Informing the participants of the details of the putting competition was designed to increase their levels of anxiety to be reflective of a competitive round of golf. These levels of anxiety were to be further manipulated by informing the group that all putting sessions would be recorded, the results of the putting competition would be sent to all the participants of the study on a weekly basis, and the top putter at the end of the study would receive a $100 gift voucher to a golfing outlet. The participants were informed of how the study was to be conducted and they were given the opportunity to ask any questions regarding these procedures. Participants were encouraged not to discuss any details of the study with their co-participants.

After the initial briefing session the participants were individually taken onto the practice putting green. The instructions were repeated before the first trial was undertaken. Participants then completed two sets of 10 putts (two sets of five putts from 3 feet and two sets of five putts from 6 feet) with the first set of 10 putts being used as a warm up and familiarization process, on a hole not related to the testing conditions. The second set of 10 "live" putts was undertaken on a sloped part of the putting green. At the conclusion of each participant's allocated 10 live putts, an overall individual score was calculated and recorded. Upon completion of the second set of putts, participants completed the CSAI-2R. This scale aimed to ascertain how anxious the participants felt during the session by evaluating cognitive anxiety, somatic anxiety, and self-confidence.

Sessions 2–9—Self-Talk Training Intervention. Participants were divided into three groups (i.e., control, instructional ST, and motivational ST) using a stratified random sampling technique based on their age, number of years playing golf, and expertise as indicated by an official Golf Australia handicap. Over the next eight sessions the three groups completed different training protocols. All participants were assigned a letter representing the group (C = control, M = motivational ST, and I = instructional ST) as well as a number to identify them within each group.

For the two experimental groups, session 2 began with a short lecture introducing participants to ST. The goal of the mini lectures was not only to introduce the concept of ST to participants, but also to stimulate ideas relating to their own use of ST. The instructional ST experimental group was provided with four technical cue phrases related to the task of putting—"Putt toward the centre of the hole," "Follow through after your putt" (participant I3 chose this cue phrase), "Focus on the putter striking the ball" (participant I2 chose this cue phrase), and "Focus on a spot your ball must pass over on the way to the hole" (participant I1 chose this cue phrase). These participants were asked to choose the cue phrase that most strongly resonated with them or alternatively they were provided with an opportunity to generate a similarly worded phrase that may have been more meaningful. The motivational ST experimental group was provided with four motivational cue phrases—"Come on," "I can do this," "It's going in" (participant M1 chose this cue phrase), and

"Let's do it" (participant M2 chose this cue phrase). This group was also asked to choose the cue phrase that most strongly resonated with them or alternatively they were provided with an opportunity to generate a similarly worded phrase that may have been more meaningful.

Participants were encouraged to use this ST cue phrase during all experimental sessions as well as during any regular competitive golf rounds outside the study. Participants were advised they could repeat the cue phrase in their head or verbalize it out loud, according to their personal preference. As a manipulation check after the completion of each experimental session, participants were asked to indicate on a 10-point scale how often they used the designated ST cue phrases (1 = "not at all" to 10 = "all the time"), if they used other ST cue words or phrases, what were they and how often were they used (1 = "not at all" to 10 = "all the time"). To prevent contact between the two experimental groups, the two groups were scheduled to train at different times.

At the start of sessions 3–9 participants in the experimental groups were reminded of their ST cues while those in the control group were informed of the importance of nutrition and remaining hydrated while playing golf.

Session 10—Final Intervention Trial In the tenth session, participants were reminded of the putting competition instructions, the $100 gift voucher being awarded to the overall winner, and the fact that the final session was once again going to be video recorded. As in the familiarization session, all participants completed 10 putts (five putts from 3 feet and five putts from 6 feet). At the end of the session participants completed the CSAI-2R. A further manipulation check for the experimental groups aimed to measure the implementation of the ST cue phrases by asking participants to a) indicate on the same 10-point scale how often they used the designated ST cue phrases (1 = "not at all" to 10 = "all the time"), b) if they used other ST cue words or phrases, c) if so, what were they, and d) to what degree were they used (1 = "not at all" to 10 = "all the time").

At the conclusion of the study participants were debriefed on the purpose of the study including the use of stressful instructions, incorporating a putting competition with a first prize, and the use of video recording equipment. The most proficient putter over the 10 sessions was awarded the $100 gift voucher.

Results

Preliminary Data Analyses

The results of one participant were removed from the dataset due to her withdrawing from the study after session 3. Homogeneity of variance was assessed by running a Levene's test and the assumption was violated indicating that there were significant differences between the variances of the three groups. As a result of the data not being normally distributed, non-parametric statistical analyses were conducted.

Descriptive Statistics

Table 1 summarizes the key descriptive statistics of the average putting performances per session (in centimetres from the hole) of the participants over the duration of the study.

Table 2 summarizes the key descriptive statistics of the three sub-scales (cognitive anxiety, somatic anxiety, and self-confidence) of the CSAI-2R pre- and post-study.

Table 3 summarizes the key descriptive statistics of the average number of successful putts per session of the participants over the duration of the study.

Table 1 Average Putting Scores per Session

Participant	Sess 1	Sess 2	Sess 3	Sess 4	Sess 5	Sess 6	Sess 7	Sess 8	Sess 9	Sess 10
C1	3.0	19.2	28.2	20.0	8.4	23.8	2.3	15.1	22.9	8.7
C2	32.7	12.9	36.8	28.0	11.5	27.4	14.3	33.2	6.8	4.8
M1	22.0	24.7	20.6	26.2	14.4	23.9	15.3	7.6	27.6	19.7
M2	3.3	24.5	29.6	7.8	12.8	26.9	13.7	9.9	25.8	10.5
I1	25.4	19.3	58.1	41.7	6.6	33.0	32.6	6.5	39.5	8.1
I2	18.9	27.2	24.0	49.3	35.6	28.5	28.1	16.2	54.5	5.4
I3	8.9	17.2	34.1	16.3	13.4	21.7	17.9	45.6	38.3	16.2

Table 2 CSAI-2R Anxiety Sub-Scale Characteristics

Sub-Scale		Mean	SD	Min	Max
Self-Confidence	Pre	10.90	4.18	6	19
	Post	11.70	3.99	5	16
Somatic Anxiety	Pre	12.00	2.77	7	15
	Post	9.30	2.06	7	12
Cognitive Anxiety	Pre	9.60	3.10	6	13
	Post	10.10	5.55	5	20

Table 3 Number of Successful Putts per Session

Participant	Sess 1	Sess 2	Sess 3	Sess 4	Sess 5	Sess 6	Sess 7	Sess 8	Sess 9	Sess 10
C1	8	4	5	7	7	8	9	5	7	7
C2	8	7	6	7	7	7	6	5	9	7
M1	7	3	5	4	5	7	7	7	6	5
M2	5	5	4	7	7	4	4	6	4	6
I1	7	7	4	4	6	4	4	7	5	8
I2	6	7	7	5	4	5	6	7	2	8
I3	6	4	6	8	7	7	5	3	5	6

Kruskal-Wallis Tests

Statistical analyses were conducted on the data collected pre-intervention to ascertain if there were any significant differences between the groups. Average putting performances during the familiarization session were not significantly different between groups, $H(2) = 0.18$, *ns*. All three CSAI-2R sub-scale scores obtained at the start of study were not significantly different between groups: somatic anxiety, $H(2) = 1.71$; *ns,* cognitive anxiety, $H(2) = 2.38$, *ns;* and self-confidence, $H(2) = 0.41$, *ns*.

Wilcoxon Matched-Pairs Signed-Rank Tests

A series of Wilcoxon matched-pairs signed-rank tests were conducted to analyze if there were any intervention effects when comparing the 1st intervention session (session 2) with the last intervention session (session 10).

In accordance with hypotheses 1a and 1b, two Wilcoxon matched-pairs signed-rank tests were conducted. The first analysis found a significant improvement in average putting performance when comparing session 2 with session 10, $T(7) = 28$, $p < .05$. After analyzing the individual ranking data of the groups it appeared that the improvements in the instructional ST group and the motivational ST group (as compared with the control group) were moving in the predicted direction (see Table 4). However, a larger number of participants would be required to fully test the interaction effect.

The second analysis also found a significant improvement in the average of successful putts holed when comparing session 2 with session 10, $T(6) = 21$, $p < .05$. After analyzing the individual ranking data of the groups it was found the greatest improvement was in the instructional ST group, followed by the motivational ST group, and lastly the control group (see Table 5).

A Wilcoxon matched-pairs signed-rank test found no significant reduction in the CSAI-2R scores between sessions 2 and 10; somatic anxiety, $T(6) = 5$, *ns*; cognitive anxiety, 10, $T(7) = 9.5$, *ns*; and self-confidence, $T(7) = 4.5$, *ns.*

Statistics of Interest

C1 was part of the control group and her cognitive anxiety increased from 13 at the start of the study to 20 at its conclusion. C1 indicated she felt a greater level of pressure in the tenth and last intervention session knowing she was leading the simulated putting competition going into the session.

M2 used her motivational ST cue phrase ("Let's do it") 92% of the time during the simulated putting task and her somatic anxiety decreased from 14 at the start of the study to 8 at its conclusion, while self-confidence increased from 6 to 9 over the duration of the study.

Qualitative Feedback

An independent reviewer categorized the qualitative data into themes. Initial agreement between the primary researcher and the independent reviewer was initially 85%. After discussion 100% agreement was established. For both questionnaires four identical themes emerged: enhanced confidence, performance benefits, improved concentration, and anxiety reduction.

Table 4 Average Putting Performances as Measured by Centimetres from the Hole

Participant	Session 2	Session 10	Difference	Ranking	Signed Ranking
C1	19.2	8.7	10.5	4	4
C2	12.9	4.8	8.1	5	5
M1	24.7	19.7	5.0	6	6
M2	24.5	10.5	14.0	2	2
I1	19.3	8.1	11.2	3	3
I2	27.2	5.4	21.8	1	1
I3	17.2	16.2	1.0	7	7

Group Ranking Averages: C = 4.50, M = 4.00, and I = 3.67

Table 5 Number of Successful Putts

Participant	Session 2	Session 10	Difference	Ranking	Signed Ranking
C1	4	7	-3	6	-6
C2	7	7	0	N/A	N/A
M1	3	5	-2	4.5	-4.5
M2	5	6	-1	2	-2
I1	7	8	-1	2	-2
I2	7	8	-1	2	-2
I3	4	6	-2	4.5	-4.5

Group Ranking Averages: C = 6.00, M = 3.25, and I = 2.83

The mid-point questionnaire asked whether the participants had experienced any changes related to "putting performance," "feelings," or "whilst putting." There was also a question asking "If there have been changes, what do you think have led to these?" There were 12 responses related to participants feeling "confident" and "optimistic." Eleven responses were associated with perceptions of improved putting performance ranging from: "more consistent," "better quality putts," "more precision," and "more control of the putter." Eight responses related to feeling improved concentration levels including: "less thought conflicts," "more focused," "less confused," and "concentrated." There were five responses regarding feeling less anxious such as: "calm," "less stressful putts," and "less feelings of pressure." Table 6 summarizes the responses by group.

The end-point questionnaire was the same as the mid-point questionnaire for the control group, for the intervention groups there was an additional question related to changes resulting from the ST strategy ("what," "why," "when," and

"where"). There were 11 responses related to "confidence/confident." Fifteen statements concerned performance benefits including: "slightly better on shorter putts," "great on the longer putts," "my results were better," and "hitting more good putts." Eight responses related to feeling improved concentration levels including: "signs of clarity rather than confusion," "better concentration," "more consistent approach to each putt," and "gives me something else to focus on." There were five responses around anxiety reduction such as: "less anxious over shorter putts," "calmer," and "don't let bad golf get me down." Table 7 summarizes the responses by group.

Discussion

Overview

The aim of the current study was to investigate the effects of ST interventions on reducing anxiety, one of the primary variables linked with the occurrence of the yips and as a result, improving putting performance. The study aimed to expand upon previous research by showing that ST interventions would be beneficial to fine motor skills such as putting in golf that have been impaired by yips-like symptoms. There were five hypotheses investigated in the current study.

This discussion will provide an overview of all the results that were found in this study. First, all supported hypotheses of the study will be discussed. Second, the study's unsupported hypotheses will be examined and possible reasons given as to why the findings were inconclusive. Third, additional findings of the study will be covered. Fourth, the importance of the practical implications of the study will be considered. Fifth, the strengths and limitations of the study will be discussed. Finally, directions of future research arising from the study will be assessed.

Table 6 Mid-Point Questionnaire Summary

Theme	Control Group	MST Group	IST Group
Enhanced Confidence	3	4	5
Performance Benefits	3	4	4
Improved Concentration	3	0	5
Anxiety Reduction	3	2	0

Table 7 End-Point Questionnaire Summary

Theme	Control Group	MST Group	IST Group
Enhanced Confidence	2	4	5
Performance Benefits	4	4	7
Improved Concentration	0	1	7
Anxiety Reduction	2	3	0

Supported Hypotheses

Hypothesis 1a was supported because individuals who used motivational or instructional ST cues experienced significant improvements in their simulated putting competition scores from the beginning of the intervention (session 2) to the end of the intervention (session 10). Results indicated that the putting performances of the instructional ST group were moving in the predicted direction over the duration of the study, as were the putting performances of the motivational ST group, but not as strongly, compared with the control group. A larger number of participants would be required to further investigate the nature of this interaction between the three groups. This finding supports the meta-analysis conducted by Hatzigeorgiadis and colleagues (2011) whereby instructional ST was found to be more effective than motivational ST for fine motor skills such as putting in golf. Hypothesis 1b was also supported because individuals who used motivational or instructional ST cues experienced significant improvements in the number of successful putts made in the simulated putting competition from the beginning of the intervention (session 2) to the end of the intervention (session 10). Results demonstrated that the instructional ST group significantly displayed the most improvement in successful putts made over the duration of the study, followed by the motivational ST group, and lastly, the control group. This finding also supports the meta-analysis conducted by Hatzigeorgiadis and colleagues (2011) whereby instructional ST was found to be more effective than motivational ST for fine motor skills such as putting in golf.

Both of these findings are in line with previous research (Gould et al., 1989; Johnson et al., 2004) whereby ST interventions were found to have significantly improved performance. This study's finding that both ST interventions successfully improved putting performance is an exciting one. Strategies whereby putting performance is significantly improved would be an outcome all golfers would consider.

Unsupported Hypotheses

Hypothesis 2 was not supported. Golfers employing ST strategies did not report lower scores on the somatic anxiety sub-scale of the CSAI-2R over the duration of the study. Results found no significant reduction in the somatic anxiety sub-scale when comparing session 2 with session 10.

Hypothesis 3 was not supported. Golfers employing ST strategies did not report lower scores on the cognitive anxiety sub-scale of the CSAI-2R over the duration of the study. Results found no significant reduction in the cognitive anxiety sub-scale when comparing session 2 with session 10.

Hypothesis 4 was not supported. Golfers employing ST strategies did not report higher scores on the self-confidence sub-scale of the CSAI-2R over the duration of the study. Results found no significant increase in the self-confidence sub-scale when comparing session 2 with session 10.

The findings of these three unsupported hypotheses are in contrast to previous research by Hatzigeorgiadis and colleagues (2007) whereby motivational ST strategies were found to be effective in reducing anxiety. The small number of participants involved in the current study did make it more difficult to obtain significant results.

However, there are some individual anxiety sub-scale results that are noteworthy. C1 reported she felt very nervous during the last intervention session because she was aware she was the leading candidate in the simulated putting competition.

This nervousness was reflected in an increase of her cognitive anxiety sub-scale score of 13 at the start of the study to 20 at its conclusion. M1's somatic anxiety sub-scale score decreased from 12 at the start of the study to 7 at its conclusion. M2's somatic anxiety sub-scale score also decreased from 14 at the start of the study to 8 at its conclusion. I2's somatic anxiety sub-scale score decreased from 14 at the start of the study to 11 at its conclusion while his cognitive anxiety sub-scale score also decreased from 12 to 9 over the duration of the study. I3¢s self-confidence sub-scale score increased from 12 at the start of the study to 15 at its conclusion. While there were no statistical differences between the three groups, there were clinically significant positive changes in their anxiety scores among the participants who engaged in ST intervention strategies.

Participant Reflections

The reported responses from both the mid-point and end-point questionnaires are consistent with the research undertaken by Theodorakis and colleagues (2008) who proposed ST resulted in five key components of improved performance: increased confidence, influenced effort, regulated cognitive and emotional reactions, augmented attentional focus, and finally, initiated automatic task execution. The qualitative feedback reported in the current study is supported by another study undertaken by Hatzigeorgiadis and colleagues (2009) who found motivational ST increased self-confidence, decreased anxiety, and improved the performance of the experimental group compared with the control group.

It is possible a longer intervention period in excess of 9 sessions is required before these self-reported positive benefits are translated into statistically significant improvements in scores across the three anxiety sub-scales, potentially leading to a reduction in yips-like symptoms and an improvement in putting performance. It may take longer than 9 sessions before these positive and adaptive traits are embedded into the participants' psyches on a more permanent basis.

Practical Implications

It is clear from the literature that athletes should practice ST strategies as often as possible. Hatzigeorgiadis, Zourbanos, Latinjak, and Theodorakis (2014) suggested the IMPACT approach for the practical application of an ST strategy. Specifically, they suggested that the coach should **i**dentify together with the athlete depending on their level what they want to achieve during training or competition, **m**atch the appropriate ST cues (e.g., bend the knees) to the athletes' needs (e.g., better position), **p**ractice different motivational, instructional ST cues, **a**scertain after a lot of practice which cues work best, and finally, **c**reate a specific ST plan and practice this as much as they can.

Because anxiety has been shown to be such a strong predictor of impaired performance, another strategy that golfers could employ in conjunction with ST interventions to help improve putting performance, could be progressive muscle relaxation (PMR) and meditation techniques that could potentially help ameliorate anxiety levels. Khasky and Smith (1999) examined the effects of 25 min of PMR training and found significant reductions in anxiety and stress levels of the participants studied. Behncke (2004) found meditation helped participants achieve a

more relaxed state by bringing together a greater awareness of the mind and body. PMR and meditation techniques could be applied to golfers whereby they learn new coping techniques for reducing worry and anxiety before and after their golfing performances as well as in day to day living.

Because the experience of the yips on golfers has such a destructive influence on their putting performance, any strategies to help lessen their effect would be gratefully accepted by yips-affected golfers. A multi-level strategy involving ST, PMR, and meditation could be implemented to ameliorate the effect of the yips by focusing on reducing state anxiety. Behavioral changes may be viewed as being problematic if the effort involved is seen to be too arduous or if the results are not able to be clearly visualized. Due to the severe nature of yips-like symptoms, it is unlikely motivating golfers to participate in such activities aimed to improve putting performance would be a problem and hence the chances of such an initiative being successful are greatly improved.

Strengths and Limitations

Over a relatively short intervention period of 9 sessions, the current study found statistical improvements in the putting performances (in a simulated competitive environment) of participants engaged in ST intervention strategies. This finding indicates the potential for an effective treatment for golfers experiencing impaired performance resulting from the yips. The qualitative data elements of the study are encouraging for providing further support for yips-affected golfers by assisting with yips-protecting characteristics such as: improving confidence, reducing anxiety, and ameliorating concentration.

Nevertheless, the results of the current study should be interpreted with caution within the context of the following limitations. First, the small sample size of just seven participants limited the power of the study in relation to the unsupported hypotheses. Second, there was no baseline established for the frequency of yips-like symptoms in a competitive context before the commencement of the study. This baseline would have enabled a greater understanding of the efficacy of the ST intervention strategies. Third, it would have been helpful to discuss in greater detail the participants' pre-intervention yips-like experiences to better understand when they occur, how they are exhibited, and possible reasons for their appearance. This discussion would allow a greater exploration of this complex phenomenon and possibly improve the success of future ST interventions. Lastly, participants in the control group were not provided with the opportunity to discuss possible ST strategies they had already implemented. Without this information the results of the control group are vulnerable to misinterpretation.

Future Research Directions

Three important future directions can be derived from the current research. First, the study revealed key ST strategies to assist individuals improving their coping mechanisms to maintain performance levels when under pressure. By comparing the personality traits of individuals who appear to be choking-resistant to those individuals who experience the yips may further highlight ways for these yips-affected individuals to focus their attention. Second, the inclusion of physiological

testing measures during the study and also in a competitive context may be helpful in establishing the presence of anxiety during putting tasks and its relationship with yips-like symptoms. Third, rather than just measuring the intensity or amount of anxiety, future research should also determine if participants perceive the anxiety to be facilitative or debilitative. It is possible that the amount of anxiety experienced is not affected by ST interventions, but that the interpretation of that anxiety does change. Finally, it may be valuable to assess other tendencies associated with the yips such as those proposed by Rotheram and colleagues (2007) of obsessional tendencies and elevated self-consciousness levels. Smith and colleagues (2000) suggested that individuals low in self-consciousness were less susceptible to the yips than those high in self-consciousness. Decreasing feelings of self-consciousness may help counter Beilock and Carr's (2001) distraction/self-focus choking theories.

Conclusion

Choking under pressure and the subsequent decrements in performance that result is an area of research that has attracted a great deal of research (Beilock & Carr, 2001; Gucciardi et al., 2010; Lewis & Linder, 1997; Mesagno & Mullane-Grant, 2010). Despite potential limitations, the results of the current study have shed some light on potential intervention strategies to assist yips-affected individuals overcome these debilitating effects.

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