

Assessing the Immediate and Maintained Effects of Hypnosis on Self-Efficacy and Soccer Wall-Volley Performance

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This study evaluated the effects of hypnosis on self-efficacy and soccer performance. Fifty-nine collegiate soccer players were randomly allocated to either a hypnosis ($n = 30$) or video attention-control group ($n = 29$). A pretest–posttest design with an additional 4-week follow-up was used. Self-efficacy was measured via a task-specific questionnaire comprising 10 items relating to good performance on a soccer wall-volley task. The hypnotic intervention comprised three sessions using ego-strengthening suggestions. The control group watched edited videos of professional soccer games. Results indicated that, following the intervention, the hypnosis group were more efficacious and performed better than the control group. These differences were also seen at the 4-week follow-up stage. Although changes in self-efficacy were associated with changes in performance, the effect of hypnosis on performance was not mediated by changes in self-efficacy. The study demonstrates that hypnosis can be used to enhance and maintain self-efficacy and soccer wall-volley performance.

Keywords: sport hypnosis, self-confidence, soccer, mental skills

Self-efficacy beliefs are one of the most influential psychological constructs mediating achievement in sport (Moritz, Feltz, Fahrback, & Mack, 2000). Bandura defined self-efficacy as “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (1997, p. 3). Self-efficacy judgments have been shown to influence motivated behavior (e.g., activity selection, effort), thought patterns (e.g., goal intentions), emotional reactions (e.g., pride, happiness), and sporting performance (Moritz et al.). Typically, athletes exhibiting high self-efficacy work harder, stay on task longer, and achieve at higher levels than do athletes with low self-efficacy (Bandura, 1997).

Because self-efficacy has an influence on sport performance (Moritz et al., 2000), the effectiveness of a variety of psychological strategies to engender increased and prolonged self-efficacy in athletes has been explored. Specifically, strategies based on Bandura’s (1997) four sources of efficacy (performance accomplishments, vicarious

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experience, persuasive information, and emotional/physiological state) have been examined. In this tradition, modeling, feedback, imagery, and self-talk have all been demonstrated to enhance athletes' self-efficacy (Feltz, Short, & Sullivan, 2008). However, one technique that has been overlooked in this regard is hypnosis.

Hypnosis uses suggestions to alter perceptions, thoughts, feelings, and sensations, thereby facilitating long-term changes in behavior (Heap & Aravind, 2002). Hypnotic suggestions are proposed to facilitate a process of dissociation between executive control and monitoring functions within the brain because the nonconscious part of the cognitive control structure responds to the given suggestions and images without engaging potentially critical conscious awareness (Hilgard, 1994). It has therefore been suggested that if, during hypnosis, efficacy-enhancing suggestions are made (i.e., verbal persuasion), they will be more readily accepted by the athlete because of the absence of critical conscious awareness (Barker & Jones, 2008). Barker and Jones (2006, 2008) provided evidence to support the proposed effect of hypnosis on self-efficacy with two idiographic studies in which hypnosis successfully enhanced the self-efficacy levels of a semiprofessional cricketer and a professional soccer player.

Although these case studies are encouraging, there remains a need to use more nomothetic, group-based approaches to establish the effects of hypnosis on self-efficacy and performance and to examine the long-term effects of hypnosis (Gardner & Moore, 2006; Martin, Vause, & Schwartzman, 2005). In line with previous research it was hypothesized that hypnosis would enhance self-efficacy beliefs and soccer performance, and improvements would be maintained in the follow-up assessment (Barker & Jones, 2006, 2008).

Method

Participants

Fifty-nine collegiate athletes on sport-related degrees took part in the initial phases of the study (M age = 21.34, SD = 3.50). The sample comprised 45 males and 14 female participants who all had experience of playing competitive soccer (i.e., 11-per-side league soccer; M years of experience = 11.68, SD = 3.88). Participants were randomly assigned to either the experimental group (n = 30) or the control group (n = 29). From this sample, 28 (male n = 24; and female n = 4) participants volunteered to take part in the 4-week follow-up test (M age = 21.50, SD = 3.25; M years of soccer experience = 12.57, SD = 3.77), equating to 14 participants in each of the experimental and control groups.

Design

A pretest–posttest follow-up design with repeated measures was used. The design consisted of an experimental group (i.e., hypnosis) and control group (i.e., video attention control). The key elements of the design were as follows: all participants undertook three training sessions (of either hypnosis or video watching) in between pretest (baseline) and posttest data collection. Participants undertaking the follow-up phase received no additional training and were measured 4 weeks following the posttest data collection phase.

Measures

Performance: The Soccer Wall-Volley Task. Performance was assessed using a soccer wall-volley task (see Filby, Maynard, & Graydon, 1999). Participants were requested to continuously kick a soccer ball at a target 2.7 m wide from a distance of 7.6 m for 90 s. On the target there were five scoring zones each 30 cm wide. A hit on the middle target scored 10 points, either side of the 10-point zone were two 8-point zones. Outside of these zones were 6-, 4-, and 2-point zones. Any ball outside of the 2-point zone scored 0 points. For a score to be recorded, the ball had not only to hit the target, but also rebound back over the 7.6-m line. If the ball did not rebound over the line, then it was retrieved by the participant, placed on the starting spot, and the trial was continued. Each participant had three familiarization trials on the soccer volley task, because research has suggested that there may be a learning effect (Filby et al.). Each trial was recorded using a digital video recorder positioned on an elevated balcony overlooking the target area, and was scored by the researcher using video playback equipment. The soccer wall-volley task was selected because it required the expenditure of effort and persistence, characteristics positively correlated with self-efficacy (Bandura, 1997).

Soccer Wall-Volley Self-Efficacy Questionnaire (SWVSEQ). The SWVSEQ was a task-specific measure of self-efficacy strength (Bandura, 1997) and consisted of 10 items relating to performance on the soccer wall-volley task. These items were effort, control, accuracy, persistence, ball strike, decision making, coping with pressure, consistency, concentration, and composure. The items were based on consultation with six experienced soccer players who pilot tested the soccer wall-volley task used in the study. Participants were provided with instructions to reduce social desirability effects and responded to the stem of, "Please rate each item with regards the certainty in which you feel you can successfully complete the following qualities in relation to the up and coming soccer wall-volley task." A rating of 100 indicated high certainty and a rating of 0 indicated no belief in the ability to complete the tasks. Cronbach alpha coefficients indicated internal reliabilities with values ranging from .90 to .92 to .94 for each of the three times the questionnaire was completed.

Perceived Value of Training Form (PVT Form). To examine and control for possible attention placebo differences between groups, participants completed a questionnaire on the perceived value of their training at both the posttest and follow-up phases (see Jones, Mace, Bray, MacRae, & Stockbridge, 2002). Participants were asked, "How useful was the training you did in preparing you for performance on the soccer wall-volley task?" and were assessed on a 4-point scale ranging from 1 (*not useful*) to 4 (*very useful*).

Hypnotic Depth Scale (HDS; Sapp & Evanhow, 1998). Participants indicated their hypnotic depth on an 11-point Likert scale, with verbal anchors at points 0 (*I did not experience hypnosis*), 2 (*I had a slight experience of hypnosis*), 5 (*I felt a moderate level of hypnosis*), 7 (*I felt a deep level of hypnosis*), and 10 (*I felt the deepest possible level of hypnosis*).

Social Validation. After the study, participants were asked to comment on the procedures involved, the delivery and perceptions of the interventions, and the

usefulness of the intervention in enhancing self-efficacy and performance. This form was based on the suggestions of Kazdin (1982) and a copy can be obtained from the first author.

Procedure

Ethical approval was gained from the first author's University Faculty Committee and all participants gave informed consent before the start of the study. Participants were presented with a brief introduction to the research and were told that there would be cash prizes (£25 for first, £15 for second, £10 for third) for the best three competitors in the posttest phase.

Pretest (Baseline): All Participants. To ensure an appropriate amount of attention from the first author, groups were limited in size to no more than six. Initially, participants viewed a demonstration of the soccer task by the lead author. Following three familiarization trials, participants received an ego-threatening instructional set informing them that scores from the individual pretest performance of the soccer volley task (one trial) were to be publicly posted in rank order. Participants then completed the SWVSEQ as close to performance of the task as possible (approximately 2 min beforehand), and then the soccer volley task.

Intervention (Training) and Posttest Procedures: Hypnosis Group. The first author delivered three hypnotic intervention sessions to groups of no more than six people in a psychology laboratory. The two training sessions required participants to practice the soccer task (three trials), undertake a group hypnosis session (lasting approximately 45 min), and practice the soccer task (a further three trials). Each session started with a question-and-answer session about hypnosis to facilitate rapport. Next, hypnotic acclimatization through the hand-clasp suggestion (Heap & Aravind, 2002) took place. The hypnotic intervention was then delivered and consisted of progressive relaxation procedures and ego-strengthening suggestions specific to successful performance on the soccer wall-volley task (the hypnotic suggestions are available on request from the first author). Following hypnosis, the HDS was completed and a discussion of the session took place. For ethical reasons, all hypnosis sessions were audio recorded. In the posttest phase of the study, participants completed a third group hypnosis session (lasting approximately 45 min), and the HDS. Hypnotic depth data for training session 1 (HDS $M = 5.97$, $SD = 1.67$), training session 2, (HDS $M = 7.57$, $SD = .90$), and the posttest phase (HDS $M = 7.97$, $SD = .93$) indicated moderate-to-deep levels of hypnosis. In the sports hall, participants individually received details about the procedure of the posttest phase along with ego-threatening instructions (i.e., substantial cash prizes were available for the best performers; all performances would be viewed by an elite Football Association (FA) coach; performance scores would be publicly posted in rank order). The PVT Form and a social validation form were completed after the soccer task.

Intervention and Posttest Procedures: Control Group. The control group followed identical procedures to the hypnosis group for both training and posttest phases apart from the provision of hypnosis. Instead, participants viewed 45 min of recorded soccer highlights from the English Premier League of elite players' passing and shooting techniques in a passage of play that led to a shot or goal (three

45-min tapes were used in the study). The first author was present at the video sessions and each session was limited in size to no more than six. Instructions were given to watch carefully the passing and shooting technique of elite performers as this could improve soccer wall-volley performance. To guard against any potential video modeling effects, the videos were edited so as not to illustrate behaviors that may have facilitated self-efficacy (e.g., instances of effort, persistence, and coping with pressure). This manipulation was used so that the video was perceived to be meaningful and beneficial to soccer wall-volley performance.

Follow-Up Phase. Four weeks after completion of the posttest phase, all participants were contacted via e-mail and phone and requested to take part in a follow-up session. Again participants were told that cash prizes would be available. Twenty-eight volunteered ($n = 14$ from each group). To reduce experimenter bias, a researcher blind to the purpose of the study as well as the specific manipulations that the participants had received ran the follow-up protocol. In this phase, participants were requested to perform three practice trials of the soccer task. Then, individually, participants received the ego-threatening instructional set, completed the SWVSEQ, received a final recap of proceedings, and undertook the soccer task. Following performance, the PVT Form was again completed. Performances were scored, put into ranking order, and publicly posted. Debriefing sessions took place at the end of the study.

Data Analysis

To examine and control for any potential confounding variables due to differences between groups on perceived ratings of training usefulness, scores on the PVT Form were compared at the posttest phase and follow-up phases via two independent - samples t tests. To examine the effect of hypnosis on self-efficacy and performance in the posttest phase, in accordance with the recommendations of Huck and McLean (1975), two separate one-way ANCOVAs were conducted on posttest efficacy and performance scores using pretest score (efficacy and performance, respectively) as the covariate. Similarly, two separate one-way ANCOVAs were conducted on follow-up efficacy and performance scores using pretest score (efficacy and performance, respectively) as the covariate. To determine the magnitude of intervention efficacy, effect size was calculated using Cohen's (1988) d . Pearson's moment correlation coefficient was used to examine the relationship between percentage change in efficacy and percentage change in performance for the whole sample and hypnosis group. Finally, we examined change in self-efficacy as a mediating variable between performance from pretest to posttest and from pretest and follow-up in line with Baron and Kenny's (1986) guidelines.

Results

Initial Analyses

Descriptive Statistics. Data for each group across the pretest and posttest stages of the intervention (see Table 1) demonstrate increases in self-efficacy and soccer performance following hypnosis. The data for the subsample of participants ($n = 28$) involved in the follow-up test indicates that efficacy and performance gains for the hypnosis group persisted 4 weeks later (see Table 2).

Table 1 Means and Standard Deviations of the Dependent Variables for the Hypnosis and Control Groups Across the Pretest and Posttest Stages

Group	Pretest				Posttest			
	Hypnosis (n = 30)		Control (n = 29)		Hypnosis (n = 30)		Control (n = 29)	
	M	SD	M	SD	M	SD	M	SD
Self-efficacy	73.50	14.39	75.21	10.87	81.03	12.71	74.97	11.82
Soccer volley performance	155.73	38.74	164.00	45.23	183.20	39.27	168.34	55.16

Table 2 Means and Standard Deviations of the Dependent Variables for the Hypnosis and Control Groups Across the Pretest, Posttest, and Follow-up Stages

Group	Pretest						Posttest						Follow-up					
	Hypnosis (n = 14)		Control (n = 14)		Hypnosis (n = 14)		Control (n = 14)		Hypnosis (n = 14)		Control (n = 14)		Hypnosis (n = 14)		Control (n = 14)			
	M	SD	M	SD														
Self-efficacy	77.86	12.02	79.50	6.16	85.50	10.66	79.51	6.63	84.57	11.16	77.71	9.25	77.71	9.25	77.71	9.25		
Soccer volley performance	173.00	38.39	175.29	44.26	205.00	38.53	183.86	47.39	217.71	39.88	190.29	45.83	190.29	45.83	190.29	45.83		

Manipulation Check. For perceived value of training we found no significant differences between the groups at either posttest, $t(1, 57) = .910, p = .367$, or at follow-up, $t(1, 26) = .983, p = .335$. Therefore, this was not included in subsequent analyses.

Changes in Self-Efficacy and Soccer Wall-Volley Performance

Pretest-to-Posttest Findings. The hypnosis group held higher self-efficacy beliefs than did the control group at the posttest stage, $F(1, 57) = 22.77, p < .001$. There was a medium effect ($d = .52$) in the hypnosis group and a minimal effect in the control group ($d = .02$) for the change in self-efficacy from pretest to posttest. The hypnosis group scored higher on the wall-volley task than the control group at the posttest stage, $F(1, 57) = 14.48, p < .001$. There was a medium-to-large effect in the hypnosis group ($d = .71$) and a small effect in the control group ($d = .10$) for change in performance from pretest to posttest.

Follow-Up Findings. The hypnosis group held higher self-efficacy beliefs than did the control group at the follow-up stage, $F(1, 26) = 17.21, p < .001$. There was a medium effect in the hypnosis group ($d = .56$) and a small-to-medium effect in the control group ($d = .29$) for change in self-efficacy from pretest to follow-up. The hypnosis group performed better than the control group on the wall-volley task at the follow-up stage, $F(1, 26) = 8.92, p = .006$. There was a large effect in the hypnosis group ($d = 1.16$) and a small-to-medium effect in the control group ($d = .33$) for change in performance from pretest to follow-up.

Correlation Analyses

Moderate significant associations between percentage change in pretest-to-posttest self-efficacy and performance ($r = .31; p < .05$), and between percentage change in pretest to follow-up self-efficacy and performance ($r = .42; p < .05$) was found for the whole sample. Analyses for the hypnosis group revealed no significant correlations ($p > .05$).

Tests for Mediation

Linear regression analyses were used to determine whether change in self-efficacy (from pretest to posttest and from pretest to follow-up) mediated the effects of hypnosis upon soccer wall-volley performance. Change in self-efficacy (from pretest to posttest and from pretest to follow-up) did not mediate the effect of hypnosis on performance, Sobel's (1982) test, $z_s < 1.97$ (in absolute magnitude), $p_s > .05$.

Social Validation Data

Eighteen of the 30 participants in the hypnosis group (60%) expressed concerns (mainly about losing control) about hypnosis before their first exposure. Interestingly, the entire hypnosis group reported more favorable perceptions of hypnosis after the study, suggesting that hypnosis had helped them to feel more confident while performing the task. Typical observations were, "I was extremely confident and relaxed prior to and during the task [in the competition]," "having visualized

successful performance during the hypnosis it seemed natural for me to have confidence when performing the soccer task,” “I felt more confident because the technique [hypnosis] helped me to not have negative thoughts,” and “it [the hypnosis] helped me to have a greater feeling of relaxation and composure during my performances.” In contrast, only five participants (17%) from the control group felt that the video enhanced confidence. Twenty-one (72%) from the control group reported finding it difficult to cope with the pressure of the competitive situations. Typical responses were, “there was more anxiety and negative thoughts” and “I felt I would choke during the final trial.”

Discussion

The present study examined the effect of hypnosis on self-efficacy and performance of a soccer wall-volley task in a sample of collegiate soccer players, using a nomothetic design. Hypnosis enhanced self-efficacy and soccer volley performance immediately after the completion of the intervention and this effect was maintained 4 weeks afterward. The hypnotic intervention had medium-to-large effects on participants' self-efficacy and performance (range, .52 to 1.16), whereas effect sizes for changes in the control group were typically small to medium (range, .02 to .33). In addition, social validation responses also provided support for the influence of hypnosis on self-efficacy beliefs and soccer wall-volley performance. A particular strength of this study was the 4-week follow-up phase. The maintained effects of the hypnosis found in this study support the proposition that hypnosis can facilitate longer-term changes in behavior (Heap & Aravind, 2002) and support past idiographic research suggesting that hypnosis can be used to enhance and maintain self-efficacy and sport performance (Barker & Jones, 2006, 2008).

Hypnosis was proposed to enhance self-efficacy and performance by providing important self-efficacy information. First, suggestions given during hypnosis (i.e., verbal persuasion) could have built self-efficacy, as self-talk is proposed to be positively related to an individual's efficacy beliefs (Bandura, 1997; Feltz et al., 2008). Second, during hypnosis, the presentation of suggestions could have stimulated imagery of effective coping and mastery of challenging situations. Indeed, performance accomplishments are considered one of the most powerful determinants of self-efficacy (Bandura, 1997).

A possible limitation of this study is that participants were not ability matched on their soccer wall-volley performance before allocation to a research group, although the use of ANCOVA does overcome this shortcoming (Vincent, 2005). In addition, a small learning effect was observed in the control group on the performance task across the three stages of the study. This effect may have been a reflection of the participants being volunteers, and, because of their positive attitude toward the study, they were motivated to improve on the soccer task (Filby et al., 1999). A further limitation is determining whether participants were experiencing hypnosis. Although participants' social validation data and postsession discussions revealed they had experienced hypnosis (which was supported by the HDS data), future research can consider the use of psycho-physiological markers via brain imaging or electroencephalographic procedures to enhance an understanding of the hypnotic experience.

We attempted to meaningfully relate the scores on a self-report measure (the SWSEQ) to a real-world variable (performance) in line with recent calls (Andersen, McCullagh, & Wilson, 2007). Changes in self-efficacy were associated with changes in performance, although not when the data for the hypnosis group alone was considered. Tests examining the mediating effect of change in self-efficacy on performance illustrated that a change in self-efficacy did not mediate this relationship. Because the change in self-efficacy did not account for the effect of the hypnosis intervention on performance, it is possible that changes other than those seen in self-efficacy, such as increased relaxation and reduced anxiety (supported by the social validation data), may have contributed to the changes in performance.

In conclusion, this study is the first to demonstrate that hypnosis can enhance self-efficacy and performance in a nomothetic design (including a follow-up assessment phase). However, self-efficacy did not mediate performance and future research could further delineate the effect of hypnosis on self-efficacy and subsequent performance. The positive influence of hypnosis on self-efficacy levels has important applied implications given the relationship between self-efficacy and performance (Bandura, 1997; Moritz et al., 2000). Sport psychologists and athletes may consider using hypnosis (in group settings) as a relatively cost-effective intervention to increase efficacy beliefs and improve sport performance.

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