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THE USE AND EFFECTIVENESS OF HYPNOSIS AND THE COGNITIVE INTERVIEW
FOR ENHANCING EYEWITNESS RECALL

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THE USE AND EFFECTIVENESS OF HYPNOSIS AND THE COGNITIVE INTERVIEW FOR ENHANCING EYEWITNESS RECALL

PROBLEM

The fallability of eyewitness reports is generally well recognized by law enforcement officials, as well as by judges, jurors, and attorneys. Moreover, the limitations of eyewitness recall have been convincingly demonstrated in laboratory research (see Wells & Loftus, 1984). Nevertheless, obtaining accurate eyewitness accounts is frequently crucial to the investigative process and for the successful prosecution of the guilty party. Understandably, therefore, the forensic community has had a longstanding interest in the development of techniques to enhance the accuracy and detail of reports by witnesses and victims of crimes.

Hypnosis

The use of hypnosis in forensic investigation has had a number of advocates in the past quarter century (for a review, see Udolf, 1983) who provide persuasive anecdotal evidence of its value for enhancing witness recall. These claims are difficult to evaluate, however, because (a) the criteria for determining how helpful hypnosis was are subjectively determined and vary from case to case; (b) much of the information reported in hypnosis consists of recollections that cannot be verified; and (c) the new information might have been provided by the witness with additional waking recall attempts, without the use of hypnosis. Furthermore, when the question of whether hypnosis can enhance accessible memory (termed "hypnotic hypermnesia") has been examined in controlled laboratory studies, the evidence is essentially negative (see Orne, Whitehouse, Dinges, & Orne, 1988).

Given the lack of scientific support, coupled with evidence for greater memory distortion with hypnosis, the majority of State Supreme Courts that have grappled with the issue of hypnotically elicited testimony have placed major restrictions on its admissibility in court. Although the U.S. Supreme Court recently held that there was a Constitutional right to testify on one's own behalf and that having been hypnotized was not a sufficient basis on which to exclude a defendant's testimony (Rock v. Arkansas, 1987), the general awareness by the courts of inherent threats to the interests of justice associated with hypnotically acquired testimony is likely to maintain restrictions on its admissibility (Kuplicki, 1988).

The Cognitive Interview

In recent years, researchers at the University of California at Los Angeles and at Florida International University have developed a much-needed, pioneering memory retrieval technique for use with eyewitnesses. The procedure, known as the "cognitive interview" (see National Institute of Justice, Research in Brief, December 1985), relies upon a combination of retrieval mnemonics that have been demonstrated to be effective in laboratory studies of human memory. The objectives of these mnemonics are (a) to maximize the featural similarity of the retrieval context with conditions that prevailed at the time of the incident in question, and (b) to encourage the subject to make use of several memory search strategies.

Research on the efficacy of the cognitive interview has included both student and nonstudent populations, as well as actual witnesses and victims of crime. Across these studies, the cognitive interview has been reported to

yield an increase over the standard interview in correct recall, ranging from 17% to 63%, without a corresponding increase in erroneous information.

When the cognitive interview was evaluated against a hypnosis interview and a standard police interview, the results suggested that hypnosis and the cognitive interview were comparable and that both produced a greater amount of correct information than did the standard interview (Geiselman, Fisher, MacKinnon, & Holland, 1985). At the same time, neither procedure resulted in significantly more incorrect information than was provided by the standard interview.

PRESENT STUDY

Rationale

The development of techniques, such as the cognitive interview, that help law enforcement obtain the best possible eyewitness recall is essential. The research on the cognitive interview has been quite encouraging and there is reason to believe that the technique may provide a viable alternative to the investigative use of hypnosis. To date, however, the bulk of this research has been performed by two laboratories which were instrumental in developing the procedure. In order to ascertain the generality and reliability with which the technique can be successfully applied, it is desirable that the basic findings be confirmed in independent research carried out by other laboratories. One important objective of such an independent investigation is to employ alternative research methodologies that could reveal the limitations, if any, of the technique. In fashioning the design of our study, therefore, several considerations were given special attention.

In actual investigative situations, there is a tendency for witnesses to engage in repeated (covert as well as overt) recall attempts in anticipation, and during the course, of formal interviews. In light of the demonstrated importance of repeated retrieval efforts for producing normal waking hypermnesia (Erdelyi, 1988; Payne, 1987), potential retrieval aids developed for use with eyewitnesses should be evaluated against a multiple-recall baseline. Whereas hypnosis has been submitted to this type of comparison (see Orne et al., 1988 for a review of the relevant research), to our knowledge, the cognitive interview has not. Moreover, despite its favorable evaluation relative to standard interviews, there is no clear evidence that the cognitive interview enhances recall appreciably over a prior standard interview with the same subject. Therefore, we attempted to contrast the relative efficacy of hypnosis and the cognitive interview when administered within the context of a repeated-recall design.

When using a multiple-recall paradigm, it is paramount that subjects sustain attention, motivation, and retrieval effort during each recall attempt. Of course, novel procedures such as hypnosis and the cognitive interview are likely to provide ample intrinsic motivation so as to be used effectively in a multiple-recall situation. However, any control condition that provides the same number of recall opportunities would require a plausible rationale and the expressed conviction of the interviewer regarding its effectiveness for memory enhancement in order to maintain effortful retrieval attempts by the subject. In the current study, a special effort was made to assure a well-motivated control condition of this type.

Finally, in the forensic situation, witnesses typically are encouraged to provide free recall descriptions of the events in question. In the laboratory, however, this procedure can be complemented by the addition of a forced recall paradigm, in which subjects are required to answer a series of questions, by guessing if necessary. While the free recall format yields substantial differences among subjects with regard to the amount of information provided, the forced recall procedure effectively controls for these differences, allowing us to study recall accuracy independent of output.

Method and Results

The study involved a total of 72 volunteers, who viewed a short film depicting an armed bank robbery, followed by a chase through a parking lot in which a young boy is unexpectedly shot in the face, and ending with the robber's escape in a getaway car driven by an accomplice. Previous research has demonstrated that witnessing this film often results in amnesia for certain details, a situation that simulates the types of memory difficulties sometimes experienced by witnesses or victims of violent crimes.

Approximately one week later, each participant initially provided a detailed written account of the events of the film. Following this, they were administered either hypnosis, the cognitive interview, or a motivating control procedure.

Hypnosis interview. Subjects were instructed in hypnosis to replay the film on an imaginary television set and were told that they could control the replay by slowing the film down, speeding it up, freezing the frame, and so on.

Cognitive interview. Subjects were informed of the four basic memory enhancement techniques that constitute the cognitive interview. These techniques include reconstructing the circumstances surrounding the incident, reporting everything regardless of apparent importance, recalling events in a different order, and changing perspectives.

Control interview. The control condition involved neither hypnosis nor key elements of the cognitive interview. Instead, subjects were provided with a rationale for the memory enhancement value of the various activities they were to engage in. These included challenging periodic distractor-type tasks that would allow them to overcome mental blocks.

During each of the treatment interviews, subjects provided a free narrative oral recall, which was followed by a series of direct questions about the events of the film. At the completion of each interview, subjects produced a second written account of everything they could recall about the film.

The session concluded with an interview by another researcher, during which subjects were asked a series of questions concerning the film that called for specific responses. They were instructed to provide an answer for every question, even if they had to guess. Hence, during this forced interrogatory recall test, each subject provided an equal number of scorable responses, effectively controlling for potential differences among subjects in the total amount of information they reported.

Average scores for the three conditions based on "new" information

provided by subjects in the second written narrative are given in Table 1. New information includes only those details that were absent from the pretreatment baseline written narrative report and thus appeared for the first time following the treatment interview. As illustrated in the table, all three conditions produced substantial amounts of new information. Interestingly, scores for the cognitive interview and control conditions are comparable for each class of information. On the other hand, hypnosis consistently resulted in more information of each type than the other two conditions. That is, hypnosis produced more new correct information, but only at the expense of greater incorrect, attributional information (opinionated or subjective responses), and confabulations. This pattern of greater amounts of new information associated with hypnosis, irrespective of accuracy, implies that subjects in hypnosis simply gave more information following treatment than did subjects in the other interview conditions.

Results from the forced interrogatory recall test revealed no differences among the three conditions with regard to the number of correct responses given to the set of direct questions. The failure to find reliable differences among groups on the forced recall test securely establishes that the gains associated with hypnosis on the preceding written recall are due to productivity, and nothing more.

CONCLUSIONS

In this study, as in prior studies (see Orne et al., 1988), hypnosis was associated with a major increase in overall productivity rather than a differential enhancement of correct recall. Thus, the use of hypnosis occasioned comparatively more new information of each type than did either the cognitive interview or the control condition. In short, hypnosis did not enhance recollection relative to nonhypnotic treatments, it merely augmented subjects' willingness to report information, irrespective of its accuracy. These results imply that memories obtained with hypnosis must be regarded as unreliable from the standpoint of the forensic context, where ground truth is frequently impossible to ascertain. Our findings support the position of many courts, which restricts the admissibility of hypnotically elicited testimony. Nevertheless, in light of the powerful effect that hypnosis has on recall productivity, it may, in certain cases, be tempting to use as a means of generating investigative leads in the hope that they can be corroborated by independent physical evidence. But such evidence may not be forthcoming, and often is not in actual cases. In addition, investigative applications of hypnosis need to be tempered by the knowledge that the witness's hypnotically acquired testimony may be inadmissible given the courts' recognition that hypnotically elicited memories are unreliable.

It is noteworthy that the greater productivity with hypnosis observed in the present study is at odds with the report by Geiselman et al. (1985), which failed to find reliable differences between hypnosis and the cognitive interview. To understand the difference in findings across laboratories, it is important to remember that, while the present investigation used a repeated-recall design, Geiselman and his associates typically report data from only a single recall opportunity. Hence, while we were able to focus analyses upon new information exclusively available following the various interviews, previous work has not been able to distinguish new information elicited by the treatment from that which was available prior to treatment.

Although we cannot be certain what results Geiselman et al. would have obtained had they used a repeated-recall design, we can reanalyze our data in a manner comparable to their approach, focusing only on information contained in the second written narrative and without regard to pretreatment performance. When our data are analyzed in this way, differences between the hypnosis and cognitive interview conditions are no longer evident. In this regard, it should be noted that the use of a repeated-recall design provides a more sensitive test when considering whether various interview techniques differentially influence recall.

The use of this paradigm also provides a likely explanation for the comparability of the cognitive interview and control conditions observed in the present study. In particular, our use of a repeated-recall design almost certainly rendered our control condition more effective than the standard interview typically used to evaluate the cognitive interview. Basic memory research (e.g., Erdelyi, 1988) has demonstrated convincingly that, when subjects engage in repeated retrieval efforts, they are able to produce substantial increments in correct recall. Furthermore, in this investigation, great care was taken to maximize subjects' motivation and to establish the control condition as a plausible memory enhancement technique. These efforts were undertaken in order to ensure sustained effort across trials and lead subjects to expect their memories to improve. When evaluated against such an "active" control condition, it is perhaps not surprising that the cognitive interview did not fare as well as it has in other studies comparing it to a standard police interview.

While the cognitive interview and the control interview were equated for the number of formal recall opportunities, they differed in terms of the explicit memory strategies employed. Thus, the cognitive interview makes use of techniques to optimize the similarity of encoding and retrieval contexts and encourages different patterns of memory search. The control interview, on the other hand, relied upon engaging distractor tasks between recall attempts, and recall effort and time comparable to the cognitive interview. The equivalent performance of subjects in these two conditions may be taken to imply either (a) that the retrieval mnemonics utilized by the cognitive interview, as well as the distraction tasks of the control condition, produce equal increments over the effects of repeated recall alone, or (b) that the techniques embodied by the two interview conditions add nothing to what can be produced by repeated recall efforts per se. If the former possibility proves to be the case, this would suggest that the cognitive interview might derive additional benefit from formally adopting a multiple-recall structure that makes strategic use of distraction between each attempt to elicit new information. On the other hand, if the various mnemonic techniques intended to improve recall are in fact superfluous, then considerably more attention should be paid to devising strategies which will maximize subjects' motivation and help them to sustain a heightened level of concentrative effort over multiple recall attempts.

Alternatively, while the cognitive interview and control condition appear to be quite different, they may, in fact, activate a common memory retrieval process. Questions surrounding the way in which the cognitive interview influences memory, and the components that actually contribute to its efficacy, have important practical as well as theoretical implications. If this technique is adopted as an alternative to the forensic use of hypnosis,

it is essential to have additional scientific evidence regarding its mechanism(s) of action and potential for distorting memory, as these questions will surely be of significant consequence in court.

In summary, our results confirm the prevailing scientific view that hypnosis is an unreliable memory "refreshing" technique. What these findings imply regarding the cognitive interview is less certain, however. When compared relative to the problems of increased errors engendered by hypnosis, the cognitive interview looks promising. But the credible and motivating control procedure was just as effective as the cognitive interview, and hence it is difficult to subscribe to the view that all of the beneficial effect of the cognitive interview is contained in the special memory techniques it utilizes. In fact, based on the results of the body of work conducted for NIJ over the past 6 years, we now feel there is considerable evidence to support the view that the systematic use of repeated recall efforts in motivated subjects may be far more important for eliciting increased memory than is the use of any special cognitive strategy. The issue requiring more research is whether we can continue to build on the gains afforded by the pioneering development of the cognitive interview.

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Table 1

Mean Scores for New Information Obtained with each Interview

Group	New Correct	New Incorrect	New Confabulations	New Attributions
Hypnosis	34.6	16.5	2.3	9.8
Cognitive Interview	22.7	10.8	1.6	6.5
Control	25.8	12.4	1.4	5.9

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This research evaluated the use of hypnosis and the cognitive interview for memory enhancement using a repeated-recall design. Additionally, both treatments were compared to a motivated and credible control interview. All subjects viewed a film depicting a violent crime and during a subsequent session provided a written narrative account of their memories for the film both prior to and following one of the treatment interviews. In addition, subjects participated in a subsequent interrogatory interview in which they were required to provide an answer to a series of direct questions. Results indicate that (a) all three conditions resulted in substantial amounts of new information following treatment; (b) hypnosis consistently produced more information of each type (e.g., correct, incorrect, attributional, and confabulatory) than the other two conditions; (c) the cognitive interview and control interview failed to differ across types of information; and (d) when output was limited using a forced-recall paradigm, group differences were no longer evident. These findings imply that hypnosis yielded a differential increase in overall productivity, rather than a selective enhancement of correct recall, confirming the inherent unreliability of hypnotically elicited recall. The comparability of the cognitive interview and control conditions suggests that there is merit to conducting further research on the development of non-hypnotic interview techniques for eyewitness recall.



U.S. DEPARTMENT OF JUSTICE
Office of Justice Programs

CATEGORICAL ASSISTANCE PROGRESS REPORT

This recordkeeping requirement falls under the authority of P.L. 98-473. The information provided will be used by grant monitors to track grant progress. No further monies or other benefits may be paid out under this program unless this report is completed and filed as required by existing laws and regulations (OMB Circulars A-102 and A-110; Omnibus Crime Control and Safe Streets Act of 1968, as amended; Juvenile Justice and Delinquency Prevention Act of 1974, as amended; and the Victims of Crime Act).

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9. NAME AND TITLE OF PROJECT DIRECTOR Martin T. Orne, MD, PhD		10. SIGNATURE OF PROJECT DIRECTOR 	11. DATE OF REPORT February 7, 1990

12. COMMENCE REPORT HERE (Continue on plain paper)

BACKGROUND

The Use of Hypnosis for Memory Enhancement

The law enforcement community has had a longstanding interest in the development of techniques to increase the accuracy and detail of reports by eyewitnesses and victims of crimes. The use of hypnosis in forensic investigation is one such technique, which has had a number of advocates in the past quarter century (e.g., Arons, 1967; Hibbard & Worring, 1981; Kroger & Douce, 1979; Reiser, 1980; Schafer & Rubio, 1978), who provide persuasive anecdotal evidence of its value for enhancing witness recall. These claims are difficult to evaluate, however, because (a) the criteria for determining how helpful hypnosis was are subjectively determined and vary from case to case; (b) much of the information reported in hypnosis consists of recollections that cannot be verified; and (c) the new information might have been provided by the witness with additional waking recall attempts, without the use of hypnosis.

When the question of whether hypnosis can enhance accessible memory (termed "hypnotic hypermnesia") has been examined in controlled laboratory studies, the evidence is essentially negative (for a review, see Orne, Whitehouse, Dinges, & Orne, 1988). The few positive findings (e.g., DePiano & Salzberg, 1981; Dhanens & Lundy, 1975; Dywan & Bowers, 1983; Stager & Lundy, 1985) failed to distinguish between true memory enhancement and possible changes in the criterion subjects adopt when reporting their recollections that may cause them to provide information they would otherwise be too uncertain about to report. When report criterion is held constant with a "forced-recall" methodology, the apparent memory improvement produced by hypnosis is no greater than that which results from the same number of recall attempts by subjects in the normal waking condition (Whitehouse, Dinges, Orne, & Orne, 1988; Dinges, Orne, Whitehouse, Orne, Powell, & Erdelyi, 1987). Moreover, the amount of erroneous information elicited tends to be

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significantly greater with hypnosis (Dinges et al., 1987; Dywan, 1988; Dywan & Bowers, 1983; Nogrady, McConkey, & Perry, 1985; Sheehan, 1988; Whitehouse et al., 1988), and confidence is often considerably higher than is warranted by the accuracy of recall (Nogrady et al., 1985; Sanders & Simmons, 1983; Wagstaff, 1982; Whitehouse et al., 1988; Zelig & Beidleman, 1981). In addition, a number of studies indicate that hypnotized subjects are especially vulnerable to leading or suggestive questioning (Laurence & Perry, 1983; Putnam, 1979; Sanders & Simmons, 1983; Sheehan, Grigg, & McCann, 1984; Zelig & Beidleman, 1981). Finally, subjects cannot accurately identify the source of the memory when hypnosis is used, and will often attribute memories obtained with hypnosis to an earlier waking recall (Whitehouse, Orne, Orne, & Dinges, 1990).

In view of overwhelming scientific evidence for the unreliability of recall obtained with the use of hypnosis, the majority of State Supreme Courts that have considered the question of hypnotically elicited testimony have placed major restrictions on its admissibility in court. Indeed, because of the potential for the creation of pseudomemories and inflated certitude, many jurisdictions have taken the position of disqualifying any witness from testifying who has been hypnotized in connection with a case. The U.S. Supreme Court recognized the unreliability of hypnotically elicited testimony but also held that there was a Constitutional right to testify on one's own behalf and that having been hypnotized was not a sufficient basis for a per se exclusion of a defendant's testimony (Rock v. Arkansas, 1987). Nevertheless, awareness by the courts of inherent threats to the interests of justice associated with hypnotically acquired testimony is likely to maintain restrictions on its admissibility (Kuplicki, 1988).

The Cognitive Interview

Recently, researchers at the University of California at Los Angeles and at Florida International University have developed a much-needed, pioneering memory retrieval technique for use with eyewitnesses. Their procedure, known as the "cognitive interview" (Geiselman, Fisher, Firstenberg, Hutton, Sullivan, Avetissian, & Prosk, 1984), relies upon a combination of retrieval mnemonics that have been demonstrated to be effective in laboratory studies of human memory. The objectives of these mnemonics are (a) to maximize the featural similarity of the retrieval context with conditions that prevailed at the time of the incident in question, and (b) to encourage the subject to make use of several memory search strategies. To this end, the witness is instructed to:

Mentally reconstruct the circumstances that surrounded the incident.

Report everything, even things which seem to be unimportant.

Recall the events in a different order from the way in which they occurred.

Adopt the perspective of someone else involved in the incident and

describe the events from that person's point of view.

At relevant points in the interview, more specific mnemonics are suggested to help the witness to remember, for example, the suspect's appearance and speech, or other important details such as a license plate number.

In a study using simulated crime films as stimuli and experienced law enforcement personnel as interviewers (Geiselman, Fisher, MacKinnon, & Holland, 1985), the cognitive interview was evaluated against a hypnosis interview and a standard police interview. The findings revealed that hypnosis and the cognitive interview were comparable and that both produced a

greater amount of correct information than did the standard interview. At the same time, neither resulted in significantly more incorrect information than was provided by the standard interview. Follow-up research has extended the evaluation of the cognitive interview to nonstudent populations and actual witnesses and victims of crime, with efforts taken to refine the procedure (Fisher, Geiselman, & Amador, in press; Fisher, Geiselman, Raymond, Jurkevich, & Warhaftig, 1987; Geiselman, Fisher, MacKinnon, & Holland, 1986). Across these studies, the cognitive interview was found to yield an increase over the standard interview in correct (or corroborated) recall, ranging from 17% to 63%, without a corresponding increase in erroneous information. These findings are potentially of major significance and, if confirmed by independent investigators and demonstrated to be reliable across laboratories, the technique could be a boon to the forensic community.

Rationale for the Present Study

The development of techniques, such as the cognitive interview, that help law enforcement obtain the best possible eyewitness recall is essential. The research on the cognitive interview has been quite encouraging and there is reason to believe that the technique may provide a viable alternative to the investigative use of hypnosis. To date, however, the bulk of this research has been performed by two laboratories which were instrumental in developing the procedure. In order to ascertain the generality and reliability with which the technique can be successfully applied, it is desirable that the basic findings be confirmed in independent research carried out by other laboratories. One important objective of such an independent investigation is to employ alternative research methodologies that could reveal the limitations, if any, of the technique. In fashioning the design of our study, therefore, several considerations were given special attention.

A criticism made of some laboratory studies of eyewitness memory is that they do not reproduce the kind of memory deficit that is troublesome in a forensic investigation. That is, while experimental subjects are generally assessed for recall of stimuli that have little emotional significance, witnesses and victims of crimes may be involved in traumatic experiences that produce a recall deficit subserved by repression. There may be a difference between recall deficits produced by repression and those characteristic of normal memory, which could render some memory enhancement procedures more effective than others. From a theoretical perspective, hypnosis may have special value when used with eyewitnesses who have been emotionally distraught. Similarly, it would be important to determine the efficacy of the cognitive interview in overcoming a repression-based memory deficit. Therefore, one objective of the present study is to evaluate the ability of both hypnosis and the cognitive interview to reverse a recall deficit precipitated by an emotionally upsetting stimulus.

In actual investigative situations, there is a tendency for witnesses to engage in repeated (covert as well as overt) recall attempts in anticipation, and during the course, of formal interviews. In light of the demonstrated importance of repeated retrieval efforts for producing normal waking hypernesia (Erdelyi, 1988; Payne, 1987), potential retrieval aids developed for use with eyewitnesses should be evaluated against a multiple-recall baseline. Whereas hypnosis has been submitted to this type of comparison (see Orne et al., 1988 for a review of the relevant research), to our knowledge, the cognitive interview has not. Moreover, despite its favorable evaluation

relative to standard interviews, there is no clear evidence that the cognitive interview enhances recall appreciably over a prior standard interview with the same subject. In other words, it remains uncertain whether the cognitive interview improves recall after the subject has had a standard interview. Hence, another objective of this investigation is to examine the relative efficacy of hypnosis and the cognitive interview when administered within the context of a motivated repeated-recall design.

When using a multiple-recall procedure, it is quite difficult to sustain a high level of motivation, concentration, and retrieval effort among subjects when they are faced with the task of trying to recall the same event over and over again. Nevertheless, the motivation to continue to try to recall for a prolonged period of time has been shown to be crucial in determining the amount of accurate information the individual subsequently reports. In the multitrial forced recall procedure of Erdelyi (Erdelyi & Becker, 1974), for example, subjects are required to fill in all the blank spaces of their recall protocols with the names of stimuli which were presented earlier, even if they have to guess. This procedure keeps subjects working at the recall task for the entire duration. Even between trials, subjects are instructed to "think" about the stimuli in preparation for the next forced recall test. There is reason to believe that novel procedures such as hypnosis and the cognitive interview are sufficiently intrinsically motivating to be used effectively in a multiple-recall paradigm. However, any control condition that provides the same number of recall opportunities would require a plausible rationale and the expressed conviction of the interviewer regarding its effectiveness for memory enhancement in order to maintain effortful retrieval attempts by the subject. In the current study, a special effort was made to assure a well-motivated control condition of this type to provide a rigorous assessment of the potential benefits of hypnosis and the cognitive interview relative to the hypermnesic gains associated with repeated recall per se.

In summary, the present investigation had the following goals:

- (1) An independent replication of the effects of the cognitive interview.
- (2) Use of a stimulus film documented to produce a recall deficit, along with subjects who use a repressive coping style, to evaluate the use of memory enhancement techniques with repressed memories.
- (3) A comparison of the cognitive interview relative to standard recall attempts by the same witness.
- (4) Assessment of the effectiveness of the cognitive interview and hypnosis relative to a credible and motivating control procedure.
- (5) Evaluation of the effects of these memory enhancement techniques in both free narrative recall and forced recall paradigms.

METHOD

Subjects

Subjects were 72 volunteers (36 males, 36 females) selected from a larger sample ($N = 168$) who participated in one of 17 small group screening sessions. The Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A) of Shor and E. Orne (1962), as well as a number of psychological inventories and research questionnaires, was administered to all subjects.

In order to increase the sensitivity of the paradigm to the impact on memory of the emotionally upsetting film, we sought to include individuals who characteristically defend against anxiety by the use of repression as a coping mechanism. Following other research in operationalizing repression (Davis & Schwartz, 1987; Weinberger, Schwartz, & Davidson, 1979), we employed personality measures that assess trait anxiety (a short form of the Taylor Manifest Anxiety Scale developed by Bendig, 1956) and psychological defensiveness (Social Desirability Scale of Crowne & Marlowe, 1964) in order to identify a subsample of subjects who exhibited the repressor profile (i.e., low anxiety coupled with high defensiveness).

Subjects who were selected for full participation in the study had a mean HGSHS:A score of 8 (range 4-12). Using the criteria outlined by Davis (1987) and Davis and Schwartz (1987), 37 subjects qualified as repressors (defined as a score of 7 or less on the Manifest Anxiety Scale, coupled with a score of 15 or greater on the Social Desirability Scale); the remaining 35 subjects were classified as nonrepressors because their scores on the latter scales differed from this pattern.

Materials

Following extensive pilot testing, we selected as a stimulus, the film "3:57 Friday Afternoon," which depicts an armed bank robbery, followed by a chase through a parking lot in which a young boy is unexpectedly shot in the face, and ending with the robber's escape in a getaway car driven by an accomplice. In previous research, Loftus and Burns (1982) demonstrated that witnessing the boy being shot resulted in an amnesia for certain details of the film. Hence, subjects who saw the identical film, but without the shooting segment, did not exhibit a deficit in recall for the same details.

Preliminary research carried out by our laboratory confirmed that memory was poorer for events in the film that were proximal to the shooting incident, which is consistent with the temporal pattern of psychogenic amnesias (see Progress Report of October 26, 1988). In addition, the film was rated significantly more emotionally upsetting than other films that we had screened, including one of the LAPD training films that has been used in the past in research on the cognitive interview (e.g., Geiselman et al., 1985).

Procedure

Initial sessions, which included the group assessment of hypnotic responsivity, were conducted in 17 groups, ranging in size from 4-14 volunteers ($M = 10$). Each session began with a research questionnaire period with one experimenter, followed by administration of the tape-recorded HGSHS:A with a second experimenter and two trained observers. Following the hypnotizability scale, subjects completed their self-report response booklets, which were then collected for scoring by a third experimenter and two research assistants in another room to determine which subjects would be asked to return for a second session. After a brief intermission, a fourth experimenter and assistant showed subjects the 2.25-minute film, "3:57 Friday Afternoon." Thus, each stage of the session utilized different members of the staff to maintain blindness. Immediately after the film, subjects completed the 13-item Film Evaluation Questionnaire, which inquires about subjects' reactions to the film. A sealed take-home packet that included a stamped,

self-addressed return envelope, an abbreviated version of the Film Evaluation Questionnaire, and an Incidental Memory Questionnaire (concerning details of subjects' participation in the group session) was given to each volunteer. Subjects were told that the two questionnaires should be 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 for the second session.

Subjects returning for Session 2 were randomly assigned to one of the three treatment conditions, with the constraint that the groups were equivalent with respect to hypnotizability, gender, and repressor status. Session 2 consisted of a baseline phase and a treatment phase. The three experimenters (interviewers) were trained to administer the baseline as well as each of the treatment conditions. In order to make certain that potential differences among experimenters did not influence the baseline and treatment conditions, two procedures were used: (1) the baseline was administered by one experimenter and the treatment by another, and (2) each experimenter completed a third of all baselines and a third of all treatment conditions, randomly determined.

Subjects were worked with individually during the second session, which occurred between 3 and 13 days (Mean = 6.5 days) after the initial group session. Each participant was escorted by an experimenter to a quiet room, seated in a comfortable chair, and equipped with a small clip-on microphone. They were then informed that the purpose of the session was to learn everything they could remember about the film they had viewed during the group session and were encouraged to report everything that they could recall about the details of the film. Upon completion of their oral report, subjects were provided with paper and pencil and asked to write a detailed, comprehensive account of everything they could recall about the film. Once subjects had completed their written narratives, they were escorted to a waiting room and asked to complete a few questionnaires, after which they were introduced to a second experimenter.

The second experimenter escorted subjects to a different room, where they were again seated in a comfortable chair and equipped with a small microphone. At this point, each subject was administered one of three treatments: hypnosis, cognitive interview, or the control condition.

Hypnosis interview. Subjects in this group were initially informed that hypnosis would help them to relax and would enable them to "tap subconscious levels" of their minds. After questions were answered, they were administered a hypnotic induction followed by deepening instructions, and were then told that they were to watch "in their minds" a replay of the film as if it were appearing on a large television screen. They were told that during this replay, they would remain calm and comfortable, and in addition, they would be able to control the replay, as if by remote control. That is, they could slow the film down, speed it up, freeze the frame, even zoom in on small details. This "TV technique" and the metaphors used in hypnosis draw heavily from the procedures outlined by Reiser (1980) and employed in actual investigative situations. Subjects were then asked to describe everything they were seeing and hearing. At the end of their oral recall, subjects were asked by the experimenter a number of focused questions concerning specific details of the film (e.g., "How tall was the robber?" "Did anyone follow the robber out of

the bank?"). Subjects were then brought out of hypnosis, asked to rate how deeply hypnotized they had become (using a 10-point scale), and then were given a brief mood scale to complete. Following this, subjects were again given paper and pencil and were asked to provide a detailed final written statement of everything they could recall about the film.

Cognitive interview. The cognitive interview was fashioned directly from the techniques utilized by Geiselman and his colleagues for forensic applications. This included material drawn from his published scientific articles, unpublished reports, correspondence, personal communication, and a police training film demonstrating the technique. Subjects were initially informed that they would be able to remember additional details about the film if they were to try different ways of searching their memory. They were then presented with a small card which outlined four basic memory enhancement techniques (cf. Geiselman et al., 1985). After the subject had read the card, the experimenter described in more detail each of the techniques, which included reconstructing the circumstances surrounding the incident, reporting everything regardless of apparent importance, recalling events in a different order, and taking the perspective of another person in the film. Once subjects indicated that they understood the various techniques, they were asked to think back to the last time they had been in the laboratory and had seen the film, and were encouraged to reconstruct the circumstances and events of that visit. They were then asked to report everything they could recall about the film, using the different techniques they had learned. Following their oral recall, subjects were asked a number of focused questions, completed a mood scale, and were then asked to provide a comprehensive final written statement of everything they could recall about the film.

Control interview. The control condition involved neither hypnosis nor key elements of the cognitive interview, such as reconstructing the circumstances surrounding the incident, changing perspectives, and recalling in a different order. Instead, subjects in the control condition were provided with a credible rationale in an attempt to establish motivation to recall comparable to the hypnosis and cognitive interview conditions. This is critical to ensure that whatever memory effects accrue differentially from the techniques are not simply the result of a control group poorly motivated to recall and report information. Thus, subjects in the control condition were informed that they would be provided with a number of basic memory retrieval techniques which would enable them to recall additional details about the film. For instance, they were told that being back in the laboratory (although in a different room than the one in which they originally viewed the film) would facilitate recall. They were also told that searching their memory repeatedly would produce new information. Finally, they were told that by engaging in a variety of distractor-type tasks, mental blocks would be overcome which would allow them to remember additional information. The distractor tasks were selected to be interesting and challenging. Subjects completed five 1-minute trials of a two-handed pursuit-rotor tracking task, after which they were asked to report everything they could remember about the film. Following their oral recall, subjects were administered the Stroop Color-Word Interference Test, and were then asked a number of focused questions, followed by completion of a brief mood scale. Subjects then engaged in additional trials of the pursuit-rotor task, after which they were asked to provide a complete final written statement of everything they could recall about the film.

To maximize motivation, subjects in all three groups were repeatedly encouraged to write everything they could possibly remember, and were assured that they would not be asked to write again at any later point in the study. Upon completion of the second written recall, subjects were escorted back to the waiting room and given a number of questionnaires to complete. Once finished, subjects were introduced to a new experimenter (this was actually a fourth experimenter who had not been involved in either baseline or treatment) who took them to a new room, seated them in a comfortable chair, and asked them to review their general perceptions and experiences as they related to participation in the experiment. During this postexperimental interview, subjects were also asked a series of questions concerning the film that called for specific responses. They were instructed to provide an answer for every question, even if they had to guess (i.e., forced interrogatory recall), and to rate each answer in terms of their confidence using a four-point scale ("0 = Just guessing" through "3 = Certain"). At the completion of the debriefing, subjects were thanked and paid for their participation.

Scoring and Data Analysis

Data for the final report of this project were obtained from the two written narrative recalls -- one administered at the end of the Baseline interview and the other following the Treatment interview -- as well as from the forced interrogatory recall test which was conducted during the postexperimental interview. The two sets of narratives ($N = 144$) were transcribed by two assistants to typewritten form in a specially constructed format that was used to facilitate the derivation of scorable information units (IUs). The typewritten transcriptions were then proofread against the subjects' handwritten originals by two additional research assistants. Two scorers, who were blind to both treatment and classification (i.e., repressor status, hypnotizability, gender) variables, parsed the typewritten protocols into IUs and assigned them to three categories for each recall attempt: Descriptions of Persons; Actions; and Descriptions of Objects. A catalogue of correct information about the film was developed by collating the detailed reports provided independently by three trained assistants who each viewed the film seven times. The few inconsistencies across these reports were resolved by consensus of two additional viewers.

Scoring of the recall protocols was accomplished by comparing IUs against the catalogue of correct information. Data set #1 consisted of the following dependent variables from the written recalls completed at Baseline and Posttreatment: Total Information; Correct; Incorrect; Confabulations (i.e., filling in gaps with information that was not contained in the film); and Attributions (e.g., "The teller was upset"). A second set of dependent variables (Data Set #2) was also derived, which identified only new information that was given on the Posttreatment narrative: Total New Information; New Correct; New Correct/Noninformative (i.e., stating something already given during Baseline in an alternate way that produces additional IUs without additional information); New Incorrect; New Confabulations and New Attributions.

Interscorer reliability was established on 20 written recalls from 10 pilot subjects run through the entire protocol. The mean percent agreement between the two scorers was 92.4% (range = 85% to 98%).

Responses on the forced interrogatory recall test were scored as Correct or Incorrect, and the mean confidence ratings for both types of response were computed for each subject.

Data analysis was carried out with analysis of variance (ANOVA) procedures in which the between-subjects factors were Repressor Status and Interview Condition (general model: 2 x 3 factorial ANOVA). Initially, all measures from the Baseline recall were analyzed to ensure that the groups did not differ prior to undergoing the treatment interview phase of the study. This was followed by repeated measures (i.e., Baseline, Posttreatment) analyses applied to each of the dependent variables of Data Set #1. Data Set #2, which consisted of the various classes of "new" information given during the Posttreatment recall, was analyzed using the corresponding Baseline score for each variable as a covariate. Finally, data from the forced interrogatory recall test were evaluated with separate 2 x 3 ANOVAs for Total Correct Recall, Confidence in Correct Recall, and Confidence in Incorrect Recall.

RESULTS

Baseline Performance

Baseline recall involved asking the subject to report everything he or she could remember first orally, then in writing. Prior to any other planned analyses, a 2 (Repressor, Nonrepressor) x 3 (Hypnosis, Cognitive Interview, Control) ANOVA was conducted using the number of days elapsed between viewing the film and participating in Session 2 as the dependent variable. Neither the main effects nor the interaction was significant, indicating that the mean retention interval for each of the six subgroups (e.g., Repressor/Hypnosis) was comparable.

Next, each of the dependent measures from the Baseline written narrative recall was analyzed by a 2 x 3 ANOVA. With the exception of Attributional information, all effects were nonsignificant, indicating that the various subgroups were equivalent with respect to the information that they provided at Baseline. The finding regarding Attributional information consisted of a significant interaction involving Repressor status and Condition [$F(2,66) = 3.99, p < .05$]: While Repressors in the Control condition produced more Attributional statements than Nonrepressors during Baseline recall, the reverse was true of subjects in the other two conditions. As this difference was evident prior to the treatment phase, it is most likely due to chance (i.e., Type I error). On the other hand, the consistent absence of reliable main effects for Repressor status across the various types of information provided at Baseline indicates that Repressors did not manifest significantly poorer memory for the emotionally upsetting film than Nonrepressors, as previous research (e.g., Davis, 1987; Davis & Schwartz, 1987) had led us to expect. Nevertheless, the possibility remains that the film produced a more general recall deficit across Repressors and Nonrepressors.

Data Set #1: Changes in Total Information from Baseline to Posttreatment

Descriptive statistics for the total amount of each class of information provided at Baseline and Posttreatment are given in Table 1. Mixed model repeated measures ANOVAs were calculated for each variable, with the following results:

Total Information (Correct + Incorrect + Attributional + Confabulations)

Table 1

Mean Scores for Subjects in Each Group at Baseline (BL) and Following Treatment (FT) Using Data Set 1

Group	Total Information		Total Correct		Total Incorrect		Total Confabulations		Total Attributions	
	BL	FT	BL	FT	BL	FT	BL	FT	BL	FT

Hypnosis										
M	86.0	133.8	70.6	95.8	7.5	22.4	0.6	2.8	7.4	12.8
SD	21.4	39.9	18.0	23.5	4.4	17.4	0.9	2.5	5.3	7.0
Cognitive Interview										
M	83.4	111.0	64.2	80.3	10.1	18.5	0.9	2.2	8.2	10.0
SD	32.4	46.7	23.2	30.9	8.2	14.1	1.1	2.2	4.7	6.2
Control										
M	92.7	125.2	73.5	92.7	10.8	20.8	1.2	2.4	7.3	9.4
SD	22.9	31.7	18.2	22.3	5.1	10.4	1.6	2.1	3.4	3.8

increased from Baseline to Posttreatment [$F(1,66) = 89.98, p < .001$]. Moreover, the magnitude of increase in Total Information varied as a function of Condition [$F(2,66) = 6.97, p < .01$]. Newman-Keuls post hoc tests showed that the increase was greatest for the Hypnosis treatment and least for the Cognitive Interview, with the Control condition being intermediate but not reliably different from the other treatments. This indicates that the hypnosis treatment elicited differentially greater overall productivity.

Correct information also increased from Baseline to Posttreatment recall for all three Conditions [$F(1,66) = 85.58, p < .001$]. However, the magnitude of increase varied with condition [$F(2,66) = 5.16, p < .01$]. Post hoc tests revealed that the Hypnosis condition produced a greater gain in Correct information than either the Cognitive Interview or the Control condition, which did not differ from each other.

Similar general increases from Baseline to Posttreatment occurred for Incorrect information [$F(1,66) = 45.11, p < .001$], Confabulations [$F(1,66) = 30.76, p < .001$], and Attributional information [$F(1,66) = 11.29, p < .001$]. However, the Hypnosis interview was responsible for differentially greater increases in Incorrect [$F(2,66) = 4.47, p < .01$] and Confabulatory [$F(2,66) =$

3.01, $p = .056$] information than the other two Conditions, which did not differ on either measure.

In summary, for each dependent variable (except Attributional information), Hypnosis resulted in a significantly larger increase across tests than the other two conditions. That is, while Hypnosis led subjects to report more Correct information than either the Cognitive Interview or the Control condition, it did so only at the expense of a greater amount of Incorrect and Confabulatory information. The most parsimonious explanation of these findings is that hypnosis led to a general productivity increase: Subjects in Hypnosis gave more information -- Correct, Incorrect, and Confabulated -- than subjects in the other groups.

Although all conditions yielded an increase in absolute amount of Correct information, this "hypermnnesia" was to some extent misleading since the proportion of Correct recall, relative to Total recall, actually declined in a systematic manner [$F(1,69) = 75.39, p < .01$] from Baseline to Posttreatment for all three conditions. This effect was most dramatic for the Hypnosis condition [$F(2,69) = 4.52, p < .05$]. That is, 82% (70.6/86.0) of Total information provided at Baseline was Correct, while only 72% (95.8/133.8) of Total information following Hypnosis was Correct. This 10% decrease in the proportion of Correct information associated with Hypnosis is significantly greater than the approximately 5% drop corresponding to both the Cognitive Interview and Control conditions.

Data Set #2: New Information Generated During the Treatment Interview

Descriptive statistics for information, not reported at baseline, but provided for the first time following treatment, are presented in Table 2. Statistical analyses conducted upon the various classes of new information employed the strategy of covarying out the influence of subjects' baseline performance. The results of these analyses were as follows:

Total New Information (New Correct + New Correct (but noninformative) + New Incorrect + New Confabulations + New Attributions) differed as a function of interview condition [$F(2,65) = 8.05, p < .001$]. Hypnosis produced more Total New information than did either the Cognitive Interview or the Control condition, which did not differ. New Correct information also differed as a function of interview condition [$F(2,65) = 4.99, p < .01$], as did New Incorrect information [$F(2,65) = 4.63, p < .01$], and New Attributional information [$F(2,65) = 3.02, p = .056$]. Again, in each case, mean scores associated with Hypnosis were greater than those for the other two treatments, which did not differ.

No reliable effects were found involving either New Correct (but noninformative) information or New Confabulations, although in the latter case, the pattern of means corresponded to that described above and approached statistical significance [$F(2,65) = 2.62, p = .08$].

In summary, analyses using new information provide further support for the conclusion that the primary effect of Hypnosis was to enhance productivity, without regard to type of information. This was reflected in more Total New information, as well as more New Correct, New Incorrect, and New Attributional information being offered by subjects in the Hypnosis condition than by subjects in either the Cognitive Interview or Control conditions.

Table 2

Mean Scores for Subjects in Each Group Following Treatment Using Data Set 2

Group	New Total	New Correct	New Correct-NI	New Incorrect	New Confabulations	New Attributions
Hypnosis						
M	68.0_a	34.6_a	4.8_a	16.5_a	2.3_a	9.8_a
SD	29.3	12.2	3.8	15.4	2.4	6.1
Cognitive Interview						
M	46.3_b	22.7_b	4.8_a	10.8_b	1.6_a	6.5_b
SD	22.2	11.9	3.8	8.9	1.9	4.6
Control						
M	50.1_b	25.8_b	4.7_a	12.4_b	1.4_a	5.9_b
SD	20.4	10.0	3.1	7.3	1.8	3.7

Note. Within columns, means sharing the same subscript fail to differ significantly ($p < .05$). Correct-NI = correct noninformative information.

Forced Interrogatory Recall Data Obtained During the Postexperimental Interview

The third data set consisted of the total number of correct responses and associated confidence ratings given during the forced-recall questioning at the completion of the experiment. Seven clusters of questions, which pertained to different aspects of the film -- such as actions, and descriptions of persons and objects -- were also examined separately. None of these analyses produced significant main effects or interactions involving interview condition. Thus, for example, in terms of Total Correct, the means for the three conditions were virtually identical (Hypnosis = 37.5; Cognitive Interview = 38.0; Control = 36.6), as were the mean Confidence ratings (Hypnosis = 2.3; Cognitive Interview = 2.4; Control = 2.2).

The failure to find reliable differences among the three treatments on the forced-recall test would seem to securely establish the gains associated with Hypnosis on the preceding written recall as being due to productivity, and nothing more. That is, with differential productivity eliminated by the forced-recall method (i.e., each subject gives a single response to each question), all three treatments produced similar recall performance.

DISCUSSION

In this study, as in prior studies (e.g., Dywan & Bowers, 1983; Whitehouse et al., 1988), hypnosis was associated with a major increase in overall

productivity rather than a selective enhancement of correct recall. Thus, although hypnosis did produce gains in correct information, there was a corresponding and substantial increase in incorrect, attributional, and confabulatory material as well. Furthermore, the use of hypnosis occasioned comparatively more new information of each type than did either the cognitive interview or the control condition. The likelihood that these group differences are attributable solely to differences in productivity is solidified by results from the forced interrogatory recall test: When productivity was held constant by requiring all subjects to provide one response (excluding "I don't know") to each question posed, group differences involving correct and incorrect information disappeared. In sum, hypnosis did not enhance recollection relative to nonhypnotic treatments, it merely augmented subjects' willingness to report information, irrespective of its accuracy.

The evidence that hypnosis produced nonspecific increases in both correct and incorrect information implies that memories so obtained must be regarded as unreliable from the standpoint of the forensic context, where ground truth is frequently impossible to ascertain. Our findings support the position of many courts, which restricts the admissibility of hypnotically elicited testimony. Nevertheless, in light of the powerful effect that hypnosis has on recall productivity, it may, in certain cases, be tempting to use as a means of generating investigative leads in the hope that they can be corroborated by independent physical evidence. But such evidence may not be forthcoming, and often is not in actual cases. In addition, investigative applications of hypnosis need to be tempered by the knowledge that the testimony of a witness who has been hypnotized may be inadmissible given the courts' recognition of the inherent unreliability of hypnotically elicited memories.

Because the cognitive interview served as a second active treatment condition in the present study, and one that was specifically designed to facilitate memory retrieval, one must consider why the results achieved with this technique were consistently smaller in magnitude than those obtained with hypnosis. One plausible explanation is based on the observation that hypnotic procedures lead subjects to lower their report criterion. That is, as documented in prior work by our laboratory (Whitehouse et al., 1988), hypnosis often elicits information that was actually available to the subject beforehand, but which he or she was previously too uncertain about to report. While our data suggest that the cognitive interview may also lower subjects' report criterion somewhat, since both correct and incorrect information increased for this condition, it would appear from this study that this shift is smaller in magnitude than that produced by hypnosis. By this account, subjects administered the cognitive interview may have remained more reluctant than their hypnotic counterparts to write down information about which they were uncertain.

It is noteworthy that the greater productivity with hypnosis observed in the present study is at odds with the report by Geiselman et al. (1985), which failed to find reliable differences between hypnosis and the cognitive interview, both of which proved superior to a standard police interview. There are numerous methodological differences between the two studies that may have contributed to this discrepancy, including important differences between laboratories in the assessment of hypnotic ability and, possibly, the manner in which hypnotic procedures were applied.¹

One major methodological difference that we suspect played a significant role in our hypnosis results not being comparable to those of Geiselman et al. (1985) was the experimental designs employed. In the present study, the effects of hypnotic and cognitive interview treatments were assessed using a repeated-measures design that evaluated the interventions only after baseline recall was established. In contrast, Geiselman et al. (1985) used a between-subjects design that compared interview techniques without obtaining a prior baseline recall. Although we cannot be certain what results Geiselman et al. would have obtained had they used a repeated-measures design, we can reanalyze our data in a manner comparable to their approach, without regard to baseline performance. Accordingly, we examined Total, Total Correct, and Total Incorrect recall following treatment (see FT columns in Table 1), using one-way ANOVAs. No statistically significant differences emerged on any parameter among our three conditions. Notwithstanding the lack of a difference between the control condition and either hypnosis or cognitive interview at this one recall, a discussion of which follows, the apparent equivalence of hypnosis and the cognitive interview is now consistent with the report of Geiselman et al. It is, however, an illusion, since our analyses involving changes from baseline scores clearly demonstrate the greater effect of hypnosis on recall productivity. In this regard, evaluating the effects of hypnosis and the cognitive interview relative to a baseline measure of recall (i.e., repeated-measures design) provides a more sensitive test when considering whether various interview techniques differentially influence recall.²

The equivalent performance of subjects in the cognitive interview and control conditions was somewhat surprising. Given previous work with the cognitive interview, which consistently demonstrated the superiority of the technique over standard police interviews, one might have expected it also to have been more effective than the control condition used here. While it is possible that the cognitive interview was not administered properly in the current study, this seems unlikely. To begin with, we obtained a number of training materials directly from Drs. Geiselman and Fisher, which included published as well as unpublished detailed descriptions of the procedure, audiotaped examples of actual cognitive interviews, and a training film illustrating the technique. Additionally, our interviewers were trained to conduct each type of interview, were unobtrusively monitored through a one-way screen in order to help them refine their technique, and worked with a number of pilot subjects prior to the main study. Finally, if one ignores the problems of increased productivity, incorrect, and confabulatory material, and focuses only on correct information, then our use of the cognitive interview resulted in a 35% increase in cumulative correct information over baseline, which is well within the range of the increases cited for the cognitive interview over standard interviews in other relevant research (e.g., Fisher et al., 1987; Geiselman et al., 1985, 1986)

A more likely explanation is that the repeated-recall procedure of the present study rendered our control condition more effective than the standard interview typically used to evaluate the cognitive interview. Work by Erdelyi (e.g., Erdelyi, 1988) has demonstrated convincingly that, when subjects engage in repeated retrieval efforts, they are able to produce substantial increments in correct recall (i.e., hypermnesia). Perhaps most important in this investigation was the great care taken to maximize subjects' motivation and to establish the control condition as a plausible memory enhancement

technique. These measures were undertaken in order to ensure sustained effort across trials and lead subjects to expect their memories to improve. When evaluated against such an "active" control condition, it is perhaps not surprising that the cognitive interview did not fare as well as it has in other studies in which it was compared against what was described as a "standard police interview."

While the terminal performances of subjects in the cognitive interview and control interview were virtually identical, this does not necessarily indicate that the two interview conditions make use of the same underlying cognitive processes. Although the conditions were equated for the number of formal recall opportunities and, therefore, the potential for hypermnesia due to repeated retrieval attempts, they differed in terms of the explicit memory strategies employed. Thus, the cognitive interview attempts to make use of techniques to optimize the similarity of retrieval and encoding contexts and encourages different patterns of memory search. The control interview, on the other hand, which was designed primarily as a means to motivate subjects, may, nonetheless, have contributed to recall by breaking down unproductive mental sets between recall attempts. The equivalent performance of subjects in these two conditions may be taken to imply either (a) that the retrieval mnemonics utilized by the cognitive interview, as well as the distraction tasks of the control condition, produce equal increments over the effects of repeated recall alone, or (b) that the techniques embodied by the two interview conditions add nothing to what can be produced by repeated recall efforts per se. If the former possibility proves to be the case, this would suggest that the cognitive interview might derive additional benefit from formally adopting a multiple-recall structure that makes strategic use of distraction between each attempt to elicit new information. On the other hand, if the various mnemonic techniques intended to improve recall are in fact superfluous, then considerably more attention should be paid to devising strategies which will maximize subjects' motivation and help them to sustain a heightened level of concentrative effort over multiple recall attempts.

In conclusion, our findings confirm the prevailing scientific view that hypnosis is an unreliable memory "refreshing" technique. What these findings imply regarding the cognitive interview is less certain, however. When compared relative to the problems of increased errors engendered by hypnosis, the cognitive interview looks promising. But the credible and motivating control procedure was just as effective as the cognitive interview, and hence it is difficult to subscribe to the view that all of the beneficial effect of the cognitive interview is contained in the special memory techniques it utilizes. In fact, based on the results of the body of work we have conducted for NIJ over the past 6 years, we now feel there is considerable evidence to support the view that the systematic use of repeated recall efforts in motivated subjects may be far more important for eliciting increased memory than is the use of any special cognitive strategy.

FUTURE DIRECTIONS

The cognitive interview technique, developed by Drs. Geiselman and Fisher for use in law enforcement, marked a major advance in ways to help authorities derive the best possible eyewitness recall. To the extent that the technique is devoid of some of the problems that result from the use of hypnosis, as our data suggest, the cognitive interview is clearly an advantage over the use of

hypnosis to elicit recall. The issue now is whether we can continue to build on the gains afforded by the cognitive interview. Our results suggest a number of promising future directions for research on ways to further develop interview techniques that enhance eyewitness recall.

A major goal of the extensive study we completed was to compare hypnosis and the cognitive interview to a meaningful control interview, rather than simply showing what is already well established, namely that more productive recall is possible when these techniques are compared to a relatively inert procedure. Thus, creating a control interview that was believable, that held subjects' interest and maintained their motivation, that involved rapport with an interviewer, and that resulted in the same amount of recall time and effort was necessary to ensure that whatever effects were seen for hypnosis and the cognitive interview were not simply due to demand characteristics and the willingness of subjects to try hard to remember. To this end, we utilized a repeated recall procedure, known to result in sustained recall effort, that had the added advantage of keeping the recall time comparable to that obtained for the two treatment interviews. To make the control procedure credible we added distractor tasks between recall attempts that subjects readily accepted would help them remember. This control procedure did not involve, however, most of the explicit mentalistic strategies of the cognitive interview and it was devoid of the explicit reliance on mental imagery used in hypnosis. The results obtained, namely that the control procedure yielded recall as productive as the cognitive interview without some of the added problems of hypnosis, suggest that we may, in fact, have included in the control procedure the key elements of a successful wake recall increment -- that is, motivation, repeated effort, and personal belief that enhanced memory will result. This has now been demonstrated in three major studies we have conducted.

If one can achieve the same effects on recall with a motivated individual willing to repeatedly report everything (what we have come to call the Repeated Effort Procedure for Eliciting Additional Testimony, or "REPEAT" for short), as one obtains with a cognitive interview, then it is possible that a strategy could be developed that achieves optimum results without relying solely on cognitive strategies that require such unusual tactics as asking someone to recall something from the perspective of another person. The remarkable feature of REPEAT is that subjects may not at first be aware that they are actually recalling more information, but usually will produce more recall with repeated efforts, if the interviewer is supportive and urges the subject to continue reporting even after he or she feels as though memory is exhausted. There is considerable merit to testing the efficacy of REPEAT relative to the cognitive interview, not only because more information is sorely needed on the effect of various wake interview strategies on witness recall, but also because there is a need to resolve the cost of increased recall from such procedures in terms of confidence in memories and concomitant increases in memory errors and confabulations.

Although our results thus far are optimistic in terms of the effects of the cognitive interview and REPEAT procedures, it should be recognized that, in the most recent study, both procedures not only yielded more correct information, but also more incorrect information -- although not as much as hypnosis. This overall effect from increased productivity has not been adequately addressed in field studies of the cognitive interview. Yet it is a double-edged sword in that it brings both memory enhancement and the risk of

increased confabulation and error. Procedures are sorely needed to minimize the latter effect while maximizing the former. To achieve this end, one approach that we have adopted from the hypermnesia literature and utilized in earlier studies using the REPEAT protocol is to ask subjects during recall to list everything they can remember, then indicate when they are guessing (as they continue to try and report enough information to meet a predetermined criterion). When this is done repeatedly, subjects begin to supplant erroneous guesses and low confidence items with correct responses (resulting in hypermnesia), although they are not confident of some of the new correct responses. The end result, however, is a net increase in correct recall, without a concomitant increase in incorrect recall. This is precisely what appears to be needed as the next step in identifying ways to further improve the efficacy of wake interview techniques used by law enforcement agencies.

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Footnotes

¹ It is unclear from the report by Geiselman et al. (1985) what the mean hypnotizability was for subjects in each of their interview conditions. However, in view of their use of a brief assessment instrument, which correlates poorly with standardized scales of hypnotic ability (Orne, Hilgard, Spiegel, Spiegel, Crawford, Evans, Orne, & Frischholz, 1979), the sample in that study can be regarded as essentially unselected for hypnotizability, whereas our own sample was selected so that all subjects were at least moderately hypnotizable. Another possible source of difference may exist in the hypnotic procedures used in the two laboratories. This is especially likely since interviewers in the study by Geiselman et al. did not use a standard protocol when administering hypnosis, and, in fact, "to preserve ecological validity...were free to use whatever techniques they wanted to perform the hypnosis induction" (p. 404). Although interviewers in the present study also employed hypnotic techniques and metaphors often used in law enforcement (e.g., Reiser, 1980), since the hypnotic procedures were idiosyncratic to the hypnotists, it is not possible to compare their techniques with our standard protocol in order to evaluate any potentially important differences between the two.

² Unlike Geiselman et al. (1985), we compared recall reports before and after administration of the interview techniques rather than during the interviews themselves. It is conceivable that critical differences in recall existed between the cognitive interview and control or hypnosis interviews during treatment administration in this study. On the other hand, the use of a posttreatment recall is, in our opinion, more likely to simulate the real-world situation where a witness is interviewed using one of the techniques and then must offer a written statement and, later, recollections in testimony.