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RELIABILITY OF HYPNOYICALLY INDUCED TESTIMONY

Dr. Martin Orne

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#### BACKGROUND

In recent years, hypnosis has gained popularity as an investigative tool among law enforcement personnel. Its apparent usefulness in aiding the memories of eyewitnesses and victims of crimes is indicated by a few celebrated cases (e.g., Kroger & Douce, 1979), anecdotal reports (e.g., Schafer & Rubio, 1978), and retrospective ratings of investigating officers (e.g., Reiser & Nielson, 1980).

In view of the promising applications of hypnosis in the legal investigative context, a great number of laboratory studies were undertaken to document the phenomenon of memory enhancement by hypnosis ("hypnotic hypermnesia") under controlled conditions. By and large, no definitive evidence, one way or the other, has yet emerged. Although several investigators have reported increases in correct recall following hypnosis (e.g., DePiano & Salzberg, 1981; Dhanens & Lundy, 1975; Dywan & Bowers, 1983; Geiselman, Fisher, MacKinnon, & Holland, 1985; Stager & Lundy, 1985), just as commonly, no advantage is found for hypnotic, relative to nonhypnotic, recall (e.g., Cooper & London, 1973; McConkey & Nogrady, 1984; Nogrady, McConkey, & Perry, 1985; Putnam, 1979; Sheehan & Tilden, 1983). Of equal importance, the majority of studies that have found increases in correct recall following hypnosis also report corresponding increases in erroneous information, suggesting that the overall accuracy of hypnotically elicited recollections may actually be inferior to normal waking memory.

Given such conflicting findings, the validity of hypnotic hypermnesia cannot be determined merely by tallying the number of positive vs. null (or negative) study outcomes. A number of factors could contribute to the absence of a hypnotic memory enhancement effect without providing evidence against the reality of the phenomenon. By the same token, while a positive outcome is at least consistent with the possibility that hypnosis improves memory, it does not establish the validity of the phenomenon because some extraneous variable associated with the hypnotic process could be responsible. What is needed is a systematic analysis of the process(es) by which memory appears to be

enhanced by hypnosis under those conditions where memory increases are demonstrable.

The work supported by this contract has been guided by the latter objective. When the use of hypnosis to improve subjects' memories for some event results in greater correct recall, it may be due to a specific memory retrieval process that is augmented by hypnosis, or it might simply be the consequence of an increase in subjects' willingness to report information about which they are uncertain. If the locus of the memory enhancement effect resides in this latter tendency for hypnotized individuals to lower their report criterion, it should be possible to extract this additional recall without the use of hypnosis by exhorting subjects to report exhaustively whatever information they may have, including their best guesses. Under these conditions, where the report criterion is liberalized from the start, the ability of a subsequent hypnotic intervention to yield a still further increase in correct recall would imply a true hypermnesic process. To the extent that the recall gain associated with hypnosis exceeds that possible under a motivated waking recall condition, the hypermnesia observed can be attributed either to the hypnotic process itself or alternatively to the hypnotic context.

This approach to disentangling the putative effects of hypnosis on memory retrieval from its influence on the report criterion is based on a modification of the forced-recall technique developed by Erdelyi (Erdelyi & Becker, 1974; Erdelyi & Kleinbard, 1978). The forced-recall procedure requires subjects to produce a fixed number of responses on each of several free recall tests. The required output is typically quite high so as to make it necessary for subjects to provide a certain number of guesses (i.e., lower their report criterion) to complete all the response spaces on their recall sheets. The recall score consists of the number of correct responses given, independent of whether they were confidently recalled or merely guessed. With report-criterion controlled in this manner, Erdelyi and his colleagues have shown that true hypermnesia for certain types of meaningful stimuli occurs quite readily over trials as a function of repeated efforts to remember.

The design of the present study was based on parametric as well as theoretical considerations. First, the stimulus material must be conducive to hypermnesia (i.e., it should possess attributes likely to be imagistically or semantically encoded in memory), and preferably the stimuli will have been shown previously to yield superior recall when tested in hypnosis. Second, it must be possible to control subjects' report criterion during recall to determine whether any recall advantage observed with hypnosis represents a true hypermnesic process. Third, each subject's recall should be tested prior to and following hypnotic induction to rule out preexisting recall differences as a determinant of the level of recall following treatment. Fourth, because hypermnesia is known to occur with repeated testing under normal waking conditions (Erdelyi & Kleinbard, 1978; Roediger & Payne, 1982), a control group, tested at least twice in the wake state, is required to assess whether hypnosis supplements the normal hypermnesia that is possible under these circumstances. Finally, in order to differentiate effects that are due to hypnosis from those that occur as a function of the hypnotic situation, subjects should be selected for extreme differences in their ability to experience hypnotic phenomena as indicated by performance on standardized tests of hypnotic responsivity.

Several of these design issues were resolved when we became aware of an intriguing finding obtained in a dissertation study (Stager, 1974) only recently published by Stager and Lundy (1985). In their experiment, subjects who were both high and low in hypnotic ability viewed a short film entitled "Posters," and returned to the laboratory one week later to answer 40 questions about the film. The questions provided a number of accurate descriptions of details and events in the film, which could serve as retrieval cues for the target information. Recall was tested twice, the first time in the waking condition for all subjects. For half of the subjects, the second recall occurred following a hypnotic induction and suggestions for improved recall. The remaining subjects performed an irrelevant task and then attempted their second recall, again in the wake state. The results indicated that highly hypnotizable subjects exposed to the hypnotic treatment exhibited a significant increase in correct recall, whereas the other groups did not; moreover, the increased recall that occurred for these subjects during hypnosis was not accompanied by an increase in erroneous information. Thus, on the surface these findings are difficult to reconcile with a report-criterion shift account of the recall improvement in hypnosis, and instead, seem to provide compelling evidence that hypnosis augments the accessibility of information from memory.

The Stager and Lundy (1985) study therefore met all of the design requirements we had set except for one, i.e., control over the report criterion. From the original dissertation (Stager, 1974), which provided a more detailed description of the recall procedures used in the study, it became evident that subjects were free to indicate that they did not know the answers to certain questions. Thus, it was entirely possible that the increase in recall exhibited by high hypnotizable subjects in hypnosis was the result of their becoming less cautious in their responses. The fact that they did not appreciably increase erroneous responses could be due to the plethora of accurate retrieval cues contained in the questions themselves.

In view of the potential importance of the Stager and Lundy (1985) finding, the present study sought to clarify their observations in order to establish an empirical basis for understanding hypnotic hypermnnesia. The crucial methodological factor in our study that was not included in their study (or in virtually any other analysis of hypnotic hypermnnesia) was the requirement that subjects answer each question, whether or not they felt they knew the correct response. In addition to providing a response to each question, they were required to rate their confidence in the accuracy of each response on a four-point scale (0 = just guessing; 3 = certain).

## METHOD

### Subjects

Subjects were 78 undergraduate volunteers (33 males, 45 females) selected from a larger sample ( $N = 428$ ) who responded either to letters, newspaper advertisements, or posted announcements seeking participants for "psychological experiments utilizing hypnosis." An initial tape-recorded group assessment of hypnotic responsivity (Harvard Group Scale of Hypnotic Susceptibility, Form A; HGSHS:A of Shor & E. Orne, 1962) was administered to all subjects, and those who scored in the low range (0-5) and the high range (9-12) were invited to return to the laboratory for an individual hypnotic

assessment (Stanford Hypnotic Susceptibility Scale, Form C; SHSS:C of Weitzenhoffer & Hilgard, 1962). The 78 subjects on whom our findings are based qualified as low hypnotizable (0-4;  $N = 40$ ) or high hypnotizable (8-12;  $N = 38$ ) on the latter scale. (An additional 20 high hypnotizables and 19 low hypnotizables, as determined by scores on the HGSHS:A, were also run, but were dropped from the analyses because their hypnotizability classification was not confirmed by the subsequent SHSS:C, thus placing the accurate classification of their true hypnotic aptitude in doubt.)

### Procedure

Initial sessions, which included the group assessment of hypnotic responsivity, were conducted in 16 groups, ranging in size from 9-42 volunteers ( $M = 27$ ). Each of these sessions began with a number of research questionnaires, followed by administration of the tape-recorded HGSHS:A. When all subjects had completed their self-report HGSHS:A response booklets, they viewed the 15-minute film "Posters," which had been used in the study by Stager and Lundy (1985). At the same time, the response booklets were scored by an experimenter and two research assistants in another room to determine which subjects would be asked to return for a second session. Immediately after the film, subjects completed a 20-item, multiple-choice questionnaire concerned with various topical and incidental details presented in the film, followed by a few additional, but unrelated, questionnaires. A sealed take-home packet that included a stamped, self-addressed return envelope as well as a second copy of the 20-item, multiple-choice questionnaire was given to each volunteer with instructions that it should be opened and the questionnaire completed four days hence and mailed back to the laboratory. All subjects were thanked and paid for their participation, and appointments were made for those who qualified and were available for the second session.

Subjects were run individually in the second session, which took place between 4 and 12 days after the initial group session. Each was escorted by an experimenter to a quiet room, seated in a comfortable chair, and a microphone was placed around the neck. Subjects were instructed to close their eyes and that they would shortly hear 40 tape-recorded questions about the film they had seen during the previous session. Fifteen seconds would follow each question to allow time to respond. It was stressed that although they might not know the answers to all of the questions, they should nevertheless give their best guesses when in doubt, because "I don't know" or no response were not to be used when answering. Subjects were also told that immediately following each response they should rate their confidence in its accuracy using the following scale: 0 = Not confident, just guessing; 1 = Slightly confident, much doubt; 2 = Moderately confident, but not certain; 3 = Very confident, certain. A tape recording of the same 40 questions used by Stager and Lundy (1985) was then played, while the experimenter wrote down the subjects' responses and confidence ratings.

Following this initial wake recall phase (R1), subjects were randomly assigned to a treatment condition (wake or hypnosis) for a second recall test (R2). Subjects in the hypnosis condition rested comfortably with their eyes closed while the experimenter played the 15-minute tape-recorded hypnotic induction of Stager and Lundy (1985). Near the end of this phase, a suggestion was given that the answers to the 40 questions would come more easily than before. This was reinforced by an additional suggestion administered by the experimenter, "You will remember the film very clearly

now." Subjects then responded to the same 40 questions that were asked during R1 and provided confidence ratings for each response as they did previously. At the completion of R2, the experimenter gave the suggestion that, when awakened, "you will remember all that has taken place during hypnosis, as well as everything that happened before you were hypnotized." The experimenter then administered the tape-recorded instructions for arousal from hypnosis.

Those subjects designated to remain in the wake condition during R2 performed a 15-minute auditory signal-detection task prior to being asked the 40 questions for the second time. The signal-detection task concluded with the same suggestion for facilitated recall that was given to subjects in the hypnosis condition.

Following the second recall test, all subjects were given a booklet containing the same 40 questions in a multiple-choice recognition format. Below each question were five choices, the last of which was a blank line that subjects could select and fill in if they believed that the correct answer was not represented among the preceding four alternative choices. In fact, for 5 of the 40 questions the correct answer was not provided and thus it could only be given if subjects wrote it in on the blank line. Each question also included a space to record subjects' confidence in their choices, based on the same four-point scale used for the previous recall tests.

When subjects had completed this final recognition booklet, they were taken to another experimenter who administered the standardized SHSS:C assessment of hypnotic ability.

## RESULTS

### Pretreatment Measures

The purpose of the 20-item, multiple-choice booklets administered immediately after subjects viewed the film and four days later was to assure comparability among the treatment groups in terms of initial perceptual processing and long-term retention of information about the film. A 2 (low vs. high hypnotizability) by 2 (wake vs. hypnosis) ANOVA indicated that there were no reliable differences in multiple-choice recognition memory among these groups on the immediate test [ $F_s < 1.0$ ], nor on the test administered four days later [ $F_s < 1.0$ ]. However, as might be expected, recognition accuracy declined over the four-day retention interval for all groups [ $F(1,74) = 6.59$ ,  $p < .025$ ].

A similar analysis applied to the results of the first recall test (R1), in which a greater demand was placed on retrieval processes, also failed to detect any differences among groups [ $F_s < 1.0$ ]. Thus, there is no evidence to indicate that any differential posttreatment effects that might emerge would be influenced by preexisting cognitive differences (e.g., differential retention levels) or motivational differences (e.g., hold-back effects, cf. London & Fuhrer, 1961).

### Effects of Hypnosis and Hypnotizability on Recall

Figure 1 illustrates mean correct recall achieved on R1 (pretreatment) and on R2 (posttreatment) for low (L) and high (H) hypnotizable subjects exposed to wake (W) and to hypnotic (H) recall during R2. As the figure

clearly shows, all four groups correctly recalled more information on R2 than on R1 [ $F(1,74) = 43.36, p < .001$ ], illustrating the basic hypermnnesia that occurs with protracted effort to recall. Furthermore, neither hypnotizability [ $F < 1.0$ ] nor hypnosis vs. wake treatment [ $F < 1.0$ ] had any effect on the magnitude of the observed hypermnnesia. This finding demonstrates conclusively that hypnosis does not enhance recall beyond what is possible in the wake condition when report criterion is adequately controlled. By implication, therefore, the evidence for hypnotic memory enhancement reported by Stager and Lundy (1985), using the identical stimulus conditions and probed-recall format adopted in the present study, very likely represents a report-criterion shift occasioned by the induction of hypnosis.

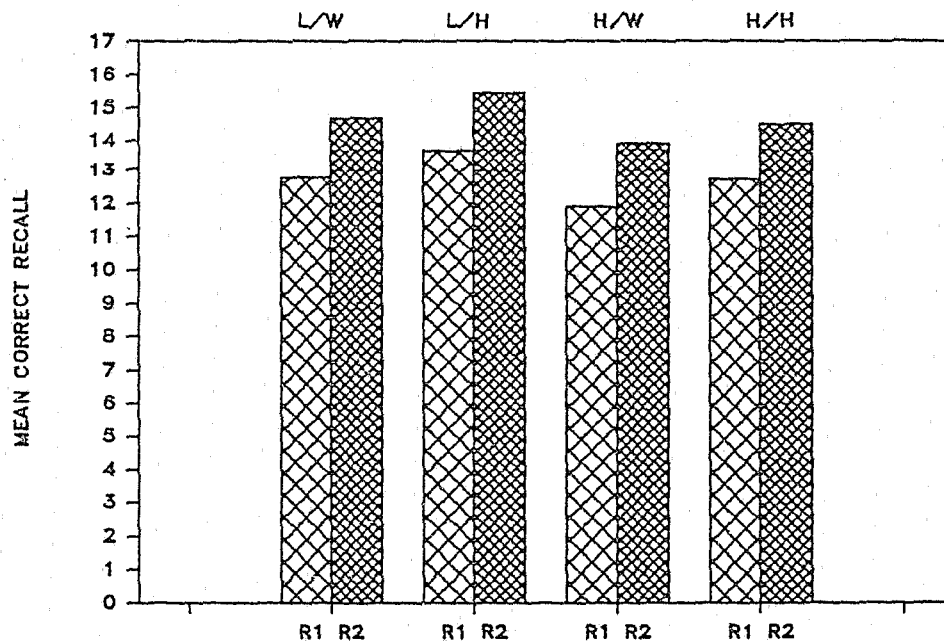


Figure 1

#### Effects of Hypnosis and Hypnotizability on Confidence

Figure 2 shows the mean confidence ratings (range = 0-3) assigned to correctly recalled information by subjects in each of the four treatment groups on R1 and R2. A three-factor mixed design ANOVA revealed a general intertrial increase in confidence associated with correct recall [ $F(1,74) = 29.22, p < .001$ ]. Although inspection of Figure 2 suggests a tendency for the hypnosis groups to exhibit a greater increase in confidence concerning their correct recall than the wake groups, this effect was not statistically reliable [ $F(1,74) = 2.29, p > .10$ ].

The results thus far indicate that the memory increases associated with hypnosis cannot be distinguished from those brought about by simple concerted effort to recall further information. Neither the magnitude of improvement in correct recall, nor the confidence expressed in its accuracy, show any benefit from hypnosis. Furthermore, because the recall tests in the present study required subjects to produce a fixed number of responses, the comparability



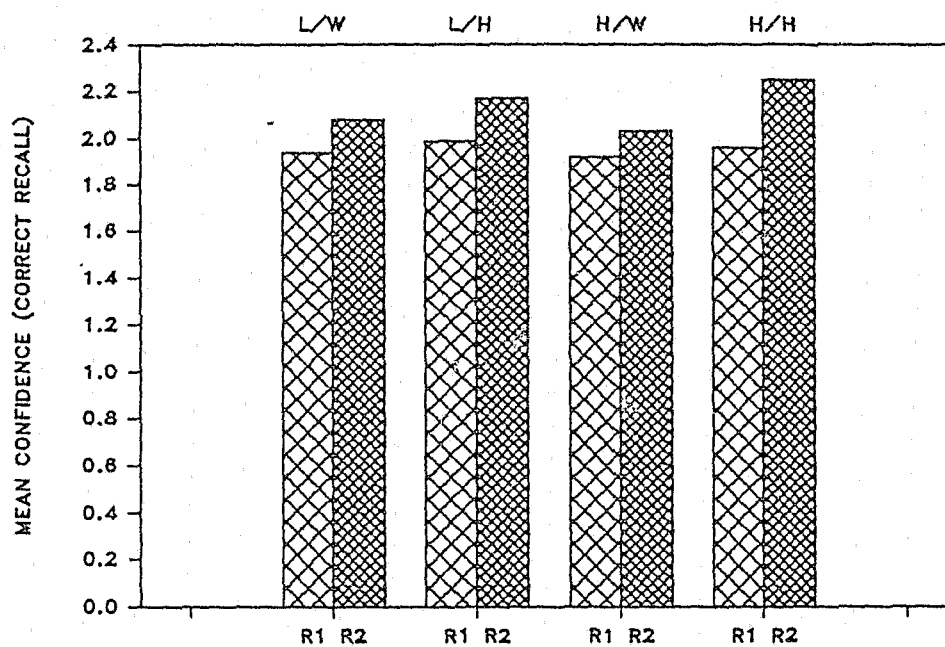


Figure 2

among the groups in correct recall necessarily implies that they also did not differ in terms of the number of incorrect responses given. However, as Figure 3 shows, there were considerable differences among the groups in the degree of confidence placed in these incorrect responses. All groups became more confident in their erroneous recall on R2 than they had been on R1 [ $F(1,74) = 91.03$ ,  $p < .001$ ], however, the extent of increase varied across

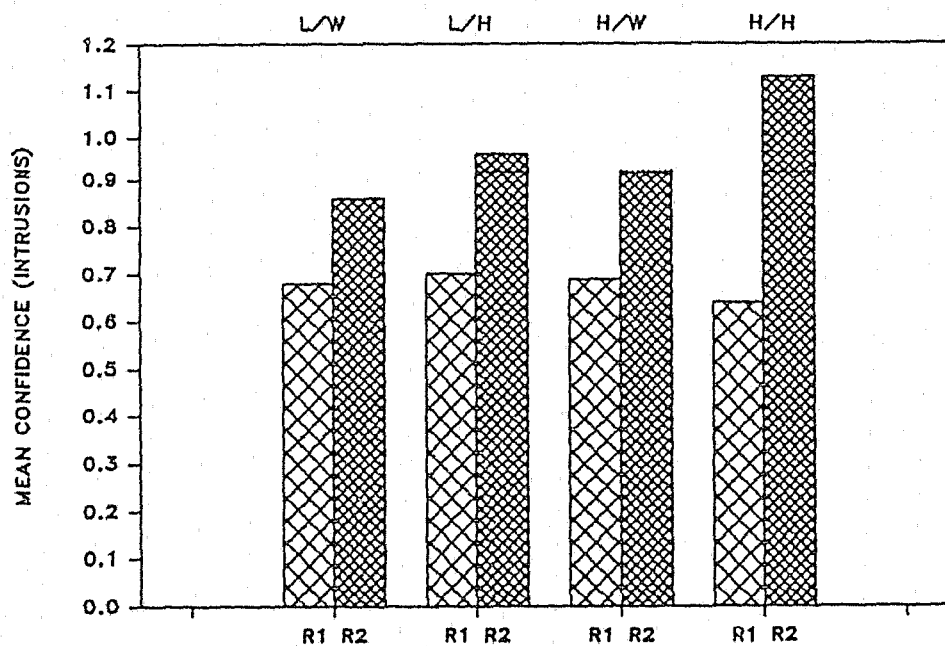


Figure 3

treatment conditions. Subjects exposed to a hypnotic induction displayed a significantly greater confidence increase in their recall errors than did subjects in the wake condition [ $F(1,74) = 7.45, p < .01$ ]. Similarly, high hypnotizables showed greater average increases in confidence than did low hypnotizables [ $F(1,74) = 5.41, p < .025$ ]. However, as is evident in Figure 3, this effect may not have been entirely independent of hypnotic vs. wake treatment, because the largest increase in confidence for incorrect recall was observed for high hypnotizables in the hypnosis condition. Nevertheless, the three-way interaction supporting this observation fell short of statistical significance [ $F(1,74) = 2.44, p > .10$ ].

The latter findings indicate that, whereas hypnosis does not facilitate correct recall, it does degrade the overall accuracy of recall, an effect that tends to occur most readily, but not exclusively, among individuals with superior hypnotic ability. This decrease in the accuracy of hypnotic memory reports need not (although it may) derive from an increase in the production of errors (in the present study, the number of errors were equivalent across groups), but can occur alternatively by augmenting the individual's conviction in the accuracy of erroneous information.

#### Effects of Hypnosis and Hypnotizability on Subsequent Memory

If the relationship between memory accuracy and confidence is altered by hypnosis and by a person's ability to experience hypnotic effects, do these alterations extend beyond the immediate context of hypnosis? Our attempt to assess this question led to a modification of the multiple-choice recognition test to include an opportunity for the subject to reject all of the available alternatives in favor of a response which he/she could endorse by writing it in. This modified recognition test was then administered to all subjects at the completion of R2 under wake conditions. Consistent with typical findings in the literature, there were no effects of previous hypnotic treatment or hypnotizability on the number of correctly recognized items [ $F_s < 1.0$ ]. However, as was the case in the preceding recall test, subjects who were exposed to the hypnotic procedure expressed greater confidence in their incorrect choices than did wake subjects [ $t(76) = 2.11, p < .05$ ]. This finding, again, points to a decrease in the accuracy of memory, which is mediated by misplaced confidence, following exposure to a hypnotic treatment.

While recognition tests, in general, are not particularly sensitive to the effects of hypnosis on memory, the modified component of the recognition test used in the present study actually constituted a recall test. Thus, if the alternatives in the recognition component were, in fact, incorrect (this was true for 5 questions), the correct answer could only be generated by the subject. Analysis of the data for those occasions in which the correct answer had to be supplied by the subject indicated that high hypnotizable subjects, more often than low hypnotizable subjects, answered incorrectly by either selecting a distractor item or entering an incorrect answer on the blank line [ $F(1,74) = 5.17, p < .05$ ]. These findings seem to suggest that high hypnotizable subjects possess a greater tendency toward either creating or accepting false answers than do persons with low hypnotic ability, both in hypnosis and in the wake condition. This may relate to a greater relative capacity to suspend their reality orientation, leading to confusion of perceptual experiences with internally generated images and thoughts (cf. Johnson & Raye, 1981).

### Relationship of Confidence Changes to Apparent Memory Enhancement

The use of a modified forced-recall procedure in the present study was intended to prevent subjects from merely lowering their report criterion to yield increases in recall. Accordingly, the recall improvement shown by subjects in hypnosis and by those in the wake condition, while comparable in degree, is considered to reflect a true hypermnesic process, i.e., an increase in accessible memory. The use of this methodology does not, however, preclude the possibility of analyzing treatment-related changes in the level of recall that may be associated with changes in report criterion. The latter analyses simply take into account the confidence values assigned to subjects' recall productions, whereas the forced-recall technique ignores confidence ratings.

Correct guesses. The issue that is most directly relevant to the role of report-criterion shifts in hypnotic memory enhancement concerns the fate during R2 of correct responses from R1 that received zero-confidence ratings (i.e., correct guesses). Here we make the (not unreasonable) assumption that responses given zero-confidence ratings would not have been reported were it not for the forced-recall requirement to do so. Evidence for a report-criterion shift would therefore consist of these correct guesses reported during R1 appearing with greater than zero-confidence ratings on R2. If hypnosis has a greater impact on the report criterion than normal waking instructions, there should be a greater proportion of correct guesses elevated to higher confidence values on R2 for subjects in the hypnotic treatment.

Figure 4 presents, for hypnotic and wake treatments, the percentage of correct guesses on R1 that were either not reported (NR) subsequently on R2 or were reported with confidence ratings of 0, 1, and 2 or more. The data for this analysis pertain only to those subjects who actually produced correct responses during R1 that were rated zero in confidence (i.e., 73% of the wake

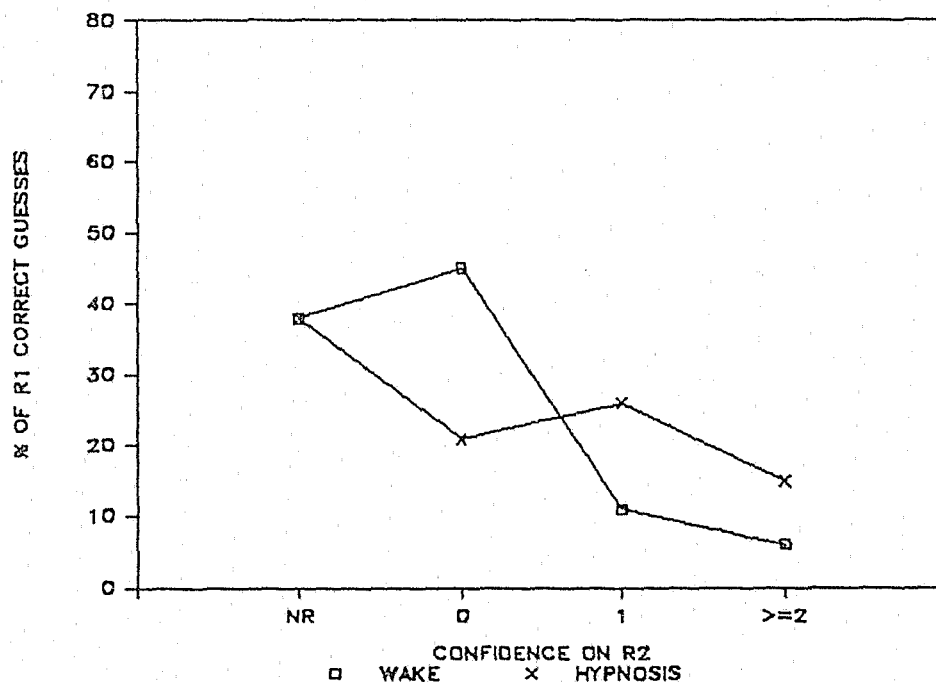


Figure 4

subjects and 78% of the hypnosis subjects; the average number of correct guesses per subject did not differ between groups [wake  $M = 1.71$ , hypnosis  $M = 1.79$ ;  $t(57) = .23$ , n.s.].

An equal percentage (38%) of correct guesses produced during R1 were not repeated (NR) during R2 by either group. However, Figure 4 reveals quite clearly that, of those guesses that were repeated, subjects in the wake condition maintained a significantly greater percentage of them at zero confidence compared with subjects exposed to the hypnotic treatment [ $z = 2.58$ ,  $p < .01$ ]. The latter subjects were more likely to express higher levels of confidence in a substantial percentage (41% vs. 17% for wake subjects) of their previous guesses [ $z = 2.61$ ,  $p = .009$ ]. This pattern demonstrates a more pronounced shift in hypnosis than in the wake condition toward confident reporting of information that was already accessed during R1, but for which subjects had no confidence at all. It further suggests that, in the absence of the forced-recall requirement to divulge uncertain information, the magnitude of improvement in correct recall from R1 to R2 would have been greater for subjects exposed to hypnosis than for wake subjects, just as Stager and Lundy (1985) had found. In other words, in the Stager and Lundy study subjects were permitted to respond with "I don't know" or to remain silent, under which circumstances it is likely that responses with zero certainty [guesses] would not have been verbalized in R1. Hypnosis would have helped promote the level of certainty to higher than zero during R2 and thus create the appearance of increased accurate memory during hypnosis. Such an effect, however, would not have been the result of increased memory accessibility, since the forced-recall procedure reveals such memories to have been extant as guesses during R1, but merely the consequence of adopting a less conservative report criterion.

Incorrect guesses. The same analysis was undertaken to determine the fate during R2 of zero-confidence incorrect responses given during R1. Because of the requirement to answer each question (by guessing if necessary), all subjects provided many of this type of response. These analyses were confined to the same subset of subjects on whom the preceding correct-guess analyses were based to avoid possible sampling bias.

One of three possibilities may occur for any zero-confidence incorrect guess on the second recall test: (1) the item might be repeated on R2; (2) the item might be replaced by a different incorrect response on R2; or (3) the item might be replaced by the correct response on R2 (a process referred to as "reminiscence"). Accordingly, it was necessary to undertake separate analyses for each of these R2 outcomes.

Figure 5 shows the percentage of R1 incorrect guesses that were repeated on R2 with confidence values of 0, 1, and 2 or more. Subjects exposed to the wake treatment maintained their zero-confidence rating for a significantly greater percentage of these incorrect responses, compared with subjects in the hypnosis condition [ $z = 3.71$ ,  $p = .0002$ ]. In contrast, hypnosis led to a considerable increase in confidence associated with previously erroneous guesses. Indeed, confidence ratings of 2 or more were significantly more prevalent for hypnosis subjects relative to wake subjects [ $z = 3.08$ ,  $p = .002$ ] on the second recall test.

Figure 6 reveals a similar, albeit less pronounced, pattern with respect to incorrect guesses that were replaced by other incorrect responses during

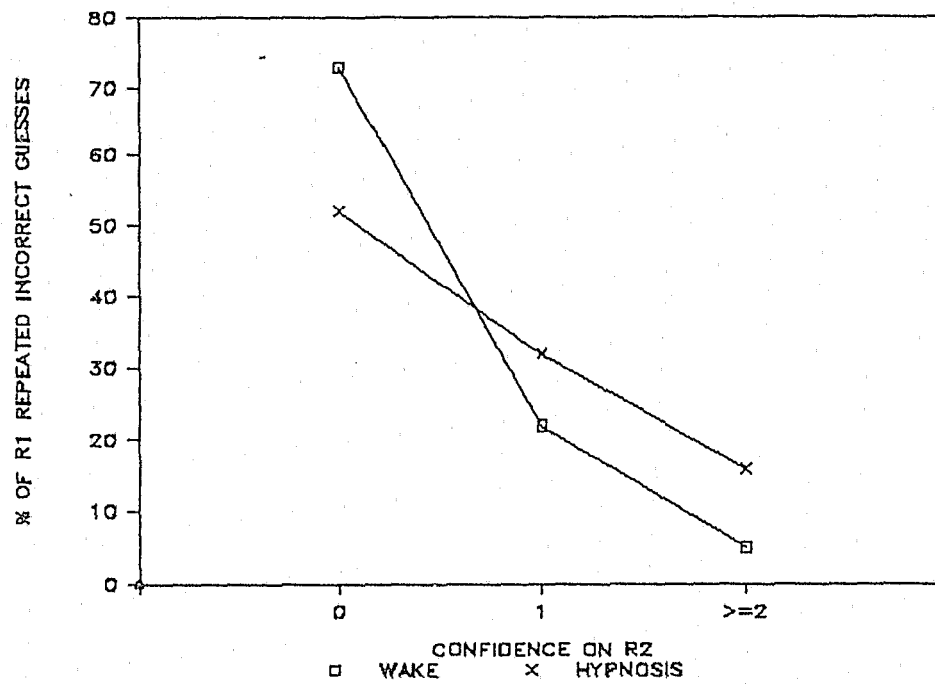


Figure 5

R2. Here again, a smaller percentage of these were maintained at the zero-confidence level by hypnosis subjects than by wake subjects, the former group having expressed greater confidence in their novel (but still incorrect) productions on R2 [ $z = 2.65$ ,  $p = .008$ ].

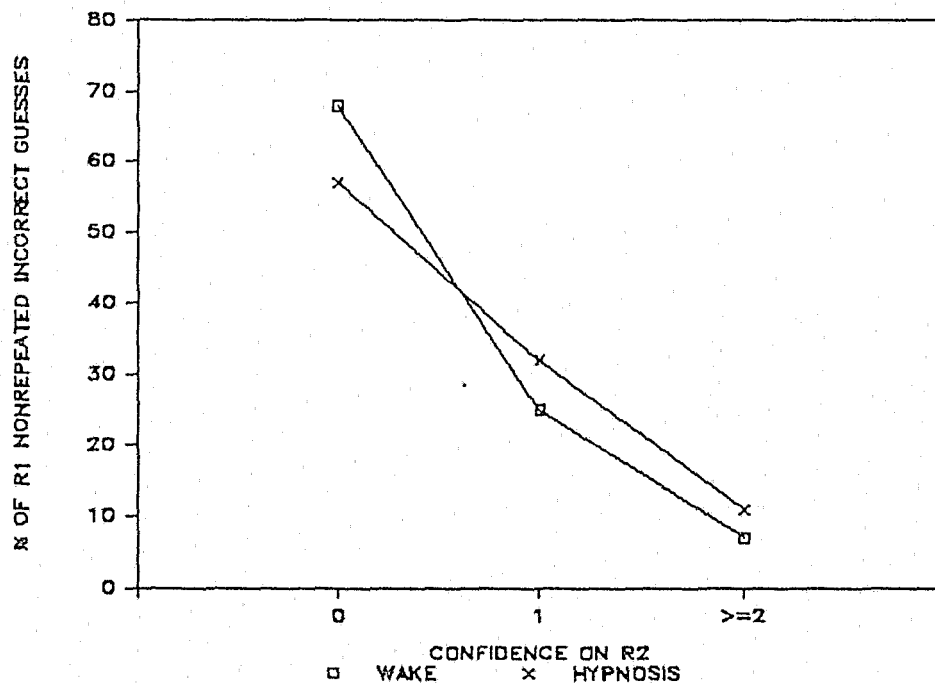


Figure 6

The same analysis was carried out for reminiscences -- responses correct for the first time on R2 -- that developed from incorrect guesses during R1. Reminiscence is the incremental component of normal hypermnesia functions (Belmore, 1981; Erdelyi, 1984; Payne, 1987), and as such, it bears on the question of whether memory improvements achieved with hypnosis differ from those produced under standard waking recall conditions. An initial analysis established that there was no difference in the average number of correct responses emanating from prior incorrect guesses between subjects in the hypnosis ( $M = 1.54$ ) and wake ( $M = 1.53$ ) conditions [ $t(57) = .03$ , n.s.]. Thus, reminiscence was not any more likely to occur for hypnotized subjects than for wake subjects.

A second question to be addressed is whether the reminiscences that do take place are more likely to be presented confidently if they occur during hypnosis than if they occur in the wake condition. Figure 7 shows the levels of confidence assigned to correct responses given on R2, which had been preceded by incorrect guesses during R1. Comparison of the functions for hypnosis and wake subjects indicates that, although approximately 25% of these novel correct responses were rated zero in confidence by both groups and presumably would not have been reported under standard recall conditions, the percentages of correct recall with higher confidence values did not differ between groups [all  $z$ s  $< .29$ ]. Therefore, the extent of confidence invested in novel correct recall is not affected by hypnosis.

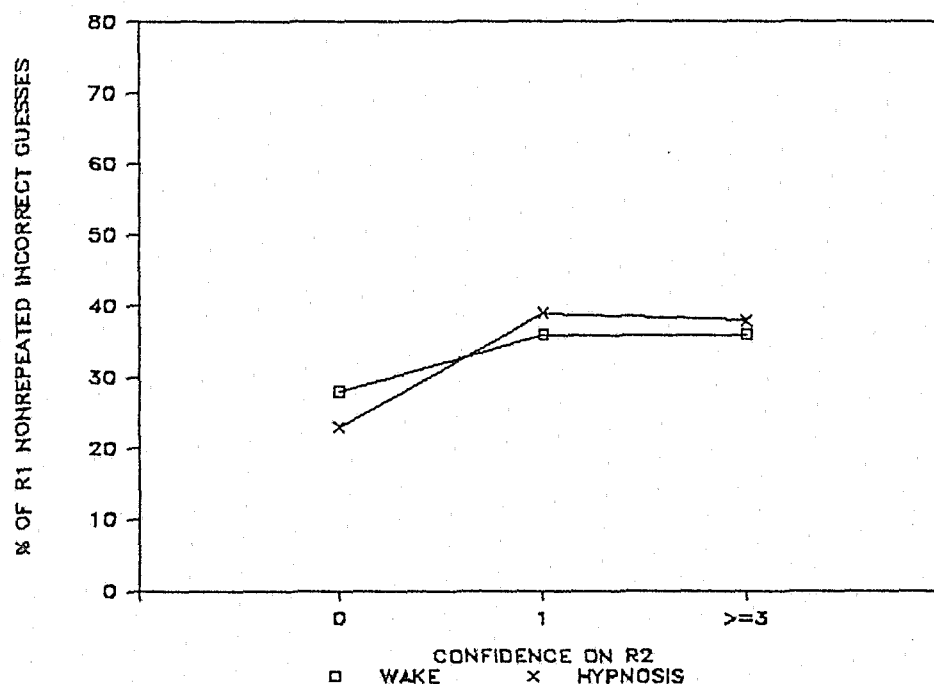


Figure 7

The impact of report criterion shifts engendered by hypnosis. These findings converge in identifying the report-criterion shift mechanism as a primary determinant of hypnotic memory reports. Although response criterion effects associated with a hypnotic procedure are usually considered only in relation to increases in correct recall, their consequences may be more

pervasive. The preceding analyses demonstrate that correct guesses elicited during R1 become transformed into confident recollections more often in hypnosis than in the wake condition. If the assumption is valid that guesses are likely not to be reported, then it is clear that hypnosis, by promoting confidence in these correct guesses, will result in the reporting of more seemingly novel correct information than would simple waking recall attempts, when the report criterion is not controlled.

Because subjects are not able to differentiate correct from incorrect recall when their confidence level is zero, it is reasonable to suggest that a report-criterion shift should also escalate confident reporting of incorrect information. Indeed, our findings are quite consistent with this nonselective effect of hypnosis on confidence. Not only are correct guesses more likely to be infused with greater confidence in hypnosis, but so also are previous incorrect guesses and other erroneous responses that are offered to replace them.

Strikingly, the effect of the report criterion shift engendered by hypnosis is specific to confidence. It does not relate to bona-fide recoveries of new correct recollections, that is, to reminiscences following previously incorrect guesses. Here, presumably because they represent true recoveries of previously inaccessible information from memory rather than uncertain recollections suppressed by a conservative report criterion, hypnosis did not have its trademark effect on confidence. Neither, it should be emphasized, did it facilitate their recovery.

#### Retrospective Assessments of the Context of Remembered Information

A final issue that we sought to investigate concerns an individual's ability to correctly differentiate recollections reported for the first time in hypnosis from those reported earlier in the wake condition. Accordingly, subjects were interviewed one week following the completion of their individual session at the laboratory. Because the procedures to collect these data were developed after the start of the experiment, data are available only for the last 59 subjects run (28 in the wake condition and 31 in the hypnosis condition).

During the course of the interview, subjects were provided with a questionnaire containing four of the questions about the film to which they had responded twice (during R1 and R2) in the previous week's session. Along with these questions were the specific verbal responses each subject had given, with two of the responses being those given during R1 and two being those that were given for the first time during R2. Subjects were asked to identify the occasion (R1 or R2) on which the particular response was first given and to indicate their confidence in their designations. Responses were selected to be of nearly equivalent confidence at the time they were originally given and one response from each recall test was correct, while the other was incorrect. These precautions were necessary to prevent subjects from attributing responses differentially to either R1 or R2 on the basis of earlier confidence in their accuracy, as opposed to their present ability to discriminate the origin of the responses.

Identification of those responses that were given during R1 occurred with very high accuracy for subjects in both groups [wake = 89%, hypnosis = 94%;  $t(57) = .77$ , n.s.]. Unfortunately, this cannot be taken as evidence for the

discriminability of memory reports with respect to the occasion of their first occurrence, because both groups of subjects also tended to misattribute responses to R1 [wake = 43%, hypnosis = 42%;  $t(57) = .10$ , n.s.] that were actually given for the first time during R2. This implies that subjects generally are not able to discriminate the occasion or temporal locus of previously reported recollections.

Figure 8 displays the percent of subjects in both the wake (left graph) and hypnosis (right graph) treatments who exhibited each of the five possible attribution patterns. (The pattern designated "4-0" indicates that all four responses were attributed to R1, pattern "1-3" indicates that one response was attributed to R1 and three were attributed to R2, and so on.) Of course, if all subjects were able to correctly identify the source of all four responses, this would be indicated by the attribution pattern "2-2" having a frequency of 100%. Comparison of the two graphs reveals a striking similarity in the relative distributions of recall allocation patterns between previously hypnotized and wake groups. Moreover, these distributions mirror the findings concerning attribution accuracy discussed above. That is, both graphs prominently depict a bias among subjects to attribute their responses to R1. This bias is conveyed not only by the fact that the median for both groups

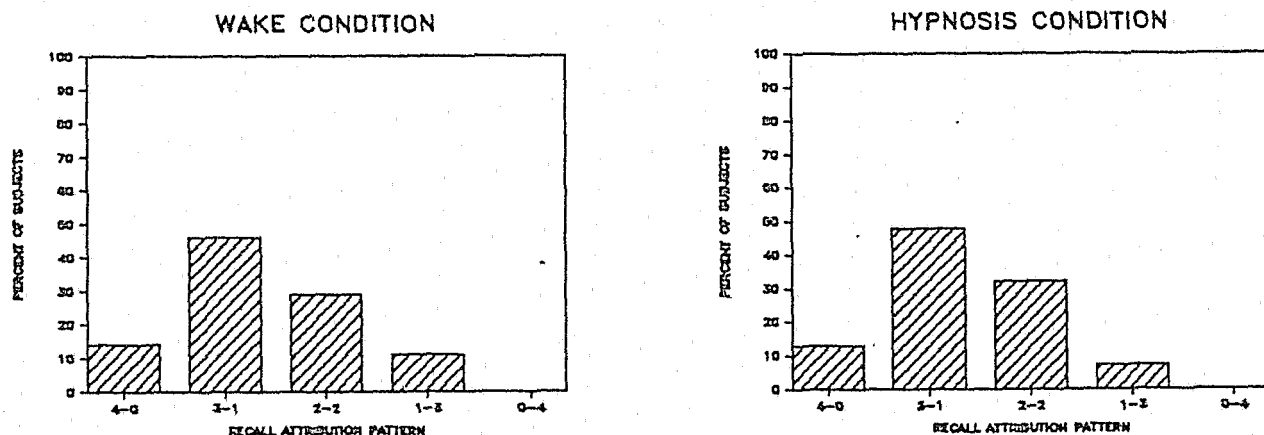


Figure 8

falls in the "3-1" cell, but also by the comparative absence of a counterbias (i.e., not a single subject attributed all four responses to R2). Finally, Kolmogorov-Smirnov one-sample goodness-of-fit tests were conducted for each distribution to determine whether it departed significantly from a theoretical distribution based on perfect differentiation of R1 and R2 responses. The results of these tests confirmed that the hypothesis that subjects can accurately identify the temporal locus of their recall is untenable (both  $p$ s < .01).

Although having been exposed previously to hypnosis apparently does not exaggerate the bias to attribute recollections to the first attempt to remember, it is noteworthy that previously hypnotized subjects tended to assert greater confidence that responses actually reported for the first time in hypnosis had been reported earlier during R1 [ $t(57) = 1.83$ ,  $p < .05$ ,



one-tailed]. Thus, the difference between subjects who underwent hypnotic recall and subjects who recalled only in the wake condition resides, not in the generally poor differentiation of the context of recalled information, but in the greater conviction of previously hypnotized subjects that they "knew it all along."

### SUMMARY AND IMPLICATIONS

This is the first study to control for report-criterion changes in assessing the potential for hypnosis to enhance recall. The stimulus conditions during the acquisition phase (i.e., "Posters" film) and recall phase (i.e., tape-recorded interrogatory format) of the experiment were selected specifically because they had been shown previously (Stager & Lundy, 1985) to yield superior recall among responsive subjects tested in hypnosis. We took special care to assure reliable determinations of hypnotic ability and to rule out pretreatment differences in retention that might have affected the outcome of the experimental treatments. Despite these efforts, which should have optimized conditions for a true hypnotic hypermnesia effect to emerge, the forced-recall procedure revealed no difference in correct recall between hypnosis and wake treatments. It cannot be argued that the forced-recall technique prevented the expression of hypermnesia. Indeed, all groups displayed an improvement in recall from R1 to R2; however, the magnitude of improvement was not any greater for subjects in the hypnosis condition. This suggests that evidence for superior recall in hypnosis, obtained when report criterion is not controlled (e.g., DePiano & Salzberg, 1981; Dywan & Bowers, 1983; Stager & Lundy, 1985), is due to an increase in the willingness of hypnotized subjects to include previously uncertain information in their memory reports.

This conclusion is not merely speculation encouraged by a failure to reject the null hypothesis. In tracking the fate of individual responses between recall tests, the data indicate clearly that subjects in the hypnotic treatment report a significantly greater proportion of their previous correct guesses at higher confidence levels than do subjects in the wake condition. Under the typical demands for accuracy that exist in most memory assessment contexts, subjects would refrain from reporting information about which they are highly uncertain. In view of the potentially serious consequences of providing erroneous information in a criminal investigation, the likelihood that a witness would volunteer such substandard recall may be even more remote. However, as the present findings show, hypnosis can "create" confidence for previously uncertain information, thereby increasing the probability that it will be reported with greater conviction subsequently.

If the use of hypnosis results in the introduction of new evidence that can be independently corroborated, then it would seem to make little difference whether it was the product of a criterion shift or confidence shift or the recovery of a previously inaccessible memory. Unfortunately, our data show that confidence in erroneous information is also heightened to a greater extent in hypnosis than in the wake condition. Since the individual has no a priori means of determining the accuracy of information about which he/she is uncertain, and since the investigative setting does not afford the ability -- intrinsic to laboratory experiments -- to sort out correct and incorrect recollections vis-a-vis what actually transpired, the report-criterion shift mechanism in hypnosis can be detrimental to the truth-seeking process. If, as the present study suggests, hypnosis has no true memory enhancing potential,

then reliance on its ability to rehabilitate uncertain recollections is likely to yield a witness who is as convinced of erroneous information as he/she is of correct information.

The most consistent finding throughout our analyses was an increase in confidence for erroneous information associated with the hypnotic treatment. This was seen during the hypnotic recall, where despite the fact that hypnosis produced no greater tendency to commit recall errors than did ordinary wake recall, subjects were nonetheless significantly more certain that their errors were accurate recollections. Similarly, the effect carried over into subsequent waking memory, with subjects previously exposed to hypnosis asserting greater confidence in errors made on a recognition test, even though the number of such errors did not exceed the rate observed among nonhypnotized subjects. Finally, when requested one week later to identify which of four responses were reported during the first recall test and which were reported for the first time during the second recall test, the bias to attribute the majority of responses to the first recall test was no greater for previously hypnotized than for wake subjects, but the former tended to express greater confidence in their erroneous attributions.

Thus, on each variable that was assessed, subjects exposed to hypnosis exhibited an unwarranted degree of confidence relative to nonhypnotized subjects. Although their performance was not worse than that of wake subjects, the excessive confidence invested by hypnotized subjects in erroneous responses would lead naturally to an increased likelihood of their being accepted as veridical. Consequently, the memory reports of individuals exposed to hypnosis are less accurate than those of wake subjects, both during and subsequent to the hypnotic session.

Finally, it is noteworthy that subjects were not able to identify accurately the context in which they first reported a memory. This was true regardless of whether the person was previously hypnotized, although as noted above, the hypnotized subjects tended to be more certain that their misattribution was correct. This finding is very relevant to several recent state supreme court decisions that permit individuals to testify only to those memories that they had prior to hypnosis. Our data clearly indicate that individuals cannot reliably distinguish which memories occurred prior to hypnosis relative to those that occurred during hypnosis. Therefore, it is not possible to rely on a person's post-hoc statement about the source of his or her recollections; rather, an objective record is needed to document the preexistence of the memories before the hypnotic session.

#### FUTURE DIRECTIONS

Although the extensive investigation just completed clearly suggests that hypnotic memory enhancement is an illusion -- albeit an appealing one -- it is appropriate to note that this may be true only for recall of meaningful material that is not emotionally charged. There is a pressing need to address the use of hypnosis for recall of memories that involve arousing or anxiety-provoking events, since this is perhaps the one situation where hypnosis might be effective at removing the recall block engendered by the traumatic or emotional content of the events to be remembered. Certainly some of the most dramatic anecdotal claims for the memory enhancing effect of hypnosis come from cases where the event to be recalled was emotionally charged.

Unfortunately, as with recall for meaningful material that was not emotionally charged, no study that has addressed the issue of hypnotic hypermnnesia for anxiety-provoking events has controlled for shifts in report criterion. As discussed above, without such a control there is no way of determining whether the effect of hypnosis is directly on the accessibility of memory or on the inability to report more information because of the emotional aversiveness of those recollections. A hypermnnesia paradigm tailored for recall of arousing or anxiety-provoking events needs to be developed and a study conducted to address the manner in which hypnosis impacts on emotionally charged memories, much as was done for more neutral meaningful material. If it is determined that hypnosis truly improves memory accessibility for emotional material, then its use with anxious and aroused witnesses and victims might be justified.

The other promising avenue for future work is the development of techniques that facilitate the investigative process of asking persons to recall the events in question. The matter is all the more pressing because, as the research just completed shows, hypnosis is not a viable and safe procedure for eliciting reliable new information. Other interview and recall techniques that do not involve the memory accuracy distortion effect (i.e., misplaced confidence in erroneous recall) seen with hypnosis need to be explored -- particularly techniques that yield more new information than routine interview and recall procedures. This process has begun with efforts to develop a cognitive interview strategy (Geiselman, Fisher, Firstenberg, Hutton, Sullivan, Avetissian, & Prosk, 1984).

While the cognitive interview holds some promise and will require extensive experimentation to document its benefits relative to its risks, other avenues of information gathering should also be explored. In this regard, we were particularly struck by the effect of the forced recall procedure and confidence rating technique utilized in the above study to identify additional correct information beyond that found when the person is not required to answer.

It is reasonable to assume that in a forensic context many people who are interviewed hold the conviction that they should be fairly confident of their recollections before offering them and consequently they adopt a conservative report criterion. Yet the goal of the investigator/interviewer in many cases where leads are few is to gather as much relevant information as possible from participants and witnesses. Adapting the forced recall procedure and confidence rating techniques used in the above study might provide a relatively distortion-free approach to maximizing the information acquired from witnesses when investigating a major case.

Such an interview technique would be based upon encouraging witnesses to mention anything relevant to the case that comes to mind, including those things they are unsure of. In addition, they would subsequently be asked to rate their confidence in their responses on a four-point scale and these would be noted by the interviewer. Data suggest that such a procedure might produce a comparable amount of information as hypnosis. The crucial difference between someone who has undertaken this kind of recall and a person who recalled in hypnosis is that the waking individual is far more accurate in identifying correct memories in which he or she can be justifiably confident. If the procedure can maximize the production of possible memory items while at the same time maintaining the individual's ability to assess the accuracy of any particular item, a relatively safe and effective interview technique will be available.

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