

HYPNOSIS AND INTERROGATIVE SUGGESTIBILITY

PATRICIA A. REGISTER¹ and JOHN F. KIHLMSTROM^{2*}

¹University of Wisconsin and ²Department of Psychology, University of Arizona, Tucson, AZ 85721, U.S.A.

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Summary—An attempt was made to induce memory errors through the use of misleading questioning in hypnosis. Subjects heard a short newsworthy story and gave initial free recall for the story details, then 4 days later were given three free recall trials: prior to hypnosis, following hypnotic induction and suggestion for enhanced memory, and after hypnosis was terminated. During hypnosis subjects were also twice interrogated with either misleading or objective questions for the story details. Accurate memory increased over the three free recall trials for all subjects regardless of hypnotizability. In recognition testing, subjects given misleading questions during the interrogation gave fewer correct responses, had more errors-in-fact as well as forgetting, and showed an increase in yielding to interrogative suggestibility over trials than subjects given objective questions. All subjects subsequently confabulated more information on the final awake free recall trial as a result of errors introduced during hypnotic interrogation process. These results help to clarify the inherent dangers in relying on hypnosis to enhance memory.

INTRODUCTION

Hypnosis is commonly employed in medical and psychotherapeutic settings to relieve pain and enhance relaxation and imagery. Perhaps because hypnosis has been so successful in these contexts, it has been widely believed that it can also be utilized in forensic settings. As a result, there are a number of instances where hypnosis was induced in an attempt to refresh the memories of witnesses, victims, and even suspects and defendants in civil and criminal cases. However, practical experience with hypnotic hypermnesia has yielded mixed results. For example, hypnosis has been successfully employed in a number of dramatic forensic cases, but in other apparently similar instances hypnosis has proven either ineffective in enhancing memory or has led to the introduction of severe distortions in recollection (for reviews, see Council on Scientific Affairs, 1985; Diamond, 1980; Kihlstrom, 1982, 1985; Laurence and Perry, 1983a; Orne, 1979; Orne, Soskis, Dinges and Orne, 1984; Register and Kihlstrom, 1987; Smith, 1983).

The resulting controversy has led a number of investigators to undertake laboratory investigations of hypnotic hypermnesia. Although generalization from the laboratory to the field is always a risky business, controlled research can offer valuable information about memory distortion effects caused by suggestive questioning, by effects of the hypnotic context itself, and by characteristics of hypnotizable subjects. This line of research has addressed two basic questions. First, does hypnosis yield any reliable advantage in accurate recall over and above any increments that might occur in the normal waking state? And second, does hypnosis increase the subject's vulnerability to leading questions and other sources of memory bias?

The empirical status of *hypnotic hypermnesia*—that is, hypnotic improvements in accurate recollection—is presently unclear. Early research seemed to show that hypnosis improved memory somewhat for meaningful as opposed to nonsense material (for a recent example, see Dhanens and Lundy, 1975). However, more recent work suggests that any enhancement of memory that might be observed is accompanied by a corresponding increase in *false* recollection. That is, those studies that have obtained hypnotic increases in accurate recollection have also obtained increases in false recollection (Dywan, 1987; Dywan and Bowers, 1983) or at least increases in the confidence attributed to recall errors (Nogrody, McConkey and Perry, 1985). A study of Register and Kihlstrom (1987) obtained no increases in false recollection, but did not obtain any increases in *accurate* reflection either. Two very recent studies appear to contradict even this generalization,

*Author for correspondence.

however (Geiselman, Fisher, MacKinnon and Holland, 1985; Shields and Knox, 1986). Still, whatever effects hypnosis may have on hypermnnesia appear to be unreliable.

There is considerably more evidence that hypnotic suggestions can produce distortions in memory for past experiences. Hypnotically suggested paramnesias have frequently been used to induce conflict in studies of experimental neurosis (for reviews see Levitt and Chapman, 1979; Reyher, 1967). An experiment by Laurence and Perry (1983b) dramatically illustrates the potential of hypnosis for producing unshakeable distortions in memory. In their study, 27 highly hypnotizable subjects were interviewed about their activities during a particular night of the previous week. Then they were hypnotized, age-regressed to the night in question, and given a (false) suggestion that they had been aroused from sleep by a noise. A total of 13 subjects accepted the suggestion, reporting posthypnotically that they had actually heard the noises in question; six of these were quite certain about the accuracy of their recollections. Even when they were explicitly told that the hypnotist had suggested that the noises had occurred, these subjects continued to accept the pseudomemory as real. This result was substantially confirmed by Spanos and McLean (1986a), although these investigators preferred to interpret the effects in terms of response bias rather than memory distortion (see also McConkey and Kinoshita, 1986; Spanos and MacLean, 1986b; Zamansky, 1986).

Many studies of hypnotically induced distortions of memory have derived their procedures from Loftus' (1979) studies of leading questions and eyewitness reports. In these studies, subjects view a slideshow or film depicting a staged crime or accident. Then they are queried about details of the incident by means of a recognition-style test. In the course of this interrogation, the subjects are subtly exposed to false or misleading information. Loftus and her colleagues have found a significant tendency for this information to be incorporated into the subjects' memory reports (but see McCloskey and Zaragoza, 1985). For example, a question such as "How fast was the Datsun going when it smashed into the Toyota?" elicits a higher estimate than a question in which the word *struck* is substituted for *smashed*. Alternatively, a question such as "Did you see the broken headlight?" elicits subsequent reports that a headlight was broken, even though no such information had been provided in the original vignette. Loftus has reported that such errors in memory can occur even when subjects are given incentives for correct responses, and may persist when they are re-interrogated with unbiased procedures (Loftus and Loftus, 1980).

In the first study to employ Loftus' procedures, Putnam (1979) exposed a group of highly hypnotizable subjects to a slideshow depicting a car-bicycle accident. Half the subjects received the biasing interrogation while hypnotized, while the other half received it in the normal waking state. Subjects in the hypnosis condition made more errors in response to leading questions than those in the waking condition, especially with a long (24 h) retention interval; however, there were no differences in response to the nonleading questions. Similar effects have been obtained by others (Sanders and Simmons, 1983; Sheehan and Tilden, 1983; Zelig and Beideman, 1981). Sheehan (1985, 1987) and his colleagues have reported an extensive line of research on this question, also using Loftus' procedures. In these studies, incorporation of misleading information was tested by means of both free recall and recognition procedures (Sheehan, 1985, Experiment 6; Sheehan and Tilden, 1983, 1984, 1986; Sheehan and Grigg, 1985; Sheehan, Grigg and McCann, 1984). In line with the studies of hypermnnesia described earlier, none of these experiments gave any evidence for the hypnotic enhancement of free recall. In the only two studies where any positive effects were obtained (Sheehan and Tilden, 1983, 1986), increases in accurate recall were also accompanied by increases in intrusion errors—much as in the study by Dywan and Bowers (1983). There were no effects of hypnosis or hypnotizability on recognition accuracy.

Principal interest, however, resides in the occurrence of memory distortion in response to misleading questions—what might be called the "misinformation effect". Sheehan and Tilden (1983) compared the response of highly hypnotizable and insusceptible subjects assigned to hypnotic and waking control conditions; in this experiment, the misleading information was introduced before the hypnotic induction. Although the subjects did show significant incorporation of the misleading information, there were no effects of hypnosis or hypnotizability. This was also the result of follow-up experiments in which hypnotic subjects were compared to simulators (Sheehane and Tilden, 1984), and hypnotizable subjects were compared to insusceptible subjects who were highly motivated to perform well on the memory tests (Sheehan and Tilden, 1986). However, when

the misleading information was introduced *during* hypnosis, the misinformation effect was greater for hypnotic subjects compared to simulators (Sheehan *et al.*, 1984), and for hypnotizable subjects compared to their task-motivated unsusceptible counterparts (Sheehan and Grigg, 1985).

Of course, subjects made errors in response to *unbiased* questions as well. In all six studies, more errors were observed on the free recall test than on the recognition test. In four studies, the hypnotizable subjects made more recall errors than the unsusceptible one (Sheehan and Tilden, 1983, 1986; Sheehan and Grigg, 1985; Sheehan, 1985, Experiment 6). However, these effects were independent of the actual induction of hypnosis. Two other studies found that hypnotic subjects made more recall errors than simulators (Sheehan and Tilden, 1984; Sheehan *et al.*, 1984); these effects are probably due to hypnotizability differences between reals and simulators rather than to hypnosis *per se*.

Finally, Sheehan and his associates have examined the confidence associated with their subjects' recall and recognition performance. In all six studies, subjects tested in a hypnotic condition were more confident in their memory reports than waking controls. However, simulators showed the same increase in confidence as real hypnotic subjects, indicating that the confidence effect is more likely due to features of the hypnotic context than to anything about hypnosis *per se*. The important point is that these effects of the hypnotic setting were independent of accuracy: the subjects showed increased confidence in their errors as in their correct memory reports.

The present study addressed similar questions of memory distortion from another angle, but still employing a variant on the Loftus paradigm. Recently, Gudjonsson has developed a scale of "interrogative suggestibility" that measures individual differences in response to misleading questions (Gudjonsson, 1983, 1984a, 1984b, 1984c, 1986, 1987; Singh and Gudjonsson, 1984). Subjects listen to a brief story about a robbery, and then receive a recognition test of memory for story details. Many of the questions contain false premises and other information intended to bias subjects' memory reports. After the initial test, the experimenter informs the subjects that many of their answers were incorrect, and the recognition test is repeated. Interrogative suggestibility is indexed by the extent to which subjects 'yield' to suggestive questioning and 'shift' their answers under interrogative pressure. The scale possesses satisfactory levels of internal consistency, and has been related to a number of external variables. For example, interrogative suggestibility appears to be negatively correlated with self-esteem (Gudjonsson and Lister, 1984; Singh and Gudjonsson, 1987). Moreover, within a sample of delinquent boys interrogative suggestibility is negatively correlated with number of convictions, indicating that highly suggestible individuals are relatively unable to resist social pressures applied during interrogation (Gudjonsson and Singh, 1984a, 1984b). The empirical relations between interrogative suggestibility and other forms of suggestibility (Evans, 1967; Gheorghiu, 1972, 1984) is presently unknown, although Gudjonsson (1987) has argued on conceptual grounds that interrogative suggestibility is a distinct type. The major purpose of the present study was to explore the effects of hypnosis on interrogative suggestibility.

METHOD

Subjects

A total of 40 college students were recruited for a study concerned with hypnosis and memory. All had previously received an administration of the Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A) followed by an individual administration of the Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C). On the basis of the SHSS:C scores, the subjects were classified as low (0-4) or high (8-12) in hypnotizability. The subjects were paid \$5.00 for their participation in a two-session experiment lasting a total of 1 hr.

Materials

The study employed a version of the short story written by Gudjonsson (1984), which in turn was derived from the story-memory passage of the Wechsler Memory Scale, and is similarly scored. The story was slightly modified for use in an American population:

Sarah Marlett of South Chicago was on vacation in Barbados when she was held up outside her hotel one morning and robbed of her purse which contained \$500.00

in traveler's checks and her passport. She screamed for help and fought off her assailants kicking one of them in the shins. A police car arrived shortly thereafter and the woman was taken to the nearest police station where she was interviewed by a Detective Sergeant Delgado. The woman reported that she had been attacked by three men, one of whom she described as Asian. The men were said to be slim and in their early twenties. The police officer was sympathetic to the woman and advised her to contact the American Embassy. Six days later the police recovered the woman's bag, but the contents were never found. Three men were later charged with the crime; two of them were convicted and given prison sentences. Only one of the men had been previously convicted for similar offenses. The woman subsequently returned home with her husband Rick and two friends, but she remained frightened of being out on her own.

The story is parsed into 40 segments; subjects receive one point for each correct detail recalled for free-recall testing.

A total of 20 subjects received a version of Gudjonsson's suggestibility scale containing 24 items in yes-no or forced choice format; six of these were leading questions, containing premises that could create expectations concerning factual details of the story (e.g. "Did the woman's glasses break during the struggle?"), falsely implying that the woman wore glasses); another six were affirmative questions, containing no salient misleading premises but which tend to elicit incorrect affirmative replies (e.g. "Were the assailants convicted 6 wk after their arrest?" when no time interval was mentioned; six were closed-alternative questions which imply details not actually contained in the story (e.g. "Did the woman have one or two children?", when no children were mentioned in the story); and six were unbiased affirmative questions, in which the affirmative answer is the correct one (e.g. "Was the woman interviewed by a Detective Sergeant?", when in fact she was).

The purpose of the biased questions is to provide an opportunity for the subject's memory to be distorted by the interrogation procedure. For comparison purposes, a second group of 20 subjects received the same procedure except that their formal interrogation was conducted in more objective, cued-recall format. That is, the subjects were simply asked to recall the specific information targeted by each of the recognition questions in the biased format. For example, in the misleading version, the subject is asked "Did the woman have one or two children?". In the objective version, the subject is simply asked "Did the woman have any children?"

Procedure

At a brief initial session the subjects were told that they would be read a story and asked to recall its details shortly thereafter, and again 4 days later. After the experimenter read the story, the subject was given a short distractor task which consisted of rating Sarah Marlett, the central character in the story, on 24 trait adjectives. Immediately following this task, the subjects were asked to recall the story (Baseline Recall Trial).

On Day 5, the subjects returned to the laboratory and received a further series of three recall tests. At the beginning of each recall trial the subjects were instructed to recall as many details as possible about the story and were told to take as much time as they needed to complete each recall. They were given no encouragements to try to come up with additional information when they reached the end of their recall abilities. After an initial recall test (Trial 1), the subject was administered a shortened version of the SHSS:C induction procedure, and was asked to give a subjective rating of hypnotic depth on a scale of 1 to 10. This was done as a kind of manipulation check to ensure that subjects felt that they had become hypnotized. The experimenter then gave suggestions for enhanced recall of the story details, followed by a second recall test (Trial 2). The experimenter then told the subject: "I'd like to ask you some questions about the story. This might help you to remember more of the details of the story. Even though you might have already given me the information, please answer every question." The subjects then received either the misleading (recognition) or objective (cued recall) version of the interrogation, with 10 hypnotizable and 10 insusceptible subjects in each condition (both versions are listed in Appendix A).

The recognition test was then immediately re-administered. In Gudjonsson's original procedure, the subjects are told between the two interrogations that they have made a number of errors, and that they should try to be more accurate the second time. The purpose of this manipulation is to increase the likelihood that subjects will shift their answers from one test to the other. In the present application, however, this negative feedback was eliminated from the procedure. Finally the subjects gave a second depth rating, hypnosis was terminated, and the subjects received a final recall test (Trial 3).

RESULTS

The mean SHSS:C score was 1.60 (SD = 0.82) for subjects in the insusceptible group, and 10.6 (SD = 1.11) for those in the hypnotizable group.

Free recall scoring

Subjects received one point for each story detail correctly recalled, for a maximum score of 40. Table 1 presents the mean number of items reported on each recall trial by susceptible and insusceptible subjects. Errors in recall were further classified as either errors in fact (e.g. if the woman's first name was remembered as Sandra instead of Sarah) or confabulations and conjectures (e.g. if the subject reported that the assailants had beards—an item of information not mentioned in the story).

A $2 \times 2 \times 3$ mixed design analysis of variance (ANOVA) with two between groups factors (level of hypnotizability and interrogation condition) and one within-subjects factor) recall trials—not including baseline) revealed significant main effects of trials on the number of items correctly recalled, $F(2, 72) = 6.37$, $P < 0.01$. All subjects showed a progressive increase in recall, thus demonstrating a general hypermnnesia effect not usually observed in experiments utilizing verbal material (Erdelyi, 1984; Payne, 1987; but see Kihlstrom, Klein and Mross, 1986). Similarly, the number of items forgotten progressively decreased across trials: $F(2, 72) = 14.52$, $P < 0.001$. In neither case, however, were there any significant main effects or interactions involving hypnotizability.

Confabulations also increased significantly across trials: $F(2, 72) = 16.50$, $P < 0.0001$. The increment in confabulations between Trials 2 and 3 was greater than the corresponding increment between Trials 1 and 2, presumably reflecting the memory errors introduced by the interrogation procedure; but again there was no effect of hypnotizability.

The only significant effect on errors of fact (all $F < 1$) was observed in an uninterpretable 3-way interaction of (trials \times condition \times hypnotizability): $F(2, 72) = 3.45$, $P < 0.05$.

Table 1. Number of items recalled in free narratives

Hypnotizability	Interrogation condition			
	Misleading		Objective	
	High (<i>N</i> = 10)	Low (<i>N</i> = 10)	High (<i>N</i> = 10)	Low (<i>N</i> = 10)
Correct recall:				
Baseline	18.60 (4.43)	19.60 (4.62)	21.30 (5.50)	22.10 (2.77)
Trial 1	14.90 (3.48)	13.20 (5.71)	16.80 (4.37)	17.20 (3.26)
Trial 2	15.80 (3.97)	16.10 (3.14)	19.00 (5.46)	17.80 (3.68)
Trial 3	17.40 (3.63)	16.80 (3.61)	18.50 (4.65)	16.60 (4.65)
Forgotten:				
Baseline	18.50 (5.10)	19.50 (3.92)	15.80 (3.12)	16.30 (5.18)
Trial 1	23.60 (6.10)	22.80 (4.08)	20.70 (4.24)	21.10 (5.07)
Trial 2	20.30 (2.91)	21.40 (3.81)	18.80 (4.39)	18.60 (5.95)
Trail 3	18.60 (3.81)	19.10 (4.70)	19.50 (5.19)	17.80 (4.24)
Confabulations:				
Baseline	0.50 (0.85)	0.30 (0.67)	0.70 (0.95)	0.40 (0.70)
Trial 1	0.70 (0.82)	0.70 (0.67)	0.80 (0.92)	0.40 (0.70)
Trial 2	0.60 (0.70)	1.40 (1.58)	1.20 (1.23)	1.10 (1.10)
Trail 3	1.80 (1.32)	2.70 (2.91)	2.40 (1.43)	1.40 (1.58)
Errors of Fact:				
Baseline	1.40 (1.07)	1.60 (1.17)	1.70 (1.57)	1.70 (1.16)
Trial 1	1.60 (1.43)	2.50 (1.27)	1.30 (1.06)	1.70 (1.83)
Trial 2	2.20 (1.40)	2.20 (1.55)	1.20 (1.31)	2.30 (1.89)
Trial 3	1.70 (1.34)	1.90 (1.20)	1.30 (1.16)	2.50 (2.01)

Table 2. Means and standard deviations for subjects intertrial hypermnasias

Hypnotizability	Interrogation condition			
	Misleading		Objective	
	High (N = 10)	Low (N = 10)	High (N = 10)	Low (N = 10)
Items Showing No Changes:				
CCC ^a	9.70 (5.54)	12.90 (3.35)	12.80 (4.49)	13.20 (5.67)
NNN ^a	16.50 (3.37)	18.30 (4.60)	15.60 (3.34)	17.10 (5.09)
Items Progressively Recovered:				
NCC	0.90 (1.73)	0.40 (0.70)	0.80 (1.03)	0.50 (0.53)
NNC	0.40 (0.70)	0.80 (0.42)	1.30 (2.41)	0.80 (0.92)
Items Progressively Forgotten:				
CNN	2.00 (1.76)	0.40 (0.52)	2.20 (1.99)	1.30 (1.16)
CCN	4.00 (3.16)	2.10 (2.23)	1.10 (1.29)	0.70 (0.95)
Items Fluctuating in Status:				
NCN	3.80 (4.57)	1.50 (1.51)	1.30 (0.95)	2.90 (4.36)
CNC	0.80 (1.23)	0.60 (0.70)	1.80 (1.48)	0.50 (0.71)

^aStatus on each of three recall trials: C = correctly recalled; N = not recalled. Thus an item with status CCC was correctly recalled on all three trials; an item with status NCN was correctly recalled only on the second trial.

It is possible that hypnosis had differential effects on intertrial recall that might be obscured by the method of analysis described above, so a further analysis was employed in which each item for recall was coded in terms of its status on a given trial (N = not correctly recalled; C = correctly recalled). Of greatest interest in analyzing effects of hypnosis are items initially not correctly recalled, recovered during hypnosis, and again correctly recalled on the final waking trial (NCC), and items correctly recalled only on the final waking trial (NNC). These categories reflect the immediate and delayed effects of hypnosis, respectively. The category NCN reflects accurate recall that is specific to hypnosis. The category CCN reflects forgetting (or errors in remembering) due to the interrogation procedure interpolated between the second and third recall trials. The remaining combinations reflect variations in memory that are not of major interest to this experiment.

Cell means for all eight combinations are given in Table 2. Separate ANOVAs with between-groups factors (hypnotizability and interrogation condition) revealed no main effects of hypnotizability on any of the three critical variables, NCC, NNC, or NCN. There was a significant main effect of interrogation condition only on CCN: there was significantly more forgetting on the third recall trial in the misleading condition, reflecting the negative effects of the biased interrogation procedure on memory. There were no significant interactions between hypnotizability and interrogation condition on any category.

Suggestibility scoring

In the misleading version of the interrogation responses to the 18 critical questions were scored as follows: (1) Correct; (2) Yield to suggestion (answering a question when the information was not given in the story); or (3) Error (subject offers alternative, erroneous information or claims to have forgotten). The subjects were also scored for "shifts" in answers across the two trials: toward error, toward accuracy, and from one error to a different error within the same question. Net confidence scores were also tabulated for the interrogation questions. For each question it was noted whether subject confidence went up (+1), down (-1), or showed no change (0) from the first to the second interrogation.

A different procedure was required for scoring the open-ended version of the interrogation, because this version lacked leading questions. Responses were scored as correct if the subjects accurately recalled information that had been given in the story or correctly replied that the relevant information had not been given. Errors were scored if the subject erroneously recalled or forgot information that had been presented in the story. Subjects were scored as yielding if they offered information which in fact had not been presented in the story. Scoring of shifts in response and confidence level were the same as in the misleading condition.

Table 3 shows the mean number of items in each category for both interrogation formats. It also shows the mean number of shifts in response and confidence observed in each of the conditions. Because of the different scoring procedures employed, the misleading and objective interrogation

Table 3. Means and standard deviations for subjects mean number of items per category on interrogation trials

Hypnotizability		Interrogation condition			
		Misleading		Objective	
		High	Low	High	Low
Correct:	Trial 1:	4.85 (3.48)	6.20 (3.47)	8.25 (2.16)	8.80 (2.78)
	Trial 2:	3.65 (3.69)	5.30 (4.17)	7.95 (2.84)	7.40 (2.38)
Yields:	Trial 1:	12.50 (3.89)	11.20 (4.49)	5.60 (1.78)	5.80 (3.01)
	Trial 2:	13.90 (4.20)	12.10 (5.00)	6.40 (2.67)	7.00 (3.09)
Errors:	Trial 1:	0.65 (0.58)	0.60 (1.41)	4.15 (1.03)	3.40 (1.54)
	Trial 2:	0.45 (0.72)	0.60 (1.41)	3.65 (1.08)	3.60 (1.78)
Shift to error		1.70 (0.95)	1.50 (1.72)	1.50 (1.18)	1.40 (1.43)
Shift to correct		0.30 (0.48)	0.60 (0.84)	1.10 (0.88)	0.40 (0.52)
Error-Error shift		0.90 (1.52)	0.70 (1.57)	0.10 (0.32)	0.10 (0.32)
Confidence shift		0.80 (1.55)	1.50 (1.90)	1.70 (2.41)	0.60 (1.90)

conditions were analyzed separately by means of 2×2 mixed-design ANOVAs with one between-subjects factor (hypnotizability) and one within-subject factor (trials).

Misleading condition. The number of correct responses decreased significantly from the first to the second interrogation, $F(1, 18) = 6.01$, $P < 0.05$. Similarly, the number of yields increased, $F(1, 18) = 6.87$, $P < 0.05$. There was not a significant change in the number of errors, $F < 1$. In none of these cases, however, were there any significant main effects or interactions involving the hypnotizability factor, all $F < 1$. In general, the subjects tended to shift toward error in response to the misleading interrogation—averaging 1.6 such responses per subject, plus another 0.80 shifts from one error to another, but only 0.45 shifts to accuracy. Finally, the subjects showed a small net increase in confidence, averaging 1.15 items. There were no differences between hypnotizability groups in the extent of shifts observed (all $t < 1$).

Objective condition. Similar results were obtained in the objective condition, even in the absence of an explicitly biased interrogation procedure. The number of questions correctly answered decreased, the number of yields increased, and the number of errors remained approximately constant. There were no significant main effects of hypnotizability on any variable, all $F < 1$. While none of the two-way interactions reached statistical significance, trends were observed for number correct ($F(1, 18) = 2.83$, n.s.) and errors ($F(1, 18) = 3.64$, n.s.). For items correctly recalled, the difference between Trial 1 and Trial 2 tended to be greater for insusceptible than hypnotizable subjects; and for errors, the difference was reversed. The subjects in the objective condition also tended to shift towards error, even though their interrogations were not misleading, averaging 1.45 shifts to error and 0.10 error-to-error shifts., but only 0.75 shifts to correct answers. Nevertheless, the subjects' confidence increased on an average of 1.05 items. There was no effect of hypnotizability on any of the shifts observed, except for shifts to correct responses ($t(18) = 2.17$, $P < 0.05$; all other $t < 1$).

DISCUSSION

This study employed a test of interrogative suggestibility developed by Gudjonsson (1984a) to examine the influence of hypnosis on distortions in memory introduced by biased interrogation procedures. However, our procedure differed from Gudjonsson's technique in two ways. Gudjonsson's test contains two elements: a set of leading questions that may introduce distortions and inaccuracies into memory (Loftus, 1979); and negative feedback that may create pressure to shift responses or yield to the premises and implications of the leading questions. Negative feedback was eliminated in the present experiment: the subjects were simply administered the interrogation procedure twice. Moreover, one condition of the experiment eliminated the leading questions as well, employing an alternative interrogation format consisting of open-ended queries. Despite these procedural changes, in a number of instances the subjects shifted their responses from the first to the second interrogation, and yielded to the premises and implications contained in the questions posed to them. Even in the absence of negative feedback, leading questions produced some distortions in memory. Moreover, some inaccuracies were introduced even in the absence of the misleading questions themselves. Apparently a simple retest is sufficient to suggest to subjects that their previous answers were for some reason inappropriate or erroneous and should be altered.

Even when subjects are not specifically pressured to produce more information, they tend to produce erroneous details that seem plausible to them given what they remembered about the story. Thus, this experiment tentatively suggests that there are three possibly independent components to interrogative suggestibility: response to negative feedback, response to leading questions, and response to repeated interrogation.

One major purpose of this study was to investigate the effect of hypnosis on memory for narrative prose, as an extension of earlier research on pictures and words (Register and Kihlstrom, 1987). Memory did improve across three free recall tests, showing a hypermnesia effect (Erdelyi, 1984; Payne, 1987). However, even though the hypnotic suggestions for improved memory were interpolated between the second and third tests, hypnotizable and insusceptible subjects showed essentially the same amount of hypermnesia. Because hypermnesia did not vary as a function of hypnotizability, the recall gains observed cannot be attributed to hypnosis. Interestingly, confabulations also increased over trials, indicating that hypermnesia to some degree reflects a guessing strategy on the part of the subject. That is, an increase in true positives is accompanied by an increase in false positives. Nevertheless, there were no effects of hypnotizability on confabulations or other kinds of errors. These findings are largely in accord with the available experimental literature, which indicates that hypnosis does not enhance the accuracy of memory under laboratory conditions (for a review, see Register and Kihlstrom, 1987).

The other major purpose of this study was to address the separate but related question of the effect of hypnosis on interrogative suggestibility. In this experiment, a suggestive interrogation was conducted while the subjects were hypnotized. Although subjects produced a considerable number of shifts and yields (even when they were not specifically encouraged to do so), as well as a slight net upward shift in confidence, the extent of these changes did not differ between hypnotizable and insusceptible subjects. That is, hypnotizable subjects were neither more nor less responsive to the misinformation effect during the interrogation than insusceptible subjects. These results support Gudjonsson's (1987) hypothesis that interrogative suggestibility is independent of suggestibility as measured in a hypnotic content.

In this respect the present results seem inconsistent with those obtained by Sheehan (1985), who found a greater misinformation effect for hypnotic subjects compared to those in simulation or task-motivated groups when, as in our procedure, the misleading information is presented during hypnosis. However, the procedural differences between the two experiments are considerable. While further research is needed to clarify the relations between hypnosis, hypnotizability, and interrogative suggestibility, it seems clear that hypnotic subjects are neither immune to the effects of misleading questions nor particularly likely to show improvements in memory. Thus, no great confidence should be attached to the unverified memory reports of subjects interrogated in hypnosis.

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APPENDIX A

Questions used in the Misleading Version of the Interrogation

1. Did the woman have a husband named Rick?
2. Did the woman have one or two children?
3. Did the woman's glasses break in the struggle?
4. Was the woman's name Sarah Harmson?
5. Was the woman interviewed by a Detective Sergeant?
6. Were the assailants black or white?
7. Was the woman taken to the central police station?
8. Was the woman's purse damaged in the struggle?
9. Was the woman vacationing in Barbados?
10. Were the assailants convicted six weeks after their arrest?
11. Did the woman's husband support her during the police interview?
12. Did the woman hit one of the assailants with her fist or purse?
13. Were the assailants armed with knives or guns?
14. Did the woman's screams frighten the assailants?
15. Were the assailants tall or short?
16. Was the interviewing police officer's name Delgado?
17. Did the police give the woman a ride back to her hotel?
18. Did one of the assailants shout at the woman?
19. Were the woman's clothes torn during the struggle?
20. Were there three assailants?
21. Was the woman's purse brown?
22. Were the assailants dressed in dark or light clothing?
23. Did the attack take place at night?
24. Was the woman from South Chicago?

APPENDIX B

Questions in the Objective Version of the Interrogation

1. What was the woman's husband's name?
2. Did the woman have any children?
3. Describe anything that happened to the woman's possessions while she was struggling with the assailants.
4. What was the woman's name?
5. What was the rank of the police officer who later interviewed the woman?
6. Describe the complexions of the assailants.
7. Where was the woman taken by the police following the incident?
8. Did anything happen to the woman's bag during the struggle?
9. Where was the woman vacationing?
10. What eventually became of the assailants?
11. Describe the woman's husband's attitude during the police interview.
12. Describe the woman's actions against the assailants during the attack.
13. Were the assailants armed?
14. Describe any verbal communication directed at the assailants by the woman during the attack.
15. How tall were the assailants?
16. What was the interviewing police officer's name?
17. Did the police do anything to help the woman following the interview?
18. Describe any verbal communications directed at the woman by the assailants.
19. What condition was the woman's clothing in following the attack?
20. How many assailants were there?
21. What color was the woman's bag?
22. What were the assailants wearing?
23. What time of day did the attack take place?
24. Where was the woman from?