

EXPECTANCY INFORMATION AS A MODERATOR OF THE EFFECTS OF HYPNOSIS ON MEMORY

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Abstract

Highly suggestible and low-suggestible students were shown slides of 40 line drawings and asked to recall them six times. Two-thirds of the students were given a hypnotic induction and hypermnesia suggestion for trials 3 and 4. Half of these participants were told that hypnosis enhances memory. The others were warned that hypnosis can lead to the production of false memories. Highly suggestible students given memory enhancement expectancy information displayed an increase in confident errors during hypnosis and retained these false memories after hypnosis. However, this effect was mitigated during hypnosis and eliminated after hypnosis among students who were warned that it might occur. Compared to control participants, hypnosis did not produce an increase in accurate memories, regardless of warnings. These data argue against both the use of hypnosis to enhance memory and the *per se* exclusion of testimony from hypnotized witnesses.

Key words: hypnosis, memory, expectancy, false memory, hypermnesia

Introduction

The idea that hypnosis increases access to information stored in memory led to its use as a means of uncovering memories in both clinical and forensic settings. Despite occasional reports to the contrary (e.g. Shields and Knox, 1986), most subsequent data (reviewed below) have failed to substantiate the hypothesized hypermnesia effect of hypnosis, and many studies indicated that hypnotic suggestions can lead to the production of confidently held intrusions or false memories. These data have led to the exclusion of hypnotically obtained evidence and to the *per se* exclusion of testimony by witnesses and defendants who have been hypnotized.

Studies investigating the effects of hypnosis on memory reports are of two sorts. In most, hypnosis has been coupled with attempts to implant memory errors through the provision of misleading information or direct suggestion about particular past events (Laurence and Perry, 1983; Yuille and Evans, 1985; Sheehan and Tilden, 1986; Sheehan, 1988; Lynn et al., 1989; McConkey et al., 1990; Sheehan et al., 1991; Barnier and McConkey, 1992; Sheehan et al., 1992; Weekes et al., 1992; Lynn et al., 1994; Green et al., in press). In a smaller number of studies, the effects of hypnosis have been assessed without misleading information or suggestions about the events to be recalled (Nogradly et al., 1985; McConkey and Kinoshita, 1988; Whitehouse et al., 1988; Spanos et al., 1991; Dinges et al., 1992; Orne et al., 1996). In these studies, hypnosis was reported to increase the production of incorrect recall.

Although the increased errors in memory following hypnosis may be due to the induction of hypnosis, they could also be explained as a response expectancy effect (Kirsch, 1985, 1997, in press). The belief that hypnosis enhances memory is widespread (McConkey, 1986), and this belief might lead people to give undue credence to the veracity of ideas experienced in hypnosis (Hammond et al., 1994; Orne et al., 1996). Also, in studies of the effects of hypnosis on memory, it is not uncommon for experimenters to give participants information aimed at strengthening this response expectancy. Dinges et al. (1992), for example, told participants that hypnosis would make the targeted material easier to remember, would bring additional memories from their subconscious minds, and would make their recollections more vivid and clear. Information of this sort might lead people to interpret thoughts and fantasies as memories. Indeed, the finding that memory liabilities can be produced in people with low scores on scales of hypnotic suggestibility has been interpreted as support for the hypothesis that these effects may be due to hypnotic response expectancies rather than hypnosis (Orne et al., 1996). However, even if the effect is linked to hypnotic suggestibility, as some data suggest (Nogrody et al., 1985), it still might be mediated by expectancy. People who have found themselves to be very responsive to other suggestions might expect to be responsive to hypnotic memory enhancement as well.

If the negative effects of hypnosis on memory reports are due to expectancy then they might be preventable by the provision of information that counters those expectancies. The impact of pre-hypnotic information on pseudo memory formation has been investigated in two studies. Lynn et al. (1991) told some participants that the mind is like a tape recorder and hypnosis can improve recall, whereas others were told that hypnosis does not improve memory. A third group of participants was not given any information about the effects of hypnosis on memory. False memories were induced via a suggestion to hear a telephone ringing in the room. The authors reported that their expectancy manipulation failed to affect the rate of pseudo memory production or the degree of confidence that participants had in those memories. However, the base rate of responding to the telephone ringing suggestion was very low, leaving little room for its inhibition by expectancy information.

In a second study, Green et al. (in press) used the nocturnal events paradigm (Orne, 1979), which produces a higher rate of pseudo memory production in suggestible individuals. This procedure entails participants selecting a night during which they do not remember waking up or dreaming, hypnotizing them, and then suggesting that they heard a loud noise which woke them up on the night in question. Half the participants were warned that hypnosis could lead to false memories; the others were not. Consistent with the response-expectancy hypothesis, the authors reported that the effect of the warning was to reduce the rate of pseudo memory reporting from 75% to 38%. However, among participants who developed pseudo memories during hypnosis, the warnings did not affect the subsequent retention of the false memories.

Both previous studies of the effects of pre-hypnotic warning on pseudo memory production involved the intentional suggestion of false memories. Participants were told that they could hear a telephone ringing or that a loud noise had woken them up on a particular night. Although direct suggestions of this sort might be used by some therapists or forensic hypnotists, more prudent practitioners are likely to avoid such suggestive procedures. In a forensic setting, for example, a witness might be instructed to recall as many details as possible of what was seen, without being told that they had seen certain events. The purpose of this study was to determine whether pre-hypnotic expectancy information about the effects of hypnosis on

memory might affect the production of memory intrusions in the absence of misleading information. Using procedures similar to those of previous studies (Nogrady et al., 1985; McConkey and Kinoshita, 1988; Whitehouse et al., 1988; Dinges et al., 1992; Orne et al., 1996), three groups of students were asked to view slides depicting common objects and later to recall what they had seen. After baseline memory assessment, participants in two of the groups were hypnotized and additional recall trials were provided. Half the hypnotized students were warned that hypnosis can lead to the creation of false memories, whereas the others were told that hypnosis can facilitate memory production.

Method

Participants

Ninety female and 60 male undergraduate students at the University of Connecticut agreed to participate in the study in exchange for credit in an introductory psychology course. Half the participants had been selected because they achieved low scores (0–3) and half because they achieved high scores (9–12) on the Waterloo–Stanford Group C scale of hypnotic susceptibility (WSGC; Bowers et al., 1982), a group adaptation of the *Stanford Hypnotic Susceptibility Scale, Form C* (SHSS:C; Weitzenhoffer and Hilgard, 1962). Participants were among approximately 900 undergraduate students who had previously been screened on the WSGC in exchange for class credit. Participants were assigned randomly to three experimental conditions – positive expectancy, negative expectancy and no hypnosis control – with the restrictions that:

1. The proportion of males to females be equal in each condition.
2. There be an equal number of low- and high-suggestible participants in each condition.

Participants were contacted by telephone and invited to take part in the study. During recruitment, no mention was made of hypnosis or of the connection between this study and the prior screening sessions. This was to avoid any possible hold-back effect (Zamansky et al., 1964) that might occur during pre-hypnotic baseline assessment.

Procedure

Participants were told that they would be shown 40 slides depicting common objects and that subsequently they would be asked to remember and write down the names of the objects they saw. They were then shown 40 slides containing black and white line drawings of commonplace objects, which had been randomly selected from the standardized set of Snodgrass and Vanderwart (1980). Slides were presented on a carousel projector with an automatic timer set at the rate of one slide every five seconds.

Recall of the objects depicted in the slides was assessed using procedures developed in previous studies (Dinges et al., 1992; Orne et al., 1996). After being shown the slides, participants were given response sheets containing 40 blank lines, on which they were asked to write down the names of all the objects they could remember having seen. They were told that when they could not remember any more items, they were to draw a line under the last entry and begin filling in the blank spaces with their best guesses. If they remembered additional items while completing the guessing section they were to put a checkmark beside them, so as to distinguish remem-

bered items from guesses. Participants were given five minutes to complete the recall trial. There were six recall trials, organized into three sessions, with two trials in each session. Each trial was preceded by a two-minute period during which response sheets were distributed and instructions repeated.

Before Session 2, participants in the hypnosis conditions listened to a 15-minute, tape-recorded, hypnotic induction, adapted from the SHSS:C (Weitzenhoffer and Hilgard, 1962). Participants in the control condition spent 15 minutes completing a personality inventory unrelated to the study, and reading unrelated material.

Immediately before the induction, participants in the positive expectancy condition were told:

'Many hypnosis researchers have found that hypnosis can actually help enhance memory for previous events, and as you probably know, hypnosis has often been used in forensic and clinical settings to help people remember things that they could not remember earlier. You see, your mind acts much like a video recorder; it records all of the things you experience and stores them permanently in your memory. However, for one reason or another, some of your experiences may not be available to your conscious mind, no matter how hard you try to remember them. For this reason, hypnosis is often used by forensic and clinical experts as a tool to help bring forth additional memories from the subconscious mind and to make these recollections very vivid and clear. An interesting thing about hypnosis is that it allows people to focus their minds on the things they are trying to remember. While you are hypnotized, you may find it easier to focus your attention and concentration on the pictures you have seen before, and you may also find that your memories for the pictures have become very sharp and clear. You may also find that remembering the pictures while your hypnotized helps bring forth from your subconscious mind new memories of items that you have seen in the slides. It seems that the act of focusing your attention and concentration during hypnosis helps release memories from your subconscious mind, so that they are available to your conscious mind, and once these memories are available to your conscious mind during hypnosis, they can be recalled permanently, even when you are not hypnotized. We are interested in seeing whether hypnosis can help you better remember the pictures that you have seen earlier.'

In place of these instructions, participants in the negative expectancy condition were told:

'It was once thought that hypnosis enhances memory for previous events, but we now know that hypnosis can also lead to the creation of false memories. That is because hypnosis is linked to the imagination. When people are hypnotized, they are encouraged to fantasize. That is how they produce suggested experiences. The problem is that it can be very difficult to tell the difference between a fantasy and a memory. So people who have been hypnotized sometimes mistake their hypnotic fantasies for things that actually happened. In other words, while hypnosis may lead to the increased reporting of accurate memories, it may also lead to the reporting of false memories. In fact, some courts will not allow a witness to testify if he or she has been hypnotized. Furthermore, hypnotized people can become very confident in the accuracy of their false memories. This happens because they have the mistaken belief that hypnosis only produces accurate memories. However, we have found that this negative effect of hypnosis can be prevented if people are forewarned about it, and that is why I am telling you about it now. Once they know about this danger, good hypnotic subjects can tell the difference between real and false memories, if they are careful. We are interested in seeing whether hypnosis can help you better remember the pictures that you have seen earlier, but we want you to be aware that since hypnosis may increase your confidence in your guesses, you should be careful about whether you really remember seeing the objects you write down or whether you are just guessing.'

Control subjects were given instructions based on those given to their counterparts in the study by Dinges et al. (1992):

'The purpose of having you read this material is to take your mind off of the pictures for a while. Taking a little break this way will make it easier for you to remember the pictures later on when you are asked to do so.'

Following the hypnotic induction, participants in both hypnosis conditions were given the following tape-recorded hypnmesia suggestion:

'Now please keep your eyes closed and continue to relax. In a moment, I will ask you to open your eyes and write down the names of the objects you have seen in the pictures. You will be able to do so while remaining deeply relaxed and hypnotized. You will find it very easy to focus your attention and concentration on the pictures that you have seen. The pictures will appear easily and effortlessly in your mind's eye, and you will have no trouble remembering them. An interesting thing about hypnosis and memory is that the more items you recall, the easier you will find it to recall even more. Although you are still deeply hypnotized, you will be able to open your eyes when you are asked to do so, to write, and to follow the instructions of the experimenter. Now, remaining very deeply hypnotized, please open your eyes.'

Immediately prior to Trial 4, hypnotic participants were given the following tape-recorded suggestion:

'Please continue to relax and focus your concentration and attention on the pictures you see in your mind's eye. They are emerging easily and effortlessly in your mind, and you continue to see them clearly. As you focus on the pictures, more and more of them are coming to your mind. You see them very clearly and vividly. When the experimenter tells you to, write down the names of the objects you have seen earlier.'

After Trial 4, hypnosis was terminated for participants in the hypnosis conditions, and recall trials 5 and 6 were administered to all participants. At the conclusion of the session, participants were debriefed.

Results

Table 1 presents the means and standard deviations of correct and incorrect memories as a function of suggestibility (high and low), experimental condition (positive expectancy, negative expectancy, no hypnosis control), and session (baseline, hypnosis, after hypnosis). These data were limited to those indicated by participants to be memories; guesses were excluded from analysis regardless of whether they were accurate or inaccurate. Session scores are the mean of the two trials that constituted the session. Correct and incorrect memories at baseline were subjected to 2 x 3 (suggestibility x condition) analysis of variance (ANOVA). These analyses revealed a significant main effect for condition in false memories, $F(2,144) = 4.02$; $p < 0.02$. With alpha set at 0.05, a Tukey's Honestly Significant Difference test indicated that more incorrect memories were reported at baseline by participants assigned to the positive expectation group ($M = 0.45$) than by those assigned to the negative expectancy ($M = 0.17$) or control ($M = 0.17$) conditions. Because participants had been assigned randomly and no aspect of the experimental manipulation had yet been administered,

this difference was attributed to sampling error, and subsequent analyses of incorrect memories included session one scores as a covariate.

A 3 x 2 x 3 (condition by suggestibility by session) mixed model analysis of variance (ANOVA) on accurate memories revealed a significant main effect for sessions, $F(2,288) = 167.72; p < 0.001$, but no other significant main effects or interactions. The mean number of accurate memories reported were 19.02 before hypnosis, 20.98 during the hypnosis session, and 21.71 after the hypnosis session. A 3 x 2 x 2 (condition by suggestibility by session) mixed model analysis of covariance (ANCOVA) on incorrect memories, with baseline scores as the covariate, revealed significant two-way and three-way interactions. These consisted of a condition by suggestibility interaction, $F(2,143) = 3.14; p < 0.05$, and a condition by suggestibility by session interaction, $F(2,143) = 3.29; p < 0.05$. Tests for simple effects confirmed a main effect for condition, $F(2,143) = 5.29; p < 0.01$, and a condition by session interaction, $F(2,143) = 3.12; p < 0.05$, only for highly suggestible participants.

Table 1. Means (standard deviations) of accurate and inaccurate memories as a function of suggestibility, experimental condition and session

Memory	Suggestibility	Condition	Session		
			Pre-hypnosis	Hypnosis	Post-hypnosis
Accurate	High	Positive expectancy	19.10 (4.63)	21.64 (4.53)	22.34 (4.73)
		Negative expectancy	19.42 (4.35)	21.50 (4.98)	22.20 (5.48)
		Control	19.36 (4.23)	21.44 (4.72)	22.02 (4.85)
	Low	Positive expectancy	18.94 (3.69)	20.50 (4.39)	21.12 (4.52)
		Negative expectancy	18.50 (5.08)	20.34 (5.87)	21.40 (5.66)
		Control	18.80 (2.67)	20.46 (2.67)	21.18 (3.15)
Inaccurate	High	Positive expectancy	0.54 (0.93)	1.18 (1.68)	1.12 (1.84)
		Negative expectancy	0.22 (0.46)	0.54 (0.80)	0.26 (0.66)
		Control	0.26 (0.66)	0.28 (0.50)	0.36 (0.87)
	Low	Positive expectancy	0.36 (0.55)	0.44 (0.70)	0.46 (0.72)
		Negative expectancy	0.12 (0.30)	0.24 (0.52)	0.30 (0.60)
		Control	0.08 (0.19)	0.26 (0.46)	0.14 (0.34)

Table 2. Adjusted mean memory errors as a function of suggestibility, experimental condition and session

Suggestibility	Condition	Session	
		Hypnosis	Post-hypnosis
High	Positive expectancy	0.91	0.90
	Negative expectancy	0.58	0.31
	Control	0.28	0.36
Low	Positive expectancy	0.35	0.36
	Negative expectancy	0.38	0.46
	Control	0.44	0.34

Adjusted means corresponding to these effects are reported in Table 2. Between group differences for each session were tested by Tukey's Honestly Significant Difference tests with alpha set at 0.05. These data indicated that during the hypnosis session, highly suggestible participants in the positive expectancy condition displayed more errors than control subjects; participants in the low expectancy condition did not differ significantly from participants in either the high expectancy or control conditions. After the hypnosis session, highly suggestible participants in the positive expectancy condition produced more errors than participants in either of the other conditions; the difference between low expectancy and control subjects was not significant.

Finally, we examined changes in memory errors among highly suggestible participants in each of the experimental conditions. Participants in the positive expectancy condition showed an increase in false memory reports both during and after hypnosis, during hypnosis $t(24) = 2.64; p < 0.02$, after hypnosis $t(24) = 2.21; p < 0.04$. In contrast, although participants in the negative expectancy condition evidenced an increase in false memory reports during hypnosis, $t(24) = 2.06; p < 0.05$, after hypnosis the frequency of these reports did not differ significantly from that observed during the baseline memory session. Also, control subjects failed to show any significant between session differences in memory errors.

Discussion

This study replicated previous experiments in which the effects of hypnosis on memory report was assessed without providing misleading information or suggestions about the material to be recalled (Nogrody et al., 1985; McConkey and Kinoshita, 1988; Whitehouse et al., 1988; Dinges et al., 1992; Orne et al., 1996). As in previous studies, repeated recall led to the classic hypermnesia effect (i.e. increases in accurate memories), but hypnosis failed to increase this effect. Instead, hypnosis increased the production of inaccurate memories. In contrast to the results reported by Orne et al. (1996), however, it did so only among highly suggestible participants. In the study by Orne et al. (1996) there was a one-week delay between the baseline recall session and the hypnosis recall session, whereas in our study, baseline and hypnotic recollections were obtained during the same session. It is possible that this difference in methods is responsible for the difference in results, but the reason for this possible effect of delay on low-suggestible participants is unclear.

We varied the information provided to participants, and this information was found to moderate the negative effect of hypnosis on memory. Among highly suggestible participants, only those given positive information about the effects of hypnosis on memory committed more memory errors during hypnosis than un hypnotized participants did on the same trials. Among highly suggestible participants who were warned about the possibility of inducing false memories, the number of memory errors produced during hypnosis was intermediate between that displayed in the high-expectancy group and that displayed in the control group. When hypnosis was terminated, even the small effect on memory reports in the negative expectancy condition disappeared. At this point, highly suggestible students in the negative expectancy group did not differ from those in the control group, but reported significantly fewer inaccurate memories than those in the positive expectancy condition.

These data are only partially consistent with previous studies of the effects of expectancy manipulations on hypnotically engendered pseudo memories. As in our study, Green et al. (in press) found that warning participants about the possibility of

pseudo memory formation decreased its production substantially. Unlike the results of this study, however, the inaccurate memories produced by warned participants in the study by Green et al. (in press) were as likely to be retained as those produced by unwarned participants. In our study, a lasting negative impact of hypnosis on memory was found only among participants who had been given positive information about the effects of hypnosis on memory. This difference is most likely due to the highly suggestive nature of the procedures used by Green et al. (in press). In that study, a specific false memory was suggested during hypnosis, whereas in our study, no misleading information was given about the material to be recalled.

In summary, these data indicate that in the absence of misleading information and with appropriate warnings, the negative impact of hypnosis on memory is small and transient. Indeed, the effect was so small as to raise the possibility of a floor effect obscuring differences that might otherwise have been found. These data raise questions about the *per se* exclusion of testimony by hypnotized witnesses. Conversely, our data provide no rationale for the use of hypnosis to enhance memory retrieval in the first place. Despite a relatively large sample, we found no evidence that hypnosis increases accurate recall. Generalization of these findings to forensic or clinical contexts must be made with caution because:

1. The stimuli were simple line drawings, as opposed to the more complex and ambiguous stimuli about which witnesses might be required to testify.
2. The stimuli were only briefly seen, were not meaningful, had no personal relevance to the participant, and were not associated with emotion.
3. Stimuli presentation and recall attempts occurred during the same experimental session. Thus, forensic and clinical situations might provide greater opportunity for both positive and negative effects of hypnosis on memory.

The mitigating effect of the negative expectancy information presented to participants in this study should not be interpreted as justification for the 'neutral expectation' information advocated in the Guidelines for Clinicians and for Forensic Hypnosis (Hammond et al., 1994) published by the American Society of Clinical Hypnosis (ASCH). Our expectancy information went beyond that of the ASCH guidelines in stressing that hypnosis can generate false memories. Whether these expectancy guidelines would have an effect similar to the negative expectancy information used in this study remains to be determined.

Finally, to maximize our ability to find an expectancy effect if there was one, we contrasted a positive expectancy manipulation with a negative expectancy manipulation. Future research should include such additional controls as a neutral expectancy condition and a condition in which no expectancy information is given. Because our positive expectancy manipulation provided information that was consistent with widely held views of hypnosis (McConkey, 1986), we would expect the behaviour of participants in this condition to be most similar to those of people given no expectancy-inducing information. In any case, the data from the present study provide clear evidence for two propositions:

1. Expectancy-inducing information can significantly alter the effect of hypnosis on pseudo memory production in circumstances in which that effect has previously been demonstrated.
2. The negative expectancy information used in this study can block all but small, fleeting, detrimental effects of hypnosis on memory report.

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