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The Effects of Encoding in Hypnosis and Post-Hypnotic Suggestion on Academic Performance

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Abstract

This study examined the relationship between proactive learning in hypnosis, post-hypnotic suggestion, and academic performance. Participants (N = 56) were randomly assigned to a control group or a treatment group. The treatment group was hypnotized and read a passage while in hypnosis. Concurrently, they were given a post-hypnotic suggestion, which attempted to aid recognition and performance on a test immediately following the hypnosis session. Both groups completed a multiple-choice test based on the aforementioned passage. An analysis of covariance discerned the effect of proactive learning and post-hypnotic suggestion on test performance, while controlling for the variance introduced by scholastic aptitude as measured by the ACT. Results indicated that the hypnosis sessions predicted significantly impaired test performance.

Keywords: Academic performance, hypnosis, memory, post-hypnotic suggestion, testing.

Research regarding hypnosis has studied its relationship to memory in two fundamental ways. Several studies chose to investigate hypnosis' effectiveness of recalling previous memories, while few analyses examined the efficacy of creating new memories in hypnosis. Most studies regarding the relationship between hypnosis and memory were conducted in forensic settings measuring free recall (Pinizzotto, 1989; Wagstaff, Brunas-Wagstaff, Cole, & Wheatcroft, 2004). Such studies previously concluded that hypnosis produces confidence in memories, but does not enhance recall (Erdelyi, 2010). Accordingly, previous authors suggested that improvements in memory have largely been due to increases in a confidence threshold to report information (Fligstein, Barabasz,

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Barabasz, Trevisan, & Warner, 1998; Wagstaff, Brunas-Wagstaff, Cole, & Wheatcroft, 2004); however, more current research has found contrary results (Wagstaff, Cole, Wheatcroft, Marshall, & Barsby; 2007). Regardless of their confidence, test-takers benefit from using all of their knowledge on a test; therefore, the findings in previous studies may not apply to academia. Because typical hypnosis and memory research does not generally apply to testing situations, specific studies regarding academic performance and hypnosis are essential

Prior studies of hypnosis' efficacy on academic performance yielded mixed results; some studies concluded that hypnosis enhances academic performance, while others found a neutral effect (Cole, 1977; Cooper, 1990; De Vous & Louw, 2006; De Vous & Louw, 2009; Egan & Egan, 1968; Farady, 1993; Krippner, 1963; Pearce, 1999; Schreiber, 1997; Schreiber & McSweeney, 2004). However, studies regarding academic performance principally focused on the reprocessing of previously learned memories (e.g. learning material in class, then using hypnosis to reflect on the materials previously learned). Little research has concentrated on the effects of proactive encoding while in hypnosis, which would be applicable when an individual tries to learn new information. Studies often incorporate mnemonic techniques that involve reflections on emotions and thoughts at the time of the event (Wagstaff, Cole, Wheatcroft, Marshall, & Barsby; 2007). The aforementioned research does not address if hypnosis can facilitate learning; however, other studies on memory have aimed to address how hypnosis affects learning (Halsband, 2006; Sears, 1955; Wark, 1996).

The study of hypnosis and learning has been largely limited, especially within literature of the past ten years. When examining the limited previous research regarding the effects of hypnosis on learning efficiency, Sears (1955) investigated proactive learning in hypnosis by comparing hypnotized participants against non-hypnotized participants while learning Morse-code. He found that those who learned Morse-code in hypnosis produced significantly fewer errors than those learning in the control group. Similarly, Wark (1996) studied the effectiveness of learning in self-hypnosis. Wark's results showed that the participants with the greatest depth experienced the most improvement. However, Wark's study did not utilize a control group; accordingly, any changes may have been naturally occurring phenomenon over a course of time. In a more recent study using PET scans, Halsband (2006) discovered that image provoking memories learned in hypnosis induced stronger activation in the prefrontal cortex and cerebellum, as well as an additional bilateral activation in the occipital lobe. This may suggest that image-provoking memories learned in hypnosis are encoded differently than memories learned in normal conditions.

Additionally, Halsband (2006) tested the free recall of visual memories learned while in hypnosis by comparing the effects of hypnosis against a normal state. Based on his PET findings, Halsband hypothesized that participants would recall word-pairs better in a hypnosis condition. Using a repeated measures design, participants were assigned into both a control condition and hypnosis condition. In the hypnosis condition, participants were inducted; the experimenter then read 18 word-pairs of varying difficulty aloud and gave a post-hypnotic suggestion to increase relaxation and aid performance. In contrast, participants in the control condition learned 18 word-pairs while out of hypnosis. In both conditions, participants were asked to recall the word-pairs in a normal state. Sessions took place across one ninety-minute time span. Halsband found that hypnosis resulted in a decreased recall of word-pairs in comparison to the control condition.

While Halsbrand's methodology was novel, his results dealt with recall, and therefore may not be applicable to hypnosis' effect on recognition. In a recent study, Unsworth and Brewer (2009) performed a confirmatory factor analysis on individual differences in recognition

and recall. The authors found that item recognition and recall were unique structures with independent processes, finding only a moderate correlation between recognition and recall. Because of Unsworth and Brewer's findings, greater research needs to be performed to investigate if hypnosis has any effect on recognition tasks versus recall tasks.

Due to the interconnectedness between relaxation and hypnosis, studies regarding short-term relaxation are particularly relevant (Lynn & Rue, 1991; Wagstaff, 2009); however, such studies have been largely inconsistent. A few studies regarding relaxation and short-term memory have suggested that relaxation enhances the ability to recall information (Krampen, 1997; Legostaev, 1996); however, not all studies support this claim (Nava, Landau, Brody, Linder, & Schächinger, 2004; Rankin, Gilner, & Gfeller, 1993). While previous studies regarding memory have been inconclusive, theoretical structures have asserted that memory would be enhanced due to relaxation exercises (Lindsay & Morrison, 1996).

Because many previous studies on hypnosis and academic performance have utilized hypnosis as a tool to reflect on previous memories that have been encoded in normal conditions, the current study aimed to investigate the relationship between proactive encoding and performance on a multiple-choice test (Cole, 1977; Cooper, 1990; De Vous & Louw, 2006; Egan & Egan, 1968; Farady, 1993; Krippner, 1963; Pearce, 1999; Schreiber, 1997; Schreiber & McSweeney, 2004). This methodology sought to test the immediate effects of hypnosis on academic performance, thereby testing deep-rooted comprehension and recognition. Since previous studies have concluded that recall and recognition are unique processes with only moderate correlations, we speculated that findings about recall would not be applicable to a deep-processing recognition test. Additionally, due to the theoretical structures and evidence toward the enhancement of relaxation on short-term memory, we hypothesized that participants who received the hypnosis treatment would score higher on the multiple-choice test than the participants who received the control condition (Krampen, 1997; Legostaev, 1996; Lindsay & Morrison, 1996).

Method

Participants

Participants (N = 56 undergraduates; 43% male; ages 18 to 24; predominantly Caucasian) were pooled from an online recruitment system. Initially, participants gave their informed consent and completed a health questionnaire. Participants were not eligible to complete the study if they suffered from diabetes or epilepsy, as at the time of the study the authors were aware of previous reports that indicated that hypnosis could induce seizures and lower blood sugar (Khan, Baade, McNerney, Golewale, & Liow, 2009; Olson, Howard, & Shaw, 2008; Schwartz, Bickford, & Rasmussen, 1955; Vandenbergh, Sussman, & Titus, 1966). However, it should be noted that recent literature has not supported the trend on hypnosis' influence on blood sugar levels (Riazi & Bradley, 2007). Three participants did not complete a preliminary survey required for the analysis; as such, they were not included in this study.

Experimental Procedure

One of four experimenters trained in hypnosis conducted sessions with one participant at a time. Upon completion of the health questionnaire, participants completed a preliminary questionnaire in which they noted their ACT score (an indicator of academic aptitude; ACT, 2008). An experimenter then randomly assigned participants to the treatment group (N = 28) or the control group (N = 28). Using a script, the treatment group was then

induced into hypnosis using a progressive relaxation technique by first asking the participants to systematically relax each of their muscles. Next, an experimenter completed the induction with a "staircase method," asking participants to visualize themselves walking down a flight of stairs, while simultaneously counting down in odd increments from twenty-one to one.

Participants were then given a post-hypnotic suggestion to reduce anxiety, enhance concentration, and improve recall ability to heighten performance on a multiple-choice test that was administered afterward. As Hammond (1990) recommends, the following post-hypnotic suggestion was constructed in a repetitive manor to stress the importance of particular major points and to enhance participants' self-confidence:

> Your mind is capable of retaining all the information it is presented with. I am about to read you a passage. Later you will be asked to recall details from the passage, so listen carefully to my voice. All that you hear, you will be able to remember. You will be able to know everything you are presented with. When you are asked to recall any information that you have heard; it will come to you easily. All things will stay in your mind until they are needed. Everything will be remembered easily now. Easier and easier. Listening and remembering will come very naturally to you now. Memory is easy, easy, easy. All the information you need is in your mind. It will come to you very easily. Everything you have heard is easy for you to remember. And now, I am about to read you a passage. All the information in it will stay in your mind. This will stay with you until you answer all the questions. This will be very easy.

After reading a practice ACT literature passage aloud to participants, an experimenter then brought participants out of hypnosis. Subsequently, participants took a ten-item multiple-choice test based on the aforementioned passage (Kaplan, 2005).

A control group was used to assess the relative performance of the treatment group, serving as a baseline and controlling for the effect of environmental variables (e.g. time of day, location). Accordingly, the control group watched an unrelated film in place of the induction and enhancement script. The control group then listened to the same passage as the treatment group. Next, they resumed watching the film for the same amount of time that the treatment group was taken out of hypnosis. The control group received the same multiple-choice test and the same instructions as the treatment group.

Results

The frequencies on the ten-item multiple-choice test were investigated. Scores ranged from two to ten with only two students obtaining perfect scores on the test, indicating that no floor or ceiling effect was present. The average multiple-choice test score was 6.52 (SD = 1.78) out of 10. The hypnosis treatment group (M = 27.96, SD = 3.96) and the control group (M = 28.93, SD = 3.52) groups did not significantly ($p > .05$) differ in their ACT scores. An analysis of covariance (ANCOVA) tested if the dependent variable (multiple-choice test performance) was affected by group placement (hypnosis group or control group), while controlling for variation due to academic aptitude (via ACT score; ACT, 2008). The ANCOVA found a significant main effect for group placement, F (1, 53) = 9.968, p = .003, ς_p^2 = .158. The ANCOVA indicated those placed in the treatment group (M = 5.79, SD = 1.89, N = 28) scored significantly lower than the control group (M = 7.25, SD = 1.32, N = 28). Additionally, ACT significantly predicted multiple-choice test performance, F (1, 53) = 4.703, p = .035, ς_p^2 = .082.

Discussion

Contrary to our hypothesis, this study revealed that learning in hypnosis predicted significantly impaired performance on the multiple-choice test. These findings are similar to Halsband's (2006) findings on free recall. Accordingly, these findings suggest that hypnosis may affect both recognition and recall in a similar manner. However, these studies do not explain the reason for the performance deficits.

One possible explanation for these findings may be due to state-dependent memory. Cassady, Bloomfield, and Hayward (2002) found that short-term memory was benefited by a relaxed learning environment. When comparing recall in neutral conditions, the authors found that participants recalled information more efficiently when material was learned in a relaxed condition and then tested under neutral settings. When applying these results to the present study's findings, this suggests that state-dependency of hypnosis is not affected by relaxation. While hypnosis is related to relaxation, it is not equivalent (Lynn & Rue, 1991). Further research needs be conducted to determine the total relationship between state-dependent memory and hypnosis.

There are many reasons why the performance deficits may have occurred in this study. One potential reason may be that our post-hypnotic script was ineffective in aiding participant's testing ability. Another possibility may be attributed to the depth of each participant's hypnosis. As this study did not screen for hypnotic responsiveness, participants may not have been hypnotized to the depth required to be effective on test performance. Thus, future research should be concerned with how the depth of each session impacts performance (Barabasz, & Perez, 2007; Barnier, & Council, 2010). As this study assessed learning in hypnosis after one session, future research should study the efficacy of multiple-sessions on performance; perhaps, this would have more profound effect on recognition.

Accordingly, Halsband (2006) made a cursory investigation into depth of hypnosis and found differences between high and low hypnotizable participants. However, because he dichotomized participants between high and low, he did not test the continuous relationship between the depth of each session and the effect of processing, which may have led to misleading conclusions (Irwin & McClelland, 2003; MacCallum, Zhang, Preacher, & Rucker, 2002; Preacher, Rucker, MacCallum, & Nicewander, 2005). Thus, future research should focus on the relationship between the depth of the hypnosis, recall, and recognition.

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