

## The Effects of Hypnosis on Flow States and Golf-Putting Performance

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This study examined the effects of hypnosis on flow states and golf-putting performance in 5 competitive players. The investigation utilized an ideographic single-subject multiple baseline across subjects design combined with a procedure that monitors the internal experience of the participants (Wollman, 1986). The method of intervention utilized in this study involved hypnotic induction, hypnotic regression, and trigger control procedures. The results indicated that all 5 participants increased both their mean golf putting performance and their mean flow scores from baseline to intervention. There were no overlapping data points between the baseline and intervention for either performance or flow state. Additionally, each participant indicated that they had felt the intervention was useful in keeping them relaxed, confident, and focused. Three of the golfers also reported experiencing reduced concerns about performing and more control over their putting stroke.

Psychologically golfers are an interesting group of athletes because they spend an inordinate amount of time between shots waiting to play. This time spent between shots provides an opportunity to facilitate an appropriate or an inappropriate psychological state for performance. Recently, Catley, and Duda (1997) have indicated that a golfer's ability to control pre-performance psychological states is as important as skill level. Their study also revealed that a psychological state described by Csikszentmihalyi (1975) as flow was strongly associated with peak performances in golfers. A similar finding was echoed in the work of Cohn (1991) who indicated that improved performances, a lower handicap, and greater enjoyment of the game could be associated with techniques designed to facilitate the flow experience. An interesting aspect of flow is that one cannot force it to happen. However, according to Loehr (1994), many top-level athletes have identified their own ideal performance state, and have learned strategies to create and main-

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tain the state voluntarily. For example, in his book *Golf My Way* (Nicklaus & Bowden, 1974), Jack Nicklaus describes the power of imagery as the single most important element in achieving high levels of performance.

Studies from the sport psychology literature have also indicated imagery has a positive influence on golf performance. Indeed, Woolfolk, Murphy, Gottesfeld, and Aiken (1985) found positive outcome imagery to have an enhancing effect upon performance on a golf-putting task. Additionally, Kirschenbaum, Owens and O'Connor (1998) found SMART golf, an approach that utilized imagery in the positive refocusing stage, of a five component program, improved the handicap, emotional control, and self-talk of experienced golfers. Researchers have also found that golfers who use imagery techniques spend significantly more time practicing, set higher goals for themselves, have more realistic self-expectations, and adhere more to their training programs (Martin & Hall, 1995).

In addition to imagery techniques, relaxation has also been associated with excellence in elite professional golfers. For example, McCaffrey and Orlick (1989) reported that staying calm and relaxed between and during shots were important during tournament play. Cohn (1991) also reported that feeling physically relaxed and mentally calm were important characteristics of peak performance in golf. Moreover, Murphy and Woolfolk (1987) found that a relaxation technique significantly reduced anxiety and improved performance on a golf putting task.

In addition to these findings, some researchers have demonstrated that when relaxation is combined with imagery the effects on performance are greater than when the techniques are used alone. For example, Weinberg, Seabourne, and Jackson (1981) found that visual motor behavior rehearsal (VMBR) a technique that combines imagery and relaxation training into one procedure was significantly superior to imagery training or relaxation training when used to improve karate performance. In another study where imagery and relaxation were combined with goal setting, energy control, and self-monitoring techniques, Beauchamp, Halliwell, Fournier, and Koestner (1996) found that the intervention produced positive performance effects on a golf putting task.

While the efficacy of approaches that integrate imagery and relaxation techniques have been researched (e.g., Seabourne, Weinberg, Jackson, & Suinn, 1985) sport psychologists have rarely explored the effect of these skills when combined with hypnotic procedures. Traditionally and perhaps still within the public sphere, hypnosis has been regarded as an altered state of consciousness (or trance) resembling sleep. The methods by which hypnosis can be induced vary enormously although relaxation, an inward focus of attention, and imagery are probably the most common (see Edmonston, 1986; Waxman, 1989).

Close analysis of the literature reveals that the trance phenomena normally associated with hypnosis occurs as a result of participants following directives to rapidly switch attention from emotional and physical responses induced by relaxation, to emotional and physical responses induced by imagery. The result of this experience produces a highly relaxed psychological state often referred to as trance. Following the induction of the trance state, suggestions are typically made that evoke particular behaviors or experiences. The nature of suggestions will vary

from one situation and purpose to another allowing the intervention to be designed around individual needs. For example, a responsive golfer can be inspired to display behaviors and emotions consistent with his or her experience of optimal performance.

Although hypnotic procedures include components often used in other applied sport psychology interventions such as VMBR, they differ from other programs because they require participants to enter a hypnotic state before techniques such as imagery and relaxation are applied (See Unestahl, 1986). Interestingly, a review of the sport literature reveals that in many important ways hypnotic states are almost identical to peak performance states as described by Privette (1983). For example, interviews conducted by Unestahl (1983) on elite athletes after experiencing flow indicated that flow states and hypnotic states share many of the same qualities. These included changes in thinking (less paralysis by analysis), memory (amnesia), perception (slow motion and enlargement of objects), dissociation (pain detachment), and information processing (parallel processing). Other shared elements of the two states included dissociation/detachment from one's surroundings, absorption, feelings of control, and perceptual distortions such as altered perceptions of time (Kihlstrom, 1985).

The striking similarities between flow states and hypnotic states suggest that interventions that utilize hypnosis as a mental training technique may increase personal control of the flow experience. Pates, Maynard, and Westbury (in press) provided some evidence to support this interpretation when they utilized an idiographic single-subject replication-reversal (ABA) design to analyze the effects of a hypnosis intervention on free-throw and jump-shooting performance in basketball players. Their results indicated that an intervention consisting of a hypnotic induction phase designed to create a state of deep relaxation, a hypnotic regression phase designed to help athletes relive an earlier life experience of their optimal performance, and a trigger control phase designed to bring athletes' ideal performance state under the control of a stimulus, was highly effective. The intervention improved basketball shooting accuracy and elicited emotions and cognitions normally associated with flow states and successful athletic performance.

A fundamental feature of the approach of Pates et al. (in press) that clearly differentiated their work from previous research on hypnosis in sport was the use of trigger control techniques. Triggers are words, sounds, images, or a natural part of a routine that one can do or think about in order to induce a response usually obtained during the induction phase of the hypnotic procedure. Unestahl (1983, 1986) has implied that sport psychologists may use two types of triggers for applied work. The first are natural triggers which are usually part of a normal routine (e.g., holding the grip of a golf club) while the second are artificial triggers which do not form part of a normal routine (e.g., a word).

Another feature of the approach used by Pates et al. (in press) was hypnotic regression. This technique invited athletes to relive an earlier life experience of their optimal performance with no conscious awareness of any future realities beyond the time frame being experienced. It utilized a complete dissociation from any other reference to the present and as a result of the change in perception the

rekindling of the participants' experiences tends to be more kinesthetic and emotive (Hammond, 1990). During the regression phase of their intervention, Pates et al. (in press) found they were able to condition positive emotions associated with basketball players' ideal performance states to a trigger that allowed athletes to access an optimal performance experiences during a future event.

The current study attempted to extend the work of Pates et al. (in press) by evaluating the effectiveness of a hypnosis intervention in facilitating flow states and performance accuracy in golfers. It was expected that during hypnosis the golfers experience of flow could be conditioned to a natural trigger. It was then hypothesized that after conditioning, the participants would achieve more intense states of flow; secondly, it was hypothesized that golfers using the natural trigger would achieve greater accuracy in the performance of a golf putting task.

In this study a natural trigger was used instead of an artificial trigger because the researchers wanted to demonstrate the effects of a trigger that requires no conscious control. A single-subject multiple baseline across subjects design was deemed the most appropriate method to study the effects of the intervention because it allowed the analysis of an intervention that cannot be withdrawn or "turned off" (Hrycaiko & Martin, 1996). Based on the recommendations of Wollman (1986) and other researchers who have utilized single-subject designs (e.g., Lerner, Ostrow, Yura, & Etzel, 1996; Smith, 1988; Swain & Jones, 1995), the present study also applied a procedure that monitored both flow states and the internal experience of each player.

## METHOD

### *Participants*

The participants were five male golfers age 21 years. The golfers had handicaps ranging from 24 to 11. Each player had at least four years of playing experience. The five participants were carefully selected for the study because they all had previous experience of flow and had obtained performance levels greater than their handicaps indicated. Additionally, none of the golfers had previous experience with hypnosis training. Prior to the study the golfers were informed of the nature and extent of the investigation, and all agreed to participate. The golfers also agreed not to practice or participate in competitive golf throughout the duration of the study.

### *Experimental Design*

A single-subject multiple baseline across individuals design was implemented to examine the effects of a hypnosis intervention on flow states and golf putting performance. This type of design allows subjects to serve as their own source of control for the experiment (Barlow & Hersen, 1984; Hrycaiko & Martin, 1996). This format was also most appropriate because it facilitates the analysis of the effects of an intervention that could not by its very nature be withdrawn from the

participants due to the use of natural trigger control techniques (Barlow & Hersen, 1984).

The design required the observation of baseline performance and treatment phase for each of the participants with the length of pre-intervention baseline increasing for each succeeding player used in the analysis. The intervention was introduced when a stable baseline or a trend in the opposite direction of the change anticipated became apparent for each of the participants. A sequential application of the treatment was applied until all participants received the intervention.

### *Dependent Variables*

*Golf putting.* Golf putting was selected as a criterion task because participants were familiar with the technique and it reflected an important component of their performance. The putting task was adapted from Boutcher and Zinsser (1990) and involved putting a golf ball on a carpet to a target hole 11.5 cm diameter. The data collection consisted of 11 trials with each trial requiring the completion of 10 putts from a distance of 4 meters. All trials were initiated when the golfers had attempted 20 practice putts at the target to familiarize themselves with the speed, pace, and condition of the carpet. The accuracy of each attempt was calculated by measuring the distance between the putted ball and the center of the target hole. For each trial putting performance was measured by calculating the average radial error score for the 10 putts.

*Flow analysis.* In addition to the performance data, information on the intensity of flow experienced by the participants was assessed using the Flow State Scale (FSS) questionnaire developed by Jackson and Marsh (1996). This 36-item instrument provides a quantitative measure of the nine dimensions of flow outlined by Csikszentmihalyi (1990). The internal consistency estimate for the nine FSS scales was ( $\alpha M = .83$ ). For the purpose of this investigation a single global FSS score was calculated for each of the five participants after each of the 11 trials. The FSS scores were collected in order to determine to what extent the participants experienced a state of flow during each trial. A global measure of flow was preferred in this investigation because of Jackson's (1999) contention that single factor approaches tend to reveal incomplete information about the total flow experience.

### *Treatment: The Hypnosis Intervention*

The training of the participants in hypnosis took place immediately after the completion of the first baseline and was divided into two stages. The first author, who had successfully completed extensive training in a variety of hypnosis techniques, delivered the intervention.

In the first stage of the intervention participants were encouraged to sit in a comfortable position and then were asked to focus on their breathing. Specifically, they were instructed to breathe deeply and to release air slowly while counting backwards from the number 10. They were then given a 15-min session involving

progressive muscular relaxation (PMR). The technique originally pioneered by Jacobson (1938), involved the golfers tensing and relaxing parts of their body, while deeply inhaling. Suggestions asking the participants to contrast the differences between the tense and the relaxed muscles were given along with instructions to direct their attention to images of situations that were associated with relaxation. For example, the external image of a warm comfortable beach, or the internal sensation of floating in water. An Ericksonian hypnosis technique known as a staircase induction (Hammond, 1990) was then applied. The staircase induction consisted of a journey, one step at a time, down a flight of 20 stairs. As the participants took the journey they were told to see each stair in front of them and feel the stair under their feet. At the bottom of the stairs they were told they would see a door, and beyond the door they would see a room with a comfortable chair. The participants were then asked to sit down in the chair and focus on a small cinema screen on which appeared a relaxing scene. Throughout this stage suggestions were given to reinforce both the experience of the PMR, the deep breathing, and imagery techniques.

In the second stage suggestions were given to help the participants regress, and remember a multi-sensory experience of their best competitive performance. Specifically they were asked to include visual, auditory, tactile, olfactory, gustatory, and memory of their best performance from an internal perspective. Their best performance was then conditioned to be released by a natural trigger. The trigger used was the grip of the golf putter. The participants were then told to see themselves rising from the chair and proceed out of the door and up the staircase. They were also told as they ascended the staircase that they would feel refreshed and alert. Once the participants re-acclimatized to the environment they were asked to access their ideal performance state by utilizing their triggers. Training was considered complete when the participants felt that an experience of their best performance was under trigger control.

### *Intervention Procedure*

The hypnosis intervention was administered to the five participants in a small, quiet and comfortable room on the college campus and lasted approximately 40 min. The training was composed of three stages: Stage 1-hypnotic induction, Stage 2-hypnotic regression, and Stage-3 trigger control.

After the training, participants were asked to commit themselves to practice the techniques, by playing a 40 min audiotape recording of the live session, every day, over a seven-day interval between the first baseline and intervention phase of the study. In total, the players were given one live session, and seven audiotape sessions before the intervention phase. To ensure participants had listened to the audio tape recording, the players were contacted daily and asked to listen to the audiotape in a quiet room in the presence of an experimenter. The quality of the participants' experience was assessed by examining the thoughts, feelings, and cognitions immediately after each session. Finally, it should be noted that during the intervention stage the players were not under hypnosis, instead they were merely

using the trigger that was conditioned to the emotions, feelings, and cognitions they experienced during their ideal performance.

### *Procedural Reliability Assessment*

To ensure that participants received the same information throughout the study a number of strategies were employed. For instance, some of the sessions, including a familiarization session prior to the first data collection, were conducted in a group. The sessions were delivered in a standardized protocol (see appendix A). Verification that all aspects of the standardized protocol were consistently applied was obtained from an observer.

The internal experience of each player was monitored by asking each participant to complete a questionnaire (see appendix B) after each testing trial. This information permitted on-going assessment of the quality of the participants' feelings, thoughts, and cognitions across the baseline and treatment sessions. The data was analyzed by comparing the comments obtained in the baseline sessions to the comments obtained during the intervention phase of the experiment.

### *Treatment of Data*

The performance scores obtained from the participants were plotted according to the accuracy of their attempts. Via visual inspection of the data the researchers used the following criteria to establish the occurrence of an experimental effect: (a) when baseline performance was stable or in the direction opposite to that predicted for the effects of treatment, (b) the greater the number of times that an effect was replicated both within and across subjects, (c) the fewer the number of overlapping data points between baseline and treatment phases, (d) the sooner the effect occurs following the introduction of the treatment, and (e) the larger the size of the effect in comparison to baseline (Hrycaiko & Martin, 1996).

### *Practical Assessment*

In order to provide information about the effectiveness of the intervention, each of the participants completed a practical assessment questionnaire adapted from Kazdin, (1992) and Kendall, Hrycaiko, Martin, and Kendall (1990). The participants were asked the following questions: How did you feel during the performance? What were you thinking during the performance? Were there any outside thoughts distracting you? Did you experience any problems? Were you satisfied with the results following the intervention? Were the procedures acceptable to you? What was the effect of the intervention? What were your general beliefs about your performance? How much effort did you put into today's performance?

Following the completion of the study, the participants were given a social validation questionnaire. The questionnaire was designed to provide information concerning the importance of the study and the effectiveness of the intervention. Specifically, the participants were asked the following questions: (a) Did you per-

ceive the putting task to be important? (b) Were the procedures of the study acceptable? (c) Are you satisfied with the results? (See Hrycaiko & Martin, 1996.)

## RESULTS

Upon receiving the intervention Participants 1, 2, 3, 4, and 5 experienced an immediate performance effect with no overlapping data points between the baseline and the intervention phase. Specifically, Participant 1 improved from a mean of 28cm during the first baseline to a mean of 12cm during the intervention phase, Participant 2 from 25cm to 17cm, Participant 3 from 28cm to 17cm, Participant 4 from 24cm to 18cm, and Participant 5 from 26cm to 19cm. The performance data for each participant is presented in Figure 1. The results suggest that the hypnosis intervention consistently improved golf putting performance accuracy.

During the intervention Participants 1, 2, 3, 4, and 5 also experienced an immediate flow effect with no overlapping data points between the baseline and the intervention phase. Specifically, Participant 1 improved from a mean flow score of 114 during the baseline to a mean of 155 during the intervention, Participant 2 from 110 to 136, Participant 3 from 131 to 148, Participant 4 from 114 to 138, and Participant 5 from 134 to 172. The flow data for each participant is presented in Figure 2. The results suggest that the hypnosis intervention consistently increased the intensity of each participant's experience of flow.

### *Practical Assessment Data*

Upon completing the study, each of the participants was asked to respond to a practical assessment questionnaire. All participants indicated that during the intervention phase they had felt more relaxed, confident, and focused when compared to the baseline phase. Additionally, Participants 2, 3, and 5 indicated they had experienced reduced concerns about performing and more control over their putting stroke. Finally, all participants reported that they were satisfied with the results of the intervention and recognized that it had improved their putting performance.

## DISCUSSION

The present study examined the effects of a hypnosis intervention consisting of a hypnotic induction, hypnotic regression, and trigger control techniques on putting performance and flow states in competitive golfers. The results indicated that the dependent variables were positively influenced by the hypnosis intervention. Additionally, all the golfers reported that during the intervention phase they had felt more relaxed, confident and focused. Three of the golfers also reported experiencing reduced concerns about performing and felt they had more control over their putting stroke.

The results are clearly relevant to sport psychology practitioners because they suggest hypnotic training may increase personal control over flow and the perfor-

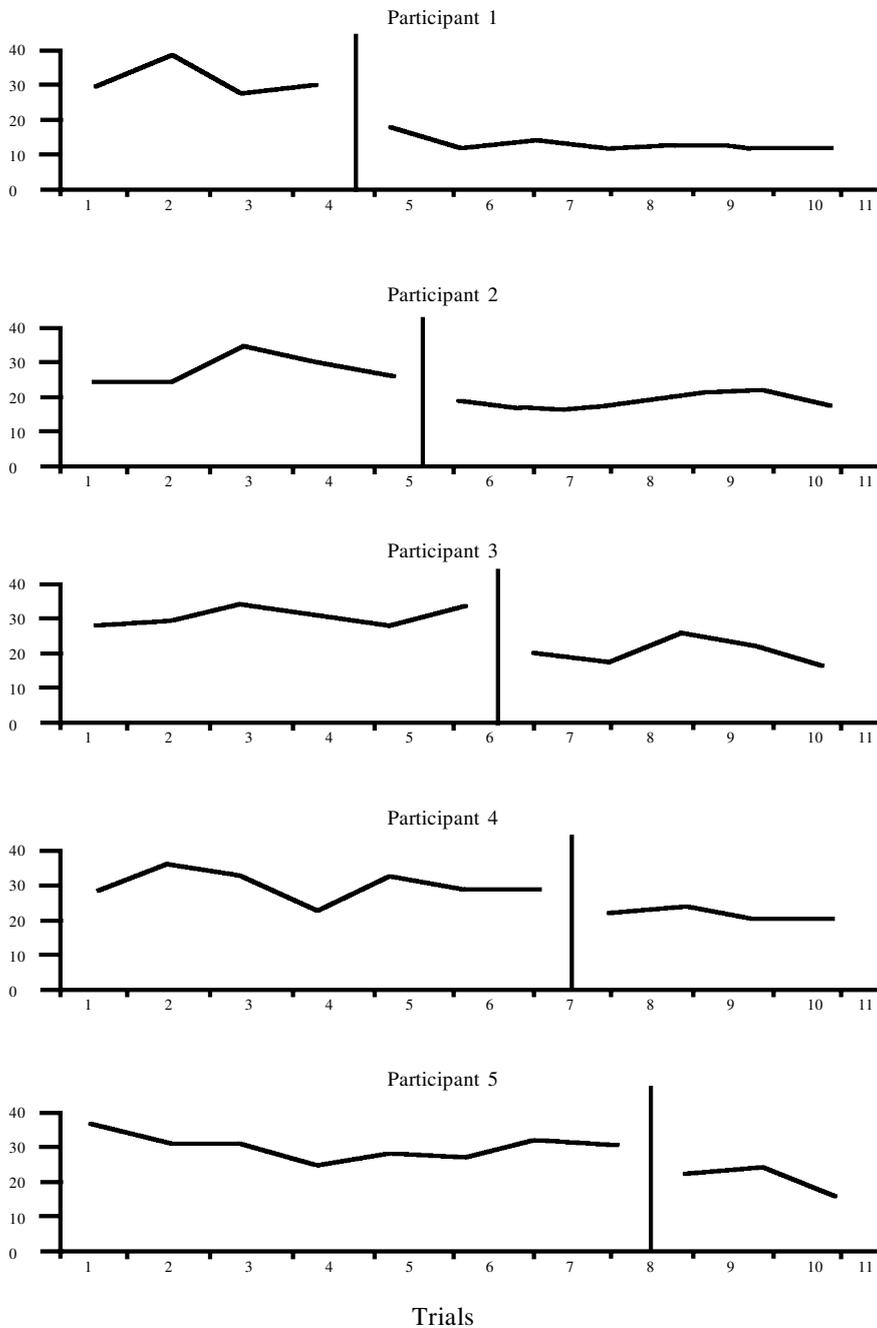
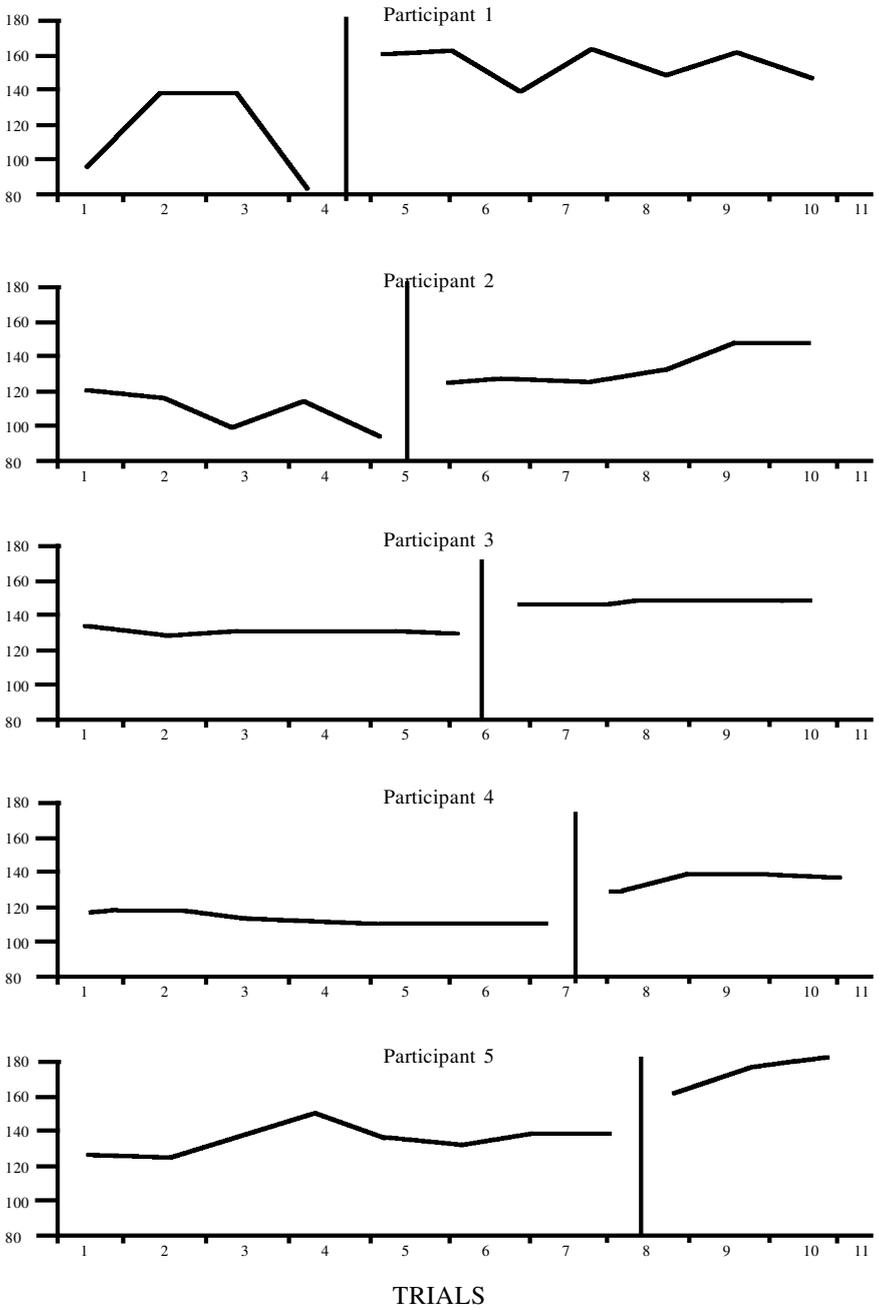


Figure 1. Performance accuracy for each participant on each trial.



TRIALS

Figure 2. Flow scores for each participant on each trial.

mance of fine motor skills. This finding supports the work of Unestahl (1983, 1986) who explicitly indicated that high levels of performance and positive emotions like flow states could be initiated through hypnotic regression and trigger control techniques. The results also support the work of Pates et al. (in press) who found hypnosis to be a highly effective tool for improving basketball shooting performances and controlling cognitions normally associated with flow states in competitive athletes.

Another important aspect of this study was that the single-subject multiple baseline across subjects design enabled the experimenters to be more confident that the change in flow and performance scores were produced by the intervention and not an uncontrolled variable. A favorable social validation assessment and the qualitative information provided further support for the intervention effect. However, it should be noted that Jackson (1999) questioned both the uses of retrospective self-reports as a measure of flow and the reduction of subjective experiences into quantifiable terms. Gathering information using a multi-method approach may yield a more accurate understanding of flow experienced by golfers and should be adopted in future research studies.

There also remains a possibility that the improvements in both performance and flow scores are an artifact of subject and experimenter bias. Indeed, in this study, neither the subjects nor the experimenter were blind to the outcome of the experiment, and clearly therefore it could be argued that experimenter expectations or the demand characteristics of the experiment would affect the results. There also remains an issue of a possible Hawthorne effect. This effect refers to a participant's change in performance that occurs merely as a function of being in an investigation (Drew, 1976). The scrutiny that performers receive as a function of being in a single-subject experimental design would seem to also heighten this potential problem. However, as Drew (1976) observed, the effect tends to decline as the subjects become acclimatized. Hence the extended length of the present single-subject study could be a factor that helped to control this effect.

In summary, the results of this study suggest that an intervention consisting of hypnotic induction, hypnotic regression, and triggers appeared to enhance flow and golf putting performance in high handicap golfers. This study also seems to provide evidence that hypnosis affects emotions, thoughts, and perceptions. However, if hypnosis interventions are to be accepted by the sport science community, further investigations are required. Specifically, the effects of hypnosis upon low handicap golfers and elite performers need exploration. It is also recognized that more ecologically valid tasks and group-based designs will contribute to the knowledge base in this field.

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## APPENDIX A: THE INTERVENTION CHECKLIST

**Signature of observer:**

**Date:**

***Intervention:***

Perform progressive muscle relaxation \_\_\_\_\_

Perform mental imagery relaxation \_\_\_\_\_

Perform staircase hypnosis induction \_\_\_\_\_

Perform hypnotic regression technique \_\_\_\_\_

Condition trigger to a flow experience \_\_\_\_\_

Have participants access their ideal performance state  
utilizing the trigger \_\_\_\_\_

Have participants complete Flow State Scale questionnaire \_\_\_\_\_

To reinforce training give participants an audiotape  
recording of the training \_\_\_\_\_

***General comments:***

Contact participants daily to check that they have played  
the audiotape recording of the training. \_\_\_\_\_

Check that the audiotapes have been retrieved before the beginning of the second baseline. \_\_\_\_\_

Ask if there are any questions \_\_\_\_\_

Copy questions down and answer them \_\_\_\_\_

Check understanding with participants \_\_\_\_\_

## APPENDIX B: PRACTICAL ASSESSMENT QUESTIONNAIRE

**Name:**

**Date:**

1. How did you feel during the performance?
2. What were you thinking during the performance?
3. Were there any outside thoughts distracting you?
4. Did you experience any problems?
5. Were you satisfied with the results following the intervention?
6. Were the procedures acceptable to you?
7. What was the effect of the intervention?
8. What were your general beliefs about your performance?
9. How much effort did you put into today's performance?

(Please circle the appropriate number)

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
No effort at all								Went all out	