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Rainer, Deirdre Danette

EYEWITNESS TESTIMONY: DOES HYPNOSIS ENHANCE ACCURACY, DISTORTION, AND CONFIDENCE?

University of Wyoming

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EYEWITNESS TESTIMONY:

DOES HYPNOSIS ENHANCE ACCURACY, DISTORTION, AND CONFIDENCE?

by

Deirdre D. Rainer

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The present study investigated whether implanted false information and leading questions have more effect on high hypnotizables than lows during hypnosis in comparison to waking. One hundred low and high hypnotizables were assigned to five conditions: (a) waking, no false presupposition; (b) waking, with false presupposition; (c) hypnosis, no false presupposition; (d) hypnosis, false presupposition in waking; and (e) hypnosis, false presupposition in hypnosis. Subjects were shown a wallet snatching slide presentation, developed by Loftus et al. (1979). Subjects were tested on recall accuracy on a second day, using free recall and direct questioning. Hypnosis per se, or as moderated by hypnotic susceptibility level, did not have a significant effect on accuracy or the degree of responding to false presuppositions or leading questions. High hypnotizables had, however, significantly more accurate recall than lows across all conditions. Both hypnosis and hypnotic level were found to affect the confidence that subjects placed in their memories. High hypnotizables were more confident of their correct responses than lows in both waking and hypnosis. Both lows and highs showed significant increases in their confidence levels for correct responses in hypnosis. Highs became significantly more confident of their incorrect responses during hypnosis, while lows did not change. Similar shifts in confidence level also occurred for those who responded to false presuppositions and leading questions. Relationships between

memory accuracy, responsiveness to leading questions and false presuppositions, and measured visuo-spatial abilities (Mental Rotations Test, Map Memory Test, Vividness of Visual Imagery Questionnaire, and Individual Differences Questionnaire) were examined. There was one small, but significant, correlation between accuracy and the Vividness of Visual Imagery Questionnaire. Subjects who incorporated false presuppositions scored significantly lower on the Mental Rotations Test and showed a similar trend on the Map Memory Test than those subjects who did not incorporate false presuppositions. No visuo-spatial differences were found between those who did and did not respond to leading questions.

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CHAPTER I

INTRODUCTION

Hypnosis is often regarded by the general public as a powerful memory retrieval technique, capable of reactivating a person's long dormant memories with accuracy. Because of this, hypnosis has gained increasing popularity as a criminal investigative tool. Impressive case studies are provided from applied settings to support claims of its importance. Yet, in recent years, a series of court cases have questioned the validity and admissibility of such acquired testimony due to its apparent ability to reconstruct memory and thus change dramatically an individual's recollections (Orne, Soskis, Dinges, & Orne, in press). While a number of experimental studies have addressed the question whether hypnosis can create hypermnesia, only recently have a limited number of studies begun to examine the effects of hypnosis on eyewitness testimony.

Evidence that hypnosis actually increases recall is mixed (e.g., Depiano & Salzberg, 1981; Dhanens & Lundy, 1975; for review see Orne, Soskis, Dinges, & Orne, in press; Crawford, 1982). Deeply hypnotized people may embellish their memories with spurious information (Stalnaker & Riddle, 1932). They may decrease the accuracy of their memory when exposed to leading questions or false information (Putnam, 1979), yet remain confident that they remember correctly (Sheehan & Tilden, 1983). Extensive research reported by Loftus (1975, 1977) supports the idea that leading questions and false information can

alter a witness's memory of an event even in the waking state. Because hypnosis engenders a heightened state of suggestibility, this reconstructive ability of memory may escalate.

The research on the reconstructive nature of hypnotic recall is, to date, limited. The present investigation was an attempt to focus on the reconstructive possibilities, and to answer the following questions: Will hypnosis improve recall? Will hypnosis make subjects more likely to incorporate false information into their memory than if they were in the waking state? Will hypnosis make subjects more susceptible to leading questions than when they are in the waking state? Are hypnotized subjects more confident of their answers than waking subjects? Does high confidence reflect high accuracy? Does level of hypnotic susceptibility affect any of the factors above? Is there a relationship between accuracy of memory and visuo-spatial skills?

In the present chapter, an examination of those issues surrounding the use of hypnosis to enhance memory will be presented, particularly as it relates to eyewitness testimony. The chapter will review: (1) case studies as presented by police officers, psychologists and psychiatrists who serve as consultants to police departments in their investigations of crimes; (2) various court rulings surrounding the use of hypnosis; (3) the pertinent literature regarding the validity of age regression experiences; (4) an examination of studies which have addressed hypnotic hypermnesia; and (5) research which has addressed the influence of hypnosis on eyewitness testimony, and questions which are still to be answered regarding it in terms of moderating factors

of hypnotic level and visuo-spatial skill levels.

USE OF HYPNOSIS IN APPLIED SETTINGS

Perhaps the most common use of investigative hypnosis is to retrieve or "refresh" the memory of a witness or victim of a crime. In an attempt to facilitate recall of the crime, a witness is hypnotized and asked to view the incident as if watching a videotape. The witness can "zoom-in" on details of the crime, stop the picture at any point, and create an "instant replay" of the scenario. The technique, as outlined by Reiser (1976, 1980), is a type of "age-regression" designed to allow a witness to recall the events in question, often without reliving the emotional experience. Those in applied settings contend that this method is particularly effective when investigating violent crimes (Schafer & Rubio, 1978; Reiser, 1976) - rape, for instance. The hypnotist can elicit details of the assault, such as the description of the assailant, while blocking the victim's anxiety about the incident. In some cases, a more conventional form of hypnotic age-regression may be employed. The witness is hypnotically "regressed" to the scene of the crime, and asked to "relive," emotions and all, the events in question.

There is anecdotal evidence that hypnosis as a means of refreshing recollections has unearthed valuable clues in hard to solve crimes. Reiser (1976), for example, reports that hypnotic interrogation was 60% more successful than the traditional techniques in cases involving homicide, kidnap, and rape. Similar claims were made by Stratton (1977) who reported that 90% of hypnotic interviews involving crimes

such as murder, rape, kidnapping, and robbery proved helpful to investigators. Schafer and Rubio (1978) claim that their use of hypnosis with victims and witnesses has been highly successful. They cite that out of fourteen cases, ten were substantially assisted by material gained through hypnosis. Kroger and Douce (1979) describe a number of cases in which hypnosis provided the investigative direction that led to solution of major crimes. They estimated that new, but not necessarily accurate, information or novel investigative leads were provided in 60% of the 23 FBI cases that they studies.

The now famous Chowchilla kidnapping case is an excellent example. In July of 1976, a busload of children were abducted and held captive in a camoflouged ditch. The victims succeeded in escaping, but neither the children nor their busdriver could remember anything about their abductors. The busdriver was hypnotized, and was then able to recall the numbers of two license plates. One of these, correct to a digit, proved to be the license plate number of the kidnappers' van. Similarly, in the case of the Boston strangler, hypnosis provided information that led to incontrovertible physical evidence that expidited the killer's arrest (Orne, Soskis, Dinges, & Orne, in press).

The cases cited above demonstrate a fortuitous use of investigative hypnosis. The technique can be used to develop investigative leads where little or none exist. When the facts of a crime are not known by investigators, there is minimal risk of "confusing" a hypnotized witness with preconceptions or hunches about the identity of a suspect. In contrast to this investigative use of hypnosis are

situations where the technique is used to prepare an eyewitness for courtroom testimony. This may be particularly dangerous if hypnosis is used to "refresh" the memory of a witness or victim when facts about the case are already known or presumed by authorities, the media, or the hypnotist. It is possible, in such situations, that false memories could be permanently "contaminated." The hypnotized person may confuse information heard with what he or she actually experienced and remembers about the event. Evidence indicates that once memories are thus transformed, they are presented as if they were actual representations of the facts (Loftus, 1975).

Another inappropriate use of hypnosis in legal cases is when it is used to establish the reliability of a witness's testimony, particularly when the witness has changed his or her story several times (Orne, Soskis, Dinges, & Orne, in press). Reviewing the events in hypnosis may fix one particular version of the testimony in the mind of the witness. When cross-examined, the witness, who might otherwise express some doubt in his reported memories, would appear confident and credible.

While it appears that hypnosis can provide an important tool in enhancing the recall of crimes for witnesses and victims, some members of the scientific community warn of inherent complications in the use of forensic hypnosis. They point to recent research indicating that the content and accuracy of hypnotically obtained recall may be distorted. Research conducted to determine the extent of these problems will be discussed in later sections.

THE ADMISSABILITY OF HYPNOSIS IN THE COURTROOM

The issue of whether or not hypnosis facilitates the accurate retrieval of forgotten events or whether it alters memories has been the subject of considerable legal concern within the criminal justice system. The basic issues facing the courts and the consequent decisions have been detailed by Orne, Soskis, Dinges, & Orne (in press), as well as Karlin (1983). Based on expert testimony about hypnosis, the courts must decide if hypnotically enhanced recall is sufficiently reliable to present as evidence to a judge or jury. The primary concern involves the admissability of testimony given by witnesses and victims who have participated in pretrial hypnosis to "refresh" recall. Those who wish for the exclusion of hypnotic testimony argue that the procedure is unreliable, and that the consequent testimony based on it is unreliable and therefore inadmissable as evidence. On the other side there are those who point out that hypnosis is only one of several procedures used to refresh memory, and it should be permited under the rules of evidence and left to the trier of fact to decide its credibility (Orne, et. al., in press).

The first major precedent concerning hypnotically enhanced recall was set by the Maryland Special Court of Appeals in Harding vs. State (1968). Although the court expressed some concern about the potential difficulties and problems, hypnotically aided recall was deemed admissable. The difficulties that hypnosis might cause should go to the weight of the evidence and be decided upon by judge or jury as the trier of fact. Following this decision, the use of hypnosis in legal

issues increased, and a number of other courts decided to allow hypnotically refreshed testimony before a judge or jury.

However, because the reliability of hypnotically enhanced recall has not been established in the scientific literature, its use has recently been seriously questioned by other courts. One concern voiced by the courts is that hypnotically gained testimony may not always be accurate. The Minnesota Supreme Court ruled in State v. Mack (1980) that testimony gained through hypnosis was inadmissable because of inherent reliability problems. The court expressed concern that hypnosis could increase witness' level of suggestibility, and create false recollections which the witness is quite certain are correct. Further, it held that a jury could not be expected to make the difficult decision of whether or not a given statement by a witness was the result of a particular hypnotic intervention. Relying on a precedent set by Frye v. United States (1932) - which concerns whether a special procedure has gained acceptance among the scientific community of the particular field to which it belongs - the court ruled that hypnosis had not been accepted by the scientific community as a reliable means of increasing recall. All testimony from hypnosis had to be excluded.

Since the Minnesota ruling, the Supreme Courts of Nebraska, Indiana, Pennsylvania, Arizona, California, Massachusetts, and New York have taken a similar point of view and have excluded hypnotically enhanced testimony. The changes that have taken place in Maryland concerning hypnotically "refreshed" testimony exemplify the trend of the courts

with respect to the adjudication of this issue. The Special Court of Appeals of Maryland, which originally permitted the use of hypnotically enhanced testimony (State v. Harding, 1968), has recently reversed itself (Collins v. State, 1982). The court concluded:

> After a complete and careful review of the record in this case, as well as the decision of other jurisdictions and the scientific literature which has been called to our attention, we are convinced that applying the standards explicit in Frye for the use of hypnosis to restore or refresh the memory of a witness is not accepted as reliable by the relevant scientific community and that such testimony is therefore inadmissable. To the extent that previous cases in this jurisdiction have permitted the admissability of hypnotically induced testimony, we hereby overrule those cases. (pp. 20-21)

The court not only ruled that hypnotically influenced testimony was inadmissable, but also required that even when hypnosis is used strictly for investigative purposes, certain procedural guidelines must be followed.

These guidelines, as proposed by Orne (1979), call for a record, preferably on videotape, of the hypnotic procedure so that independent experts can evaluate the procedure by which memory was enhanced. The hypnotic session should be conducted by a qualified mental health professional with training in clinical and forensic hypnosis. This individual should be an impartial expert who knows little or nothing about the case. Only the hypnotist and the subject should be present during the hypnotic sessions.

Rather than include or exclude all hypnotically enhanced testimony, some of the courts base its admissability on compliance with

these safeguards. The New Jersey Supreme Court (State v. Hurd, 1981), for instance, holds such an opinion. The New Jersey Court ruled that each case would receive individual consideration and admissability of hypnotic testimony would be based on what had been done in each specific case.

The Supreme Court of Wyoming also recently revised its opinion from admitting hypnotically enhanced testimony as a matter of law (Chapman v. State, 1982) to requiring "that the hypnotist have some qualifications and that some safeguards or verification of procedures be followed" (Fong Gee v. State, 1983). However, unlike the "Hurd" decision, the guidelines regarding hypnotic testimony remain very vague, and this may make the decision equivalent to having no safeguards at all.

The legal positions taken by the various courts to include, exclude, or require guidelines for hypnotic testimony have ruled primarily on testimony resulting from a pretrial hypnosis intervention. However, another issue now facing the courts is whether to allow as admissable recollections made by a witness prior to hypnosis. The Arizona Supreme Court had modified its decision of total exclusion (State v. Mena, 1981) to permit testimony that a witness was able to recall prior to hypnosis (Collins v. State, 1982). It is unclear, however, whether a witness can distinguish between recollections made prior to hypnosis and those reported during or after hypnosis (Orne, Soskis, Dinges, & Orne, in press). There is likely to be continued controversy on this point.

HYPNOTIC AGE REGRESSION

The use of age regression in hypnosis has been a well known practice since the days of Sigmund Freud. Freud (1953) initially utilized hypnosis to help neurotic patients relive traumatic childhood events. The rekindling of the original traumatic event, Freud believed, could help cure hysterical symptoms. When hypnotically age regressed, patients seemed to return in time and experience powerful emotional reactions. Sometimes, patients would actually report minute details about their surroundings, as if they could see the rooms and people of their past. Later, after Freud had discarded hypnosis as a treatment technique, he acknowledged that the material that emerged from these age regressions, while convincing, was not always historically accurate.

Hypnotic age regression seems to return a person to an earlier time. Under hypnosis, a person can be told he or she is seven years old, and consequently will begin to talk, act, and even think like a seven year old. If told that he or she is sitting in a second grade classroom, a person can remember the neames of classmates, describe their appearance, and produce other detailed information about the event. If given a pencil and asked to write one's name, the signature will appear to approximate the writing of a second grader.

The performance is convincing, but is the material accurate? Does the age-regressed person reinstitute the memory traces of the events that he "returns" to under hypnosis? Or is this a role-play of what he thinks he was like at a given age?

Fromm (1970) addressed these questions in her fascinating case presentation of a Japanese-American boy who, through hypnotic age-regression, recovered a forgotten childhood language. "Don," who was born a few days before Pearl Harbor, spent his early childhood years in a relocation center where Japanese was the predominant language. Despite his initial exposure to his native language, Don was entirely English speaking and thought he knew no Japanese. When hypnotically age regressed to below four years old, he spontaneously and unexpectedly spoke Japanese. Fromm believed that role-playing alone was an insufficient explanation for the fact that Don spoke and understood Japanese when regressed to ages two and three years old, but never at ages seven or eight, even when he was encouraged. She makes the point, that if the age regression had been merely reflections of the subject's adult concepts of his childhood, then Don would have spoken in English not Japanese.

Just what is really going on in hypnotic age regression remains a matter of speculation. Weitzenhoffer (1953) and Hilgard (1965) believed that most cases of hypnotic age regression included an element of "role-play" as well as an actual "return" to an earlier phase of development. Reiff and Scheerer (1959) conducted an investigation concerning the cognitive functioning of hypnotically age regressed individuals. They hypothesized that forgotten childhood memories would be recalled if the subject could return to the mode of cognitive functioning used at the time the memories occured. The experimenters hypnotically regressed five highly hypnotizable subjects

to ages ten, seven, and four years. As a control, they used three comparable age groups of nonhypnotic subjects instructed to act as if they were hypnotized. These they called simulators. All subjects were administered Piaget-like tests, word association tasks, and behavior exercises. It was believed that subjects would have no prior knowledge of how to respond age-appropriately on the various tests and tasks. The results of the study demonstrated that regressed subjects tended to function at a cognitive level consistent with the experimental age, while those who were instructed to "role-play" tended to function above the experimental age level. The results imply that age regressed subjects are not merely acting "childlike," but are re-enacting a more primitive cognition, one that can not be paralleled in the waking state.

Reiff and Scheerer's results did not go uncontested. O'Connell, Shor, and Orne (1970) challenged the findings in a very complex and comprehensive replication study. They pointed out that the original study had methodological problems. To begin with, the simulators knew they were acting as control subjects, and that the experimenter was aware of it, too. O'Connell et. al. suggested that such a situation could result in an unconvincing role performance on the part of the simulators. Furthermore, the original study used a different group of simulators for each age category, but the same five hypnotic subjects throughout the study. Inherent in this design, O'Connell et. al. insisted, were demand characteristics that could have produced differences in performance between the experimental and the control

groups. For one thing, hypnotic subjects had an opportunity to play age 10, then 7, etc. They might have had a guage at age ten, and then lowered their behavior to an earlier level. Controls did not have this opportunity. Also, the preliminary screening sessions of hypnotic subjects might have provided the experimenter an opportunity to unconsciously influence the subjects to perform as desired.

In an attempt to mitigate these methodological "flaws," as well as replicate the study, O'Connell et. al., retained the original design, but they added new comparison groups. The replicated study included the age regressed group (hypnosis), a group of very low hypnotizables (crypto-simulators), a control group required to play all three ages, and three control groups corresponding to those in the original study. Additionally, many of the tasks were administered to a group of real children whose ages corresponded to the experimental categories. Care was taken to insure that the experimenter did not know the hypnosis group from the crypto-simulators. Results indicated the behavior of the hypnosis group was essentially the same as those who participated in the Reiff and Scheerer study. However, the crypto-simulators could not be differentiated from the deeply hypnotized group. Furthermore, both groups behaved differently (at an older age) than real children at the regressed age when compared on a number of parameters.

Orne (1979) states that the results of this study demonstrate that it is possible to simulate hypnosis, but that hypnosis is not necessarily simulation. He writes:

> The fact that these individuals, without hypnosis, were able to produce the behavior of the hypnotized individuals conclusively demonstrates that, given the identical treatment, unhypnotized subjects can figure out the kind of responses that appear appropriate on the experimental tasks. (p. 538)

Orne acknowledges that the "simulating" procedure does not really address what mechanisms are actually involved in hypnotic age regression. Deeply hypnotized and simulating subjects may produce the same behavior, but through different cognitive processes. In fact, Orne believes that what the age regressed subject experiences is, at least subjectively, quite real. The subject combines random memories from the time period suggested, includes other available information and current conceptions of age-appropriate behavior, and creates a genuine hallucinatory event. While age regression probably cannot be reduced to mere role play, neither is it a revival of an earlier phase of development. Consequently, the information recalled during age-regression may contain confabulation. The remembered details may not be accurate, despite the hypnotic subject's conviction that they are.

In reviewing the hypnotic age regression studies, Orne (1981) concludes:

> The hypnotic suggestion to relive a past event, particularly when accompanied by questions about specific details, puts pressure on the subject to provide information for which few, if any, actual memories are available. This situation may jog the subject's memory and produce some increased recall, but it will also cause the subject to fill in details that are plausible but consist of memories or fantasies from other times. It is extremely difficult to know which aspects of hypnotically aided recall are historically accurate

> and which have been confabulated (Orne, 1981, p. 72).

Orne warns that subjects may weave truth and confabulation together in an unpredictable fashion. Sometimes the hypnotic recall may be confabulated, while at other times historically accurate.

The classic study done by Stalnaker and Riddle (1932) demonstrates that confabulation under hypnosis can, and does, occur. The authors age regressed deeply hypnotized subjects to the time when they had learned poetry or similar material, at least a year prior to the experiment or as far back as grade school. Under hypnosis the subjects thought that they recalled the material with greater ease and accuracy than in the waking state. However, closer examination of the results demonstrated that subjects did not always accurately recall the material, but they mimicked the author's style, using erroneous words and phrases. For instance, one subject could not recall the second stanza of Longfellow's The Village Blacksmith in the waking state. In hypnosis, he recalled the second stanza as follows:

> The smithy whistles at his forge
> As he shapes the iron band;
> The smith is very happy
> As he owes not any man.

What at first seemed like greatly enhanced recall, was, in fact, the subject's impressive ability to mimic Longfellow's style. Longfellow's actual stanza was written:

His hair is crisp, and back, and long,
   His face is like the tan:
His brow is wet with honest sweat,
   He earns what e'er he can,
And looks the whole world in the face,
   For he owes not any man.

Stalnaker and Riddle note that their deeply hypnotized subjects seemed less critical but more confident of the recalled material. Although a subject might construct a verse like the one above, he would believe that he had remembered the poem correctly.

Orne (1979) believes that a hypnotically age regressed subject may make up suitable memories, using whatever information is available, in an effort to comply with the hypnotist's demands. Loftus (1980) supports Orne's position, and postulates that confabulation in hypnosis takes place because a person undergoes a "criterion shift." That is, when hypnotized, the individual wants to please the hypnotist, and behave in a manner that he or she perceives as the "right" behavior. The "good" hypnotic subject thinks he should be relaxed, willing to concentrate, and produce information that is pleasing to the hypnotist. Even very subtle communications from the hypnotist can influence a subject's desire to comply (e.g. Sarbin & Coe, 1972). This type of compliance is particularly a problem in a forensic situation where evidence about a crime may rest on the memory of the hypnotized witness. The witness about to be hypnotized may have expectations and preconceptions that hypnosis will help him remember things that were not remembered without it. Such prehypnosis beliefs can increase the subject's willingness to produce the desired

and expected effects (e.g., Zamansky, Scharf, & Brightbill, 1964).

HYPNOTIC HYPERMNESIA

Whether or not hypnosis actually improves memory has not been clearly demonstrated experimentally. Numerous studies have shown that hypnosis is generally not an effective technique to enhance recall of nonsense material (Huse, 1930; Rosenthal, 1944; Rosenthal & London, 1963; Barber & Calverley, 1966; Dhanens, 1973; Dhanens & Lundy, 1975). Nor has hypnosis been found to aid the memory of lists of common words unless those words are learned under "stress" (Rosenthal, 1944). Rosenthal (1944) told subjects that recall of words interspersed in lists of nonsense syllables constituted a test of intelligence. Although hypnotic and waking recall of the words did not differ on the first trial, subjects who were hypnotized at a later date did significantly better than those in a waking state when given a chance to improve their scores.

Hypnosis has been found to enhance the recall of meaningful material. The early studies often showed impressive results, but were frequently based on a small number of subjects or had other methodological problems. Stalnaker and Riddle (1932), for instance, report that their subjects recalled prose and poetry significantly better in hypnosis than in the waking state. However, as previously discussed, along with increased recall came an increase in material, much of it confabulated. White, Fox, and Harris (1940) followed up with a more complex study comparing recall of nonsense syllables, poetry, and moving picture scenes. While nonsense material did not

show hypermnesia under hypnosis, poetry was enhanced by 53%. The results concerning motion picture scenes showed hypermnesia for individual subjects, but was not significant overall.

Rosenthal (1944) tested 13 subjects for recall of poetry twenty-four hours after they had learned it. Subjects serving as their own controls, were tested for recall in both waking and hypnotic state. Results were that hypnotized subjects recalled more words under hypnosis than when in a waking state. This was in contrast to the non-significant results found when he asked subjects to recall nonsense syllables or words embedded in nonsense syllable lists.

Sears (1954) demonstrated that hypnosis enhanced recall when he displayed a number of familiar items on a table and asked subjects to recall what was there. Twenty-four subjects were given 30 seconds to look at the objects and then were tested for recall over three different time periods: immediately following learning, one week later, and three weeks later. In each session, recall was tested first in the waking state and then in hypnotic state. Results showed significance for hypnotic recall in each time period. Because subjects were always asked to recall material in first the waking and then the hypnotic state, the possibility exists that subjects might have shown improved recall when assessed the second time, regardless of hypnosis.

Taken as a group, the early hypermnesia studies involving meaningful material suggest that hypnosis may enhance recall. However, Barber (1965; Barber & Claverley, 1966) reviewed these early studies and pointed out methodological flaws that he believed rendered the

results unreliable. He suggested that hypnotic and waking subjects were selected and treated differently. For instance, hypnotic subjects were selected for their level of hypnotizability while waking subjects were not. Furthermore, suggestions for improved performance were often given to hypnotic subjects, but not to those in the waking condition. Even the tone of voice of the investigator could be a source of experimental bias. The experimenter might unwittingly communicate expectations by being more emphatic and expectant when delivering suggestions to hypnotized subjects. Barber (1966) also criticized the practice of closed eyes for hypnotic subjects, while the eyes of waking subjects remained open. This, he claimed, might deprive waking subjects of the opportunity to shut out distracting stimuli, and so might negatively affect their recall abilities.

Barber pointed out the need for greater experimental controls in studies of this nature. In so doing, he reported his own study that rectified some of the design flaws that he had criticized. Ninety subjects were assigned to nine experimental groups with ten subjects in each group. He provided task-motivating instructions to the waking conditions, controlled for distracting stimuli by having waking subjects close their eyes, and randomly assigned unselected and untrained subjects to the treatment groups. The results of Barber's study demonstrated no significant differences between hypnotic recall and waking recall. However, the test of recall was based on nonsense material even though previous research had suggested that hypnosis is only effective with recall of meaningful material.

Noting this drawback, Cohen (1972) patterned his dissertation research after the Barber and Calverley (1966) study. He utilized many of the methodological controls that they suggested, but instead of nonsense material, Cohen employed a prose passage for the original learning situation. The results of the study failed to demonstrate that recall of meaningful material is facilitated by hypnosis alone or combined with age regression suggestions. What Cohen did find was that highly hypnotizable subjects, when regressed, with or without hypnosis, experienced a profound feeling of having been back in time.

A study by Cooper and London (1973) also failed to demonstrate the effects of hypnotic hypermnesia. Fifty two subjects were given five minutes to read an article about a rare chemical. Recall immediately after learning showed no significant differences between the hypnotic and waking conditions. Subjects were asked to recall material again two weeks later in both the hypnotic and waking conditions in a counter-balanced sequence. The difference between hypnosis and waking recall was not significant, and the authors concluded that "hypnosis does not affect the memory process," at least for this particular type of learning. One could argue, however, that an article about a rare chemical has minimal meaningfulness for the average reader, and is more akin to nonsense syllables or lists of words. It is interesting to note that in the original learning situation, a few students recalled the information about the rare chemical much better than the majority. The students with better recall were, it was discovered, enrolled in a chemistry course.

Consequently, these students were excluded from further participation. One can only speculate on how the outcome would be different if a passage about rare chemicals had been given to students interested in chemistry.

It should be pointed out that Cooper and London (1973), as well as Cohen (1972), asked subjects to recall information by using a short-answer response format rather than a free-narrative inquiry. All previous studies that demonstrated enhanced hypnotic recall had utilized a free-narrative recall format. The use of free recall as opposed to a short-answer response format will be discussed in some detail later.

Another study that incorporated Barber and Calverley's suggestions about experimental design was done by Dahnens and Lundy (1975). This comprehensive study investigated hypnotic susceptibility, motivation, and relaxation of suggestions on recall of meaningful and nonsense material. High and low hypnotizable subjects were assigned to one of six experimental conditions: 1.) hypnosis plus motivating instructions, 2.) motivating instructions without hypnosis, 3.) hypnosis plus age-regression, 4.) age-regression without hypnosis, 5.) relaxation, and 6.) no treatment control. Subjects were asked to learn a short biographical sketch and 13 nonsense syllables. Recall took place under free-recall conditions, first in waking, and again one week later in one of the experimental or control conditions. The results of the study support the finding that hypnosis can significantly enhance memory under certain conditions. Recall was only

demonstrated for highly hypnotizable subjects who were given hypnosis plus motivating instructions. Furthermore, the increase in recall was only demonstrated for meaningful material, not for nonsense syllables.

Stager (1974) demonstrated that hypnosis could increase recall for highly hypnotizable subjects even without specific task motivating instructions. He compared high and low hypnotizables both in waking and hypnosis on the learning and recall of visually presented material. No differences existed between groups in the learning phase, but when asked to recall the material, highly hypnotizable subjects in hypnosis remembered significantly more than any of the other groups and made less errors than high hypnotizables in the waking state or the low hypnotizables in hypnosis.

What is unique about this study is that Stager was the first to demonstrate hypnotic hypermnesia utilizing a probed recall format. He asked specific, but open-ended questions instead of allowing subjects to freely recall material. As mentioned, other studies demonstrating hypnotic hypermnesia had utilized a free-recall format. Typically, in these studies, enhanced recall was based on the number of accurate details a subject recalled, with no regard for increase of inaccurate information. For instance, the Stalnaker and Riddle (1932) study demonstrated the subjects recalled more in hypnosis, but they also produced more material in general, much of it confabulated. The point has been made (Orne et. al., in press) that a free recall format does not really measure hypnotic hypermnesia, but reflects a subject's reduced critical judgement in hypnosis. When given the opportunity to

freely recall learned information, the subject will volunteer more information and include details that, in the waking state, he might reject as too uncertain to report. An increase in accurate and inaccurate information may result, not because of enhanced memory, but because of a relaxed reporting style. If this is the case, Stager's research is, at least for Orne, the strongest evidence of hypnotic hypermnesia to date.

But the question remains, why had the other studies that utilized a probed recall format failed, while Stager succeeded in demonstrating hypnotic hypermnesia? One possibility is that hypnotic hypermnesia was not really demonstrated and that Stager's results are an artifact of the experimental design. Orne suggests that Stager was able to demonstrate hypnotic recall because his questions were worded so that they provided subjects with "extensive and accurate information about the circumstances to which the subject was required to add additional detail" (Orne et. al., in press, p. 31). He believes that hypnotized individuals might be more responsive to these retrieval cues than those in the waking state.

On the other hand, Stager's positive results for hypnotic recall might be more parsimoniously explained. Although he used a probed response format, his questions were open ended and sufficient in number (40 questions were asked) to allow subjects to demonstrate the enhanced memory which may have occured. In contrast, Cohen (1972), who did not demonstrate hypnotic hypermnesia, asked only 15 questions and utilized a very structured, fill-in-the-black response format

(i.e., "Currently, Billy feels very lonely.") Thus, while subjects may have remembered additional information, they were not asked about it.

At present, these issues remain unclear. However, it seems that the more structured and restricted the response format, the less likely that hypnotic hypermnesia will be demonstrated (Relinger, 1983).

Recently, the literature assessing hypnotically enhanced recall has focused on simulated crimes as the material to be recalled. Such variables as hypnotic level, stress level, task-motivating instructions, and the effects of regression suggestions without hypnosis have been manipulated.

Shaul (1978) tested recall of high, medium, and low hypnotizable women who had viewed both a high stress film and a low stress film. Twenty-four hours after they had viewed one of the films, they were asked to recall the material in one of three conditions: 1.) hypnosis plus cognitive recall instructions, 2.) cognitive recall instructions without hypnosis, and 3.) a no treatment control. Cognitive recall instructions included the "zoom" in on details and other techniques outlined by Reiser (1974). Recall was tested under either free narrative or direct questioning (moderate in structure) conditions. Results indicated that high hypnotizables benefited from receiving a hypnotic induction, but their performance was equal to those who had received the cognitive strategy alone. With respect to the format of the recall questionnaire, direct questioning provided greater recall productivity with fewer inferences for each group than narrative reporting. However, fewer items were recalled incorrectly by each group under narrative conditions. There were no significant differences in the

amount recalled correctly under direct questioning and narrative reporting.

Timm (1981) examined the differences between hypnosis and regression techniques. He staged a mock assassination for 45 college students and asked them to recall it two months later. Subjects were in one of three conditions: 1.) hypnosis with regression, 2.) regression alone, and 3.) waking interrogation. Recall was measured by a series of open ended questions and 38 multiple choice items. Results revealed a trend for increased accurate recall on both questionnaires for hypnosis with regression as well as regression alone. Although the regression procedure improved recall without hypnosis, it is possible that, given highly hypnotizable subjects, the regression suggestions induced a hypnotic trance. Although the number of inaccurate responses did not differ among the three groups, Timm reported that confabulated details emerged when subjects were asked open-ended questions in the hypnotic state.

Depiano and Salzberg (1981) focused their research on hypnotic recall learned under varying arousal conditions: traumatic arousal, sexual arousal, and low arousal. Subjects were asked to recall information that was incidental (posters hung on the wall), meaningful (one of the three arousal films), and verbal material that was presented simultaneously to the film. Testing for recall was oral in either the hypnotic or waking conditions. Subjects were asked to complete phrases and supply short answers to open-ended questions. Results revealed that hypnotized subjects yielded significantly greater

recall than waking subjects in all three types of material. Similar to Shaul's (1978) results, the type of arousal had no significant effect on hypnotic recall.

Finally, Dywan and Bowers (1983) studied hypnotic hypermnesia over time in high and low hypnotizables. A series of sixty black and white drawings were presented followed by the Vividness of Visual Imagery Questionnaire (VVIQ; Marks, 1973). Fifty-four subjects were asked to recall the material over a period of six days. Prior to a final recall on the seventh day, they were given either hypnotic induction or waking task motivation instructions. High hypnotizables who were given a hypnotic induction recalled significantly more new material than those highs given task motivating instructions and more than low hypnotizables in either of the experimental conditions. However, they also reported almost three times as many false memories as task-motivated high subjects or lows in either condition. Post-hoc analysis of the VVIQ indicated that visualization ability may be an important variable modifying the relationship between hypnosis and recall. The authors hypothesize that hypnosis enhances visual imagery and that this enhanced vividness generates a "sense of recognition" not only to stimuli that are presented but to associated stimuli as well. Thus, "enhanced vividness could lead to a false sense of recognition and hence the inflated output as well as the surprising certainty that subjects have about their hypnotically enhanced recall," (p. 11).

In sum, hypnotically enhanced recall has not been clearly demonstrated in the scientific literature. Hypnotic hypermnesia has occurred, however, at times for meaningful material under some conditions but not for nonsense material or paired associates. The hypermnesia effect is shown most consistently for subjects who are highly hypnotizable and who are asked to recall material in a loosely structured or free recall format. Increased memory for these subjects seems to be accompanied by an increase in recalled material in general, an increase in false memories, as well as a subjective feeling that what they remember is correct even though it may not be.

Speculation about the underlying mechanisms of enhanced recall and confidence in hypnosis suggests that a deep hypnotic trance may heighten a subject's visual imagery abilities. Crawford and Allen (1983) suggest that highly hypnotizable subjects may experience a shift from a more detail-oriented strategy in waking to a more visual, holistic strategy in hypnosis, resulting in significantly enhanced memory performance. Crawford, Nomura, and Slater (1983) linked this ability to shift into a more holistic-oriented strategy in hypnosis with subsequent enhanced performance on a spatial memory test.

Crawford and Allen (1983) speculate that the changed cognitive processing noted in their highly susceptible subjects in hypnosis may be the result of a shift in hemispheric dominance. Recent research supports this hypothesis. When highly hypnotizable subjects enter into hypnosis, their EEG patterns have been shown to shift dominance from the left (or dominant) to the right hemisphere (Chen, Devorkin,

& Bloomquist, 1981; Karlin, Cohen, & Goldstein, 1983; MacLeod-Morgan, 1982).

HYPNOSIS AND EYEWITNESS RESEARCH

Experimental Studies Involving Hypnosis

Despite the conflicting evidence from experimental hypnotic hypermnesia studies, there is considerable anecdotal evidence from applied settings about the effectiveness of hypnosis as an aid to recall. It is not surprising that hypnosis may be very attractive to law enforcement personnel as an investigative tool. However, whether or not hypnosis actually improves memory has not been clearly demonstrated experimentally. Furthermore, confabulation in hypnosis has occurred in several experimental studies, and the conditions of such confabulation are not clearly understood. Given this situation, perhaps the most suitable use of forensic hypnosis is to develop investigative leads where none exist. "Uncovered" information is essentially equivalent to an anonymous tip, and it is used only in collaboration with other evidence. Unfortunately, because eyewitness testimony is frequently inaccurate (Loftus, 1982), some investigators hoped that hypnosis could increase eyewitness accuracy and be used to "refresh the recollection" of a witness to a crime. The potential danger of this practice is underscored by Karlin (1983) who describes two criminal cases in which hypnotic testimony was utilized. In each case the victim had identified a perpetrator only during hypnosis inquiry. These identifications lacked supporting evidence but provided the sole evidentiary bases of the prosecution's argument. Karlin

summizes that both identifications were based on confabulations.

Research has begun to focus not only on hypnotic hypermnesia, but also on the reliability of the information obtained through hypnosis, and whether hypnosis of hypnotic susceptibility makes subjects more confident of their memory, independent of accuracy.

The first study to address these issues was pilot in nature. Putnam (1979) assessed whether eyewitnesses questioned during hypnosis were more likely to answer leading questions incorrectly when compared to eyewitnesses in the waking state, and whether hypnotized subjects were more confident of their responses. Putnam presented 16 subjects, whose mean Stanford Hypnotic Susceptibility Scale, Form A (Weitzenhoffer & Hilgard, 1959), scores were in the eight point range, with a video-tape of a car-bicycle accident. Two of the groups, one during hypnosis and the other during waking, were administered a questionnaire fifteen minutes after viewing the viedotape. The other two groups answered the questions, in hypnosis or waking, the following day. The questionnaire consisted of fifteen items, including six leading questions. Five of the leading questions were worded to replace the article "a" with "the." The sixth leading question asked subjects to describe the witness and to specify her hair color. This was considered a leading question because prior to examination, the examiner asked whether subjects had recognized any of the people in the videotape, "for example, the driver of the car, the blond woman who witnessed the accident, or the bicycle rider?" The witness in the videotape was, in fact, an oriental woman with jet black hair.

Contrary to expectations, on the objective questions, results showed no difference between subjects questioned under hypnosis and those questioned in a waking state. This suggests that hypnosis did not enhance recall of these subjects. However, when answering leading questions, hypnotized subjects made significantly more errors. Moreover, hypnotic subjects were just as confident of their answers as the more accurate, fully awake subjects. When asked the question regarding the color of the witness's hair, two of the hypnotized subjects remembered the hair color as blond. None of the waking group reported that the witness had blond hair. Confabulation of material also took place. Changing the article "a" to "the" led some of the hypnotized subjects to construct details. For example, asking subjects if they saw "the license plate" (which didn't exist on the videotape) elicited an affirmative response from some of the hypnotized group. They also offered partial descriptions of the license plate number. One subject remembered a license plate beginning with a W or V. The subject later explained that she remembered it because a friend's license plate began with the same letters.

Zelig and Beidleman (1981) replicated Putnam's study, but presented material that they hoped would be more emotionally involving, and hence more analogous to witnessing an actual crime. The study examined the relationship between hypnotic hypermnesia and stress as well as how eyewitness subjects would respond to leading questions under hypnosis. Thirty-six highly hypnotizable subjects were exposed to a stressful film. Twenty minutes later, subjects were asked to

recall the film in the waking or hypnotic state. The recall format, consisting of 20 items, was structured. Fifteen non-leading questions were multiple choice, while five leading questions were forced choice yes/no. Confidence for responses was measured on a scale of one to five for each question. The results indicated that hypnosis did not significantly enhance recall for nonleading questions, but that hypnotized subjects were less accurate on leading questions when "I don't know" responses were excluded. Post-hoc analysis indicated a correlation between level of hypnotic susceptibility and confidence in one's answers.

In a larger study involving 96 subjects, Sheehan and Tilden (1983) focused on the issue of whether hypnotic susceptibility increases the likelihood of memory distortion. High and low hypnotizable subjects were exposed to a slide sequence depicting the theft of a wallet. After viewing the slides, half of the subjects were given 12 open ended questions with embedded false information. The other half of the subjects answered a questionnaire containing neutral information. Fifteen minutes later, memory of the slides was assessed in waking or hypnosis on an 18 item forced choice questionnaire offering two versions of the facts, one correct, one incorrect. Just prior to the conclusion of the study, all subjects were tested for free recall in the waking state.

The results of the forced choice questionnaire indicated that distortion of memory did occur for certain items, but not in relationship to hypnotic suggestion or hypnotic susceptibility. Analysis of

free recall, however, suggested that highly hypnotizable subjects were more likely than low hypnotizables to include details that were not presented in the slides they saw. The results of the study did not evidence a superiority of memory under hypnosis. Interestingly, however, hypnotized subjects, who were no more accurate in their recall, were more confident of their inaccurate answers than those in the waking state. This was particularly true for highly hypnotizable subjects.

Out of the three studies discussed, both Putnam (1979) and Zelig and Beidleman (1981) were able to demonstrate that hypnosis may increase the distortion of memory when leading questions or false information are presented. Why Sheehan and Tilden (1983) did not replicate these findings is unclear. Sheehan and Tilden's failure to demontrate an increased bias in hypnosis for highly susceptible subjects might be explained by the fact that they utilized a forced-choiced recall format that offered the subject the correct as well as incorrect (or leading) information. The distorting effect that the leading information might have had on a hypnotized subject's memory may have been counterbalanced when he or she was faced with accurate information.

It should also be noted that none of these studies demonstrated hypnotic hypermnesia. All three of the studies asked relatively few recall questions and utilized either a multiple choice or forced choice format. For both of these reasons, hypnotized subjects may not have had the opportunity to demonstrate all that they remembered,

particularly if their enhanced recall was not for the items deemed "salient" by the investigators. Furthermore, these studies used a short interval (15 to 20 minutes to 24 hours) between exposure to the original material and test for recall. Hypnosis may indeed increase accuracy in a structured recall context, but only if the incident-test interval is sufficiently long (Stalnaker & Riddle, 1932; Dywan & Bower, 1983).

One final study deserves consideration. Sanders and Simmons (1982) designed a unique study to assess hypnosis as an aid to eye-witness recognition by utilizing a lineup identification task. Subjects were 100 undergraduate students whose level of hypnotic susceptibility was measured by the "number of suggestions to which subjects seemed to respond, ranging from 0 to 10" and correlated with subject's self-rating. Subjects in the hypnosis conditions were reported to average 6.2 on the 10 suggestion scale. All subjects observed a 20 second videotape of a pickpocket stealing a wallet. The thief was male and wore a very distinctive black jacekt with large red stripes on the sleeves. One week later subjects were given cognitive recall suggestions either in hypnosis or waking. They were then asked to identify the thief in a videotaped lineup containing six college men similar in apperance. Half of the subjects were shown a lineup that included the actual thief, the other half saw a "leading target" in the thief's place. The leading target wore the thief's distinctive jacket; the actual thief did not wear the jacket in the lineup presentation. Recall was assessed on a ten item questionnaire. Five

objective questions and five leading questions were presented in a forced choice, yes/no format. Subjects were asked to indicate the responses to which they would testify if in a courtroom trial.

Results revealed that subjects in hypnosis were less able to identify the thief when he was presented, and more likely to choose the leading target than those in the waking state. One explanation given by the authors for this finding is that hypnosis increases a subject's susceptibility to salient implications in a recognition task. "Given that the thief was of reasonably normal appearance and subjects did not get a long or careful look at his face, the most salient thing about him was his jacket," (Sanders & Simmons, 1982, p. 74). It is possible that hypnosis subjects' heightened awareness of salient features (the distinctive jacket) is, as Dywan and Bowers (1983) have suggested, the result of enhanced imagery that takes place in the hypnotic state.

Like Putnam (1979), Sanders and Simmons' (1982) results demonstrated that subjects in the hypnosis conditions were more likely than waking subjects to respond affirmatively to leading questions in the recall task. Contrary to Putnam (1979), within the hypnosis group a negative relationship was found between hypnotic susceptibility level (which they call "level of trance") and susceptibility to leading questions. The more hypnotically responsive the subjects were, the less likely they were to respond positively to the leading questions. For the non-leading questions, there was a non-significant trend for subjects in hypnosis to be more accurate than waking subjects.

The unexpected finding that those who are more hypnotically responsive are less likely to be fooled by leading questions remains unclear and contradicts previous research (e.g., Putnam, 1979; Zelig & Beidleman, 1981). If Sanders and Simmons' subjects averaged 6.2 on a 10 point suggestion scale, it is possible that this study did not include many truly highly hypnotizable subjects.

VISUO-SPATIAL SKILLS AND MEMORY

Dywan and Bower (1983) suggest that visuo-spatial abilities may moderate hypnotic hypermnesia. Substantial evidence has been provided that cognitive strategies, mental imagery, and visuo-spatial skills are important factors in memory (e.g., Carrol & Maxwell, 1979; Richardson, 1980). There is evidence, although inconsistent, that subjects with high visuo-spatial ability perform memory tasks significantly better than those with low ability, particularly when the tasks require the "maintaining in memory a 'literal' or 'untransformed' representation of to-be-remembered nonverbal stimuli," (Ernest, 1977, p. 167).

It might be hypothesized that accuracy in recall of events seen, as in an eyewitness paradigm, would be positively correlated with visuo-spatial ability. Visuo-spatial ability is complex and can be measured in various ways: (1) self-report questionnaires of the degree of vividness and/or controlability of direct images and of styles of visual/verbal thinking, and (2) visuo-spatial tasks which require the manipulation to one degree or another of items in actual or imagined space. It may be that those tasks which tap spatial memory for items

would most closely correlate with performance accuracy in an eyewitness paradigm.

The only study (Powers, Andrikis, and Loftus, 1979) that investigates this hypothesized relationship found no relationship between eyewitness recall accuracy and spatial or verbal abilities. Spatial and verbal abilities were assessed by the Washington Pre-College Test (WPC), an aptitude test similar to the Scholastic Aptitude Test and used for admittance to the University of Washington. The authors noted that their undergraduate subject population may have had a restricted range of intelligence which might have obscured any relationships. In addition, the spatial subtest of the WPC did not assess memory for spatial information.

In contrast, it might be expected that those subjects who incorporate false information or respond to leading questions in an eyewitness study might score significantly lower on those visuo-spatial masures which have a spatial memory component. Those subjects who have less adequate ability to remember details of previously presented material may be more willing to accept false details presented as accurate by an authority figure (the experimenter). Although no study has addressed this issue specifically, Gudjonsson (1983) suggests that susceptibility to leading questions and incorporation of false information is related to lower intelligence and poor memory skills.

PRESENT RESEARCH AND HYPOTHESES

Many questions about hypnotic recall remain unanswered. For instance, it is unclear whether hypnosis actually improves recall of

meaningful material. The well-controlled studies that do demonstrate hypnotic hypermnesia indicate that enhanced recall only occurs under certain conditions which include: (1) testing in free recall or with unstructured open-ended direct questions and (2) when hypnotic subjects are selected for high hypnotizability. There is also the possibility that increased recall is accompanied by an increase in errors (e.g., Dywan & Bowers, 1983; Sheehan & Tilden, 1983).

Additionally, it remains unclear whether hypnosis contributes to a subject's distortion in memory. Although spontaneous confabulation of events has been noted in the literature (e.g., Timm, 1981), the results of the studies assessing hypnotic memory distortion are preliminary and conflicting in their results. Putnam (1979) reported confabulation and increased susceptibility to leading questions in the hypnotic state. Sheehan and Tilden (1983) reported that hypnosis had no such effect, nor did subjects' level of hypnotizability contribute to memory distortion effects. Sanders and Simmons (1982) found that hypnosis did increase distortion, but contrary to expectation, highly responsive subjects were less likely to respond to leading questions than those who were less responsive.

One finding that seems to be fairly consistent in the literature is that hypnotized subjects, particularly high hypnotizables, are quite confident of their memory under hypnosis, even when what they recall is not accurate. Dywan and Bowers (1983) raise the possibility that this inflated confidence may be the result of the hypnotically enhanced vividness of mental imagery.

None of the reviewed studies investigated the role that visuo-spatial abilities might play in the accuracy of hypnotic recall. Dywan and Bowers (1983) conducted a post-hoc analysis and found that high visual imagery ability might have an important mediating role in the hypnotic enhancement of recall over and above hypnotic ability. The relationship between visuo-spatial and distortion of memory has yet to be explored.

The present research focused on whether hypnosis would increase the likelihood of distortion of memory when false information or leading questions were introduced, and whether such an effect would be moderated by hypnotic level. As well, the study provided data to assess hypnotic hypermnesia and the effects of hypnosis on subject's confidence about their memory of what took place. Visuo-spatial skills were assessed to determine if there was a relationship between such skills and accuracy of recall or distortion of recall.

The study utilized the stimulus situation developed by Loftus (1979) and used by Sheehan and Tilden (1983) simultaneously to the present study. The situation involves a short slide presentation depicting the theft of a wallet. After viewing the slides, all subjects were asked to perform a series of visuo-spatial tasks: two of these measured the ability to spatially remember pictorial information and additionally assessed ability to visualize and manipulate spatial information, and two self-report questionnaires assessed the vividness of visual imagery and whether subjects viewed themselves as verbalizers or visualizers.

On the following day, subjects were asked to recall details about the slides that they had seen. Before recall was tested, 60% of the subjects were exposed to false "presuppositions" - information that contradicted the details of the slides. The other subjects were given neutral information that was not erroneous or contradictory to the slide sequence. Subjects were tested for recall in the hypnotic and in the waking state.

Subjects' memory of the slides was assessed first in a free recall inquiry and then in a direct inquiry format. Free recall was utilized to assess under what conditions subjects would voluntarily recall the false information that they had been given. The direct questionnaire consisted of fifty questions, most of which were open ended in nature (nine forced choice yes/no questions were included). Embedded in the questionnaire were three leading questions, which were presented to subjects in all conditions. Four of the open-ended questions were used to provide data on whether subjects had incorporated incorrect information in the form of false presuppositions. The remaining forty-three questions (those questions that were not leading or aimed at the false presuppositions) were used to assess accuracy of recall of the slide sequence.

All subjects had been selected for high and low hypnotic responsiveness as assessed by the Harvard Group Scale of Hypnotic Susceptibility, Form A (Shor & Orne, 1962) and by the Stanford Hypnotic Susceptibility Scale, Form C (Weitzenhoffer & Hilgard, 1962). To insure against experimenter bias, the examiner was unaware of the

subject's level of hypnotizability or assigned experimental condition.

It was specifically hypothesized that if hypnosis contributes to subjects' incorporation of information into their memory of events, as Putnam (1979) suggests, then hypnotized subjects would be more likely than waking subjects (1) to incorporate false information into responses to selected questions in the direct inquiry and to volunteer false presuppositions in the free recall, and (2) to answer the leading questions by accepting as accurate the false information given. This response pattern would be most evident for high hypnotizables in the hypnotic state because of their capability of achieving a deeper hypnotic trance. Further, subjects in hypnosis, particularly high hypnotizables would be more confident that their incorporated false presuppositions and misled answers were correct, as well as more confident of their answers overall.

It was also hypothesized that if hypnosis contributes to enhanced recall of objective, meaningful material, then hypnotized subjects would answer more questions correctly on the direct questionnaire than would waking subjects. In keeping with the hypnotic hypermnesia literature, high hypnotizables in hypnosis would be most accurate in their responses when compared to other groups.

And finally, it was hypothesized that subjects who are more accurate in their recall would have higher visuo-spatial scores. In contrast, those who were susceptible to misleading information (false presuppositions and leading questions) would have lower visuo-spatial scores than those who were not.

CHAPTER II

METHOD

SUBJECTS

Subjects were 50 female and 50 male undergraduate students at the University of Wyoming who had been previously assessed on two scales of hypnotic susceptibility: the Harvard Group Scale of Hypnotic Susceptibility, Form A (Shor & Orne, 1962), and the Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C, Weitzenhoffer & Hilgard, 1962). The Stanford Hypnotic Susceptibility Scale was used in the assignment of subjects to hypnotic level groups. Fifty low hypnotizables (SHSS:C, scores 0 to 4; did not pass SHSS:C age-regression item) and 50 high hypnotizables (SHSS:C scores 10 to 12; did pass SHSS:C age regression item) participated. An equal number of male and female subjects were represented within the low and high hypnotizability groups.

PROCEDURE

Subjects were contacted by telephone and invited to participate in a study of perceptual processing that would involve two days, each session less than one hour. Subjects were either paid six dollars or received extra credit for a psychology course for their participation.

The experiment involved two separate days of testing. On day one subjects were treated identically: they were shown slides depicting the theft of a wallet and took a series of visuo-spatial tasks. On day two, low and high subjects were randomly assigned to one of five

experimental groups and questioned about the slides seen on day one. There were 20 subjects in each group, groups were equally matched for sex and level of hypnotizability. Please see Table 1 for outline.

Day One

All subjects were treated identically. In small groups subjects were asked to watch a slide presentation developed by Loftus [1] (1979; Powers, Andrikis, & Loftus, 1979), depicting the theft of a wallet. Instructions were the following: "You are going to see a series of slides that were taken in the Rocky Mountain area. Please just watch them as if you were sitting in a car nearby and saw the things which happened." The 24 color slides were presented at 5 second intervals. They showed a woman walking down a shop lined street. She is met by a friend, they talk, and look in a store window. The friends part, and the woman continues to walk down the street. She is approached by a man wearing a cowboy hat who, in passing, bumps into her causing her to drop a shopping bag that she carries. Both the man and the woman stoop to pick up the items that have fallen out of the bag, and in the process, the woman places her open purse down beside her. While the woman is looking away, the man takes the opportunity to lift a wallet out of the purse and place it in his breast pocket. The woman does not notice the theft, and the man continues to walk down the street away from the woman. Soon the woman notices the missing wallet. She is then flagged down by two women from across the street.

[1] Special thanks to Elizabeth Loftus for contributing materials and comments.

TABLE 1

EXPERIMENTAL PROCEDURE

	Day One		Day Two		
Group 1	Slides of wallet theft and spatial tests	Visuo Spatial Tests	Recognize people? No Presuppositions	Gestalt Closure Test and discussion	Waking Inquiry
Group 2	"	"	Recognize people? False Presuppositions	Gestalt Closure Test and discussion	Waking Inquiry
Group 3	"	"	Recognize people? No Presuppositions	Hypnotic Induction and Age Regression	Hypnotic Inquiry
Group 4	"	"	Recognize people? False Presuppositions	Hypnotic Induction and Age Regression	Hypnotic Inquiry
Group 5	"	"	Hypnotic Induction and Age Regression	Recognize people? False Presuppositions	Hypnotic Inquiry

The women join her and point in the direction that the thief has fled.

Immediately following the slide presentation, all subjects were asked to take a series of visuo-spatial memory tasks. This was done to decrease subjects' opportunity to immediately rehearse the information given in the slides and also to provide information about subejcts' visuo-spatial abilities for subsequent evaluation. The visuo-spatial measures,[2] presented in counterbalanced order, were the following:

Mental Rotations Test (MRT; Vandenberg & Kuse, 1978). This test, which assesses the ability to spatially visualize and manipulate two-dimensional drawings of three-dimensional objects, consists of a criterion figure, two correct alternatives, and two incorrect ones. The subject is asked to look at the criterion figure and then determine which two of the four accompanying figures are the same as the criterion figure except rotated to a different position. The incorrect figures are rotated mirror images of the criterion figure. Score is the total number correct on both parts minus ½ of the number wrong.

Map Memory Test (MMT; Ekstrom, French, Harman, with Derman, 1976). This test assesses spatial memory of part of a map by subsequent recognition. The test consists of two parts, six minutes each. The subject is asked to study a page of maps for three minutes and then

[2]These measures assess different aspects of visuo-spatial ability, (DiVesta, Ingersoll, & Sunshine, 1971), as reflected in their correlations: MRT and MMT, r = .25 (N = 100); MRT and VVIQ, r = .11 (N = 100); MMT and VVIQ, r = .13 (N = 100); IDQ-imag and MRT r = .13 (N = 100); IDQ-imag and MMT, r = .15 (N = 100); IDQ-imag and VVIQ, r = .48 (N = 100).

answer a memory page as to whether or not a series of maps were present on the study page (3 minutes given). Score is the total number correct on both parts minus ½ of the number wrong.

Vividness of Visual Imagery Questionnaire (VVIQ; Marks, 1973). This self-report questionnaire asks subjects to assign a rating score from 1 (do not see it; only think about it) to 5 (see if quite clearly) for 16 different visual images. Scores range from 16 to 80 possible.

Individual Differences Questionnaire (IDQ, Paivio, 1971). This is a series of true/false questions designed to assess the degree to which imagery and verbal processes are utilized in thinking and processing. There are two scales: visual and imagery.

After taking the visuo-spatial tests, subjects were dismissed with a reminder of their appointment on the following day and with instructions not to discuss the tasks presented on day one.

Day Two

Ten low and ten high hypnotizable subjects, half male and half female, were assigned randomly to each of five experimental conditions:

Group 1: Waking inquiry, no presupposition given

Group 2: Waking inquiry, false presupposition given

Group 3: Hypnosis inquiry, no presupposition given

Group 4: Hypnosis inquiry, false presupposition given in waking

Group 5: Hypnosis inquiry, false presupposition given in hypnosis

Two experimenters participated. One did the preliminary questioning and hypnotic induction if hypnosis was involved. (Please see Appendix for induction instructions.) The other did the subsequent inquiry

about the slides. The second experimenter did not know to which condition subjects were assigned, thus keeping her blind as to whether the subject was hypnotized or not.

Upon arrival, subjects who were not in the presupposition conditions were asked:

> Because the slides you saw yesterday were taken in the Rocky Mountain area, we would like to know if you recognized any of the people in them.
>
> 1. Did you know the woman who was with the victim before the theft?
>
> 2. Did you know the woman who was robbed?
>
> 3. Did you know the man who committed the theft?
>
> 4. Did you know who came to assist the victim after the theft?

Subjects in the false presupposition groups were asked similar questions, but with the addition of embedded false information:

> Because the slides you saw yesterday were taken in the Rocky Mountain area, we would like to know if you recognized any of the people in them.
>
> 1. Did you know the woman who was with the victim before the theft?
>
> 2. Did you know the redheaded woman who was robbed?
>
> 3. Did you know the man who committed the theft?
>
> 4. Did you know the man and woman who came to assist the victim after the theft?
>
> 5. Did you know the person who joined the thieft after the theft?

Subjects who were assigned to the hypnosis conditions[3] were

[3] For Group 4, the questions were administered prior to the subject being informed that hypnosis would occur. For Group 5 the questions were administered subsequent to the hypnotic induction.

informed that they would be hypnotized and assured that if they did not want to be hypnotized they could participate in a waking condition. No subjects refused hypnosis. A consent form was then signed. The hypnotic induction was taken from the SHSS:C induction, with eyes closed at the beginning, and all references to sleepiness replaced with references to relaxation. Subjects were then given suggestions to return to the prior day when they were viewing the slides:

> ...you will find yourself once again watching the slide presentation just as you did yesterday. But, this time you will find that you can look at each slide as long as you wish in order to obtain the information that you need. You will be able to zoom in on details of the slide, much like a movie camera zooms in on certain parts of a scene. Or, you will see the entire slide...

For complete instruction see Appendix A.

Subjects who were not given hypnosis instruction were involved in gestalt closure tests and discussion of these tests for an equivalent length of time.

All subjects were then told that a second experimenter would join them and ask them qustions about the slides. Subjects were seated in a comfortable chair facing the wall. The second experimenter, blind to the subject's condition, entered the room so that the subjects were seen only from the back. All subjects were asked to recall in detail the slide sequence. All questions asked of subjects are presented in Appendix B.

A free inquiry of what the subjects remembered about the slides was requested first. The subjects were asked:

1. Describe the young woman's (the victim's) appearance for me.

2. Describe the man's (the thief's) appearance for me.

3. Tell me what the thief did after he left the victim. Where did he go? What did he do?

4. Tell me about the people who talked to the victim after the incident? What did they look like? What were they wearing?

The free recall was followed by the direct inquiry. Fifty questions were asked in all: 43 of these asked about objective details of the slides, four questions could possibly be answered with a false presupposition, and three leading questions were asked which had no relationship to the false presuppositions. The direct questions were based on a questionnaire developed by Loftus (1979), but unlike her questionnaire which was multiple choice in nature, the questions were modified to be less structured. Most of the questions required a short answer response, a few asked for a yes/no response or a more detailed description of events.

The questions in which a false presupposition could be incorporated were:

1. What color hair did the victim have?

2. What did the thief do after the theft?

3. Describe the person who joined the thief after the theft.

4. Describe the people who came to assist the victim after the theft.

Also embedded within the questionnaire were the following three leading questions:

1. When the victim saw the thief take the wallet out of the purse, what did she do? (She, in fact, did not see the thief steal the wallet.)

2. Where was the gun on the thief's body? (There was no gun in the slide presentation.)

3. What were the letters and/or numbers of the license plate? (This refers to a vehicle which was parked at the scene of the crime. Although a license plate could be seen, the numbers and letters were not discernable.)

Confidence ratings on a scale of one to five were elicited after each questions during the entire questionnaire. Subjects were given the following instructions:

> After answering each question, I would like you to indicate how confident you are of your answer on a scale of one to five where one represents a guess and five represents absolute certainty.

After the inquiry, the examiner opened an envelope to determine if subjects had been hypnotized or not. If the subject had been hypnotized, he or she was brought out of hypnosis on a count from 20 to 0. Before dismissal, subjects were asked how they remembered the information that was asked of them. (Please see Appendix C for exit interview.) They were debriefed and asked if they had known what the experiment was about and whether they had discussed the experiment with anyone. They were cautioned against discussing the experiment with other students and then dismissed.

CHAPTER III

RESULTS

DIRECT INQUIRY

Accuracy for Objective Questions

Within the direct inquiry, subjects were asked 43 objective questions (excluding leading and presupposition questions). The mean numbers of items correctly recalled by low and high hypnotizables in the five conditions are given in Table 2.

A 2 (low vs. high hypnotic level) x 5 (condition) x 2 (sex) analysis of variance was performed. Overall, high hypnotizables were significantly more accurate in their responses than lows, $F(1,80) = 5.30$, $p < .02$. There were no significant differences between conditions, $F(4,80) = .47$ or sex, $F(1,80) = .46$. Nor were there any significant interactions.

Incorporation of False Presuppositions

Three false presupposition statements were introduced in Conditions 2, 4 and 5. Four questions were asked during direct inquiry to assess whether or not subject's incorporated the false presuppositions into their memory of the slides. Table 3 lists how frequently low and high hypnotizables across conditions responded to questions with a false presupposition statement.

Out of the 60 subjects who received false presuppositions statements, 38 (63%) incorporated one or more of the false statements into

TABLE 2

Mean Accuracy for Objective Questions Across Conditions for Low and High Hypnotizables

Conditions	Low Hypnotizables Mean	SD	High Hypnotizables Mean	SD
1. Waking No Presupposition	24.30	4.79	23.50	3.50
2. Waking With Presupposition	22.30	3.34	25.30	3.43
3. Hypnosis No Presupposition	23.90	3.75	26.50	3.41
4. Hypnosis With Presupposition in Waking	24.80	2.87	24.50	4.74
5. Hypnosis With Presupposition in Hypnosis	22.50	4.50	26.80	3.74

TABLE 3

FREQUENCY OF RESPONSE TO FALSE PRESUPPOSITIONS
ACROSS CONDITIONS AND HYPNOTIC LEVELS

DIRECT QUESTION	Group 2 Waking/Presup.			Group 4 Hypnosis/Presup.			Group 5 Hypnosis/Presup. in Hyp.		
	Low n=10	High n=10	Total n=20	Low n=10	High n=10	Total n=20	Low n=10	High n=10	Total n=20
DQ #8 Total Response = 17%									
What color hair did the victim have?	1	2	3 (15%)	2	3	5 (25%)	0	2	2 (10%)
DQ #38 Total Response = 22%									
What did the thief do after the theft?	4	0	4 (20%)	4	2	6 (30%)	4	3	7 (35%)
DQ #39 Total Response = 38%									
Describe the person who joined the thief after the theft.	5	2	7 (35%)	4	3	7 (35%)	4	5	9 (45%)
DQ #41 Total Response = 25%									
Describe the people who came to assist the victim after the theft. (What sex were they?)	4	1	5 (25%)	4	2	6 (30%)	1	3	4 (20%)

their answers about the slides. In order to assess differential proportions across groups, a 2 (high vs. low hypnotic level) x 2 (presup. vs. no presup.) x 3 (condition) log linear analysis (Biomedical Program, BMDP 4f, 1981)[4] was employed. As seen in Table 4, when a false presupposition was introduced, subjects were more likely than not to incorporate this false information into their answers. However, there were no significant differences in the proportion of responses for low and high hypnotizables across conditions.

At this point, the data was collapsed into less complex frequency tables. Across the three conditions, 70% of the low hypnotizables and 57% of the high hypnotizables incorporated at least one of the false presuppositions into their answers. Using a normal approximation to the binomial test for the difference between two proportions, these proportions were not significantly different, $Z = 1.13$. Collapsing across hypnotic level, 75% of the subjects in waking and 57.5% of the subjects in hypnosis incorporated at least one of the false presuppositions into their answers. These proportions were not significant, $Z = 1.33$.

One problem with these results merits further discussion. Table 3 demonstrates how frequently subjects incorporated false presuppositions into each question. The percent of subjects who incorporated false presuppositions in each question was: 17% incorporated in Direct Question #8 (What color hair did the victim have?); 22% incorporated in Direct Question #38 (What did the thief do after the

[4]Appreciation to Steve Bieber, Statistician Ph.D., for his statistical guidance.

TABLE 4

OBSERVED FREQUENCY TABLE FOR DIRECT INQUIRY FALSE PRESUPPOSITIONS ACROSS CONDITIONS AND HYPNOTIC LEVELS

HYPNOTIC LEVEL		CONDITION			
		Group 2 Waking/Presup. in waking	Group 4 Hypnosis/Presup. in waking	Group 5 Hypnosis/Presup. in hypnosis	TOTAL
		N=20	N=20	N=20	N=60
NO PRESUP. GIVEN	Low	2	2	5	9
	High	3	6	4	13
	TOTAL	5 (25%)	8 (40%)	9 (45%)	22 (36.7%)
PRESUP. GIVEN	Low	8	8	5	21
	High	7	4	6	17
	TOTAL	15 (75%)	12 (60%)	11 (55%)	38 (63.3%)

theft?); 25% incorporated in Direct Question #41 (Describe the people who came to assist the victim after the theft.); and 38% incorporated in Direct Question #39 (Describe the person who joined the thief after the theft). Subjects seemed to be responding with a false presupposition more frequently to Direct Question #39 than to any of the other questions. The phrasing of this question was, in fact, different from the other questions. Direct Question #39 alluded to the false presupposition that had been presented earlier in the experimental session. It suggested that there was a person who joined the thief (which there was not), and it appeared to be a leading question in addition to a means of eliciting a false presupposition. Because Direct Question #39 had considerable influence on subjects' response, it should not be ignored. However, it is unique in its wording, and may not be a fair test of presupposition inducement.

Another 2 x 2 x 3 log linear analysis was performed excluding Direct Question #39. Without the weight of this question, 42% of the subjects (compared to 63% in the initial analysis) incorporated one or more of the false presuppositions that had been given them. There were no significant differences in the proportions between high and low hypnotizables across conditions (see Table 5). Disregarding hypnotic level, 35% of the subjects in waking and 45% of the subjects in hypnosis incorporated at least one of the false presuppositions into their answers. These proportions were not significantly different, $Z = .74$. Nor was there a difference in proportions between waking and hypnotized subjects when Direct Question #39 was analyzed alone, $Z = .71$.

TABLE 5

OBSERVED FREQUENCY TABLE FOR DIRECT INQUIRY FALSE PRESUPPOSITIONS
ACROSS CONDITIONS AND HYPNOTIC LEVELS
EXCLUDING DIRECT QUESTION #38

HYPNOTIC LEVEL		CONDITION			
		Group2 Waking/Presup. in waking	Group4 Hypnosis/Presup. in waking	Group 5 Hypnosis/Presup. in hypnosis	TOTAL
		N=20	N=20	N=20	N=60
NO PRESUP. GIVEN	Low	6	7	9	17
	High	7	6	5	18
	TOTAL	13 (65%)	13 (65%)	14 (70%)	35 (58.3%)
PRESUP. GIVEN	Low	4	8	1	13
	High	3	4	5	12
	TOTAL	7 (35%)	12 (60%)	6 (30%)	25 (41.7%)

Susceptibility to Leading Questions

There were three leading questions embedded in the direct inquiry. The questions and how frequently subjects responded to each of them are listed in Table 6. The number of low and high hypnotic subjects in each of the five conditions responding to at least one of the leading questions are presented in Table 7. Overall, 28% of the subjects responded to one or more of the leading questions.

A 2 (high vs. low hypnotic level) x 2 (leading vs. no leading) x 3 (conditions) log linear analysis revealed no significant main effects or interactions in the proportions. Nor were there any differences when each leading question was analyzed separately.

FREE RECALL

Incorporation of False Presupposition

Overall, 47% (28 of 60) of the sample who were given false presuppositions spontaneously incorporated one or more of them in free recall inquiry. Not surprisingly, this is less than the 63% who responded in the direct inquiry. A breakdown of how subjects responded across hypnotic level and condition is given in Table 8.

A 2 (high vs. low) x 2 (presupposition vs. no presupposition) x 3 (condition) log linear analysis revealed no significant main effects or interactions in the proportions.

CONFIDENCE LEVELS

Confidence of Objective Questions

To test the hypothesis that hypnosis removes a subject's

TABLE 6

FREQUENCY OF RESPONSE TO EACH LEADING QUESTION
ACROSS CONDITIONS AND HYPNOTIC LEVELS

LEADING QUESTION	Group 1 Waking/No Presup			Group 2 Waking/Presup			Group 3 Hypno/No Presup			Group 4 Hypno/Presup			Group 5 Hypno/Presup in Hyp		
	Low N=10	High N=10	Total N=20	Low N=10	High N=10	Total N=20	Low N=10	High N=10	Total N=20	Low N=10	High N=10	Total N=20	Low N=10	High N=10	Total N=20
DQ #24 When the victim saw the thief take the wallet out of the purse, what did she do?	1	2	(3)	2	3	(5)	TOTAL = 19 (19%) 3	1	(4)	1	2	(3)	1	3	(4)
DQ #32 Where was the gun on the thief's body?	0	1	(1)	1	0	(1)	TOTAL = 9 (9%) 1	1	(2)	1	3	(4)	1	0	(1)
DQ #37 What were the letters and/or numbers on the license plate?	1	2	(3)	0	0	(0)	TOTAL = 6 (6%) 0	1	(1)	1	1	(2)	0	0	(0)

TABLE 7

OBSERVED FREQUENCY TABLE FOR FREE RECALL FALSE PRESUPPOSITIONS ACROSS CONDITIONS AND HYPNOTIC LEVELS

HYPNOTIC LEVEL		CONDITION			
		Group 2 Waking/Presup. in waking	Group 4 Hypnosis/Presup. in waking	Group 5 Hypnosis/Presup. in hypnosis	TOTAL
		N=20	N=20	N=20	N=60
NO PRESUP. GIVEN	Low	4	5	7	16 (27%)
	High	6	6	4	16 (27%)
	TOTAL	10 (50%)	11 (55%)	11 (55%)	32 (54%)
PRESUP. GIVEN	Low	6	5	3	14 (23%)
	High	4	4	6	14 (23%)
	TOTAL	10 (50%)	9 (45%)	9 (45%)	28 (46%)

TABLE 8

OBSERVED FREQUENCY TABLE FOR SUBJECTS' RESPONSE TO AT LEAST ONE LEADING QUESTION ACROSS CONDITIONS AND HYPNOTIC LEVELS

	HYPNOTIC LEVEL	CONDITION					
		Group 1 Waking/ No Presup.	Group 2 Waking/Presup. in waking	Group 3 Hypnosis/ No Presup.	Group 4 Hypnosis/Presup. in waking	Group 5 Hypnosis/Presup. in hypnosis	TOTAL
		N=20	N=20	N=20	N=20	N=20	N=100
NO LEAD RESPONSE	Low	8	7	6	8	8	37
	High	6	7	8	7	7	35
	TOTAL	14 (70%)	14 (70%)	14 (70%)	15 (75%)	15 (75%)	72 (72%)
GAVE LEAD RESPONSE	Low	2	3	4	2	2	13
	High	4	3	2	3	3	15
	TOTAL	6 (30%)	6 (30%)	6 (30%)	5 (25%)	5 (25%)	28 (28%)

uncertainty about the accuracy of his response, and that this effect is moderated by hypnotic level, two separate analyses for confidence levels were performed. One was for correct responses; the other for incorrect responses. All "I don't know" answers were eliminated.

A 2 (high vs. low hypnotic level) x 2 (hypnosis vs. waking) analysis of variance was performed on the mean confidence level given for correct responses. The two hypnosis conditions were collapsed since no significant differences between them existed. As seen in Figure 1, high hypnotizables were significantly more confident of their correct responses than were low hypnotizables, $F(1,96) = 29.5$, $p < .001$. Overall, those in the hypnotic state were significantly more confident than those in waking, $F(1,96) = 28.2$, $p < .001$. There was a significant interaction between hypnotic level and conditions, $F(1,96) = 5.00$, $p < .05$. Subsequent analysis demonstrated that high hypnotizables, who were more accurate in their responses overall, were also more confident of their answers than the lows in both waking, $t(38) = 3.59$, $p < .001$, and hypnosis, $t(58) = 3.61$, $p < .001$. While hypnosis significantly increased the confidence of both hypnotic levels (highs: $t(40) = 3.47$, $p < .01$, lows: $t(48) = 4.32$, $p < .001$), this increase was more dramatic for the low hypnotizables.

By contrast, the analysis of variance for incorrect responses revealed a very different interaction, as seen in Figure 1. Once again there was a significant interaction between condition and hypnotic level, $F(1,96) = 4.58$, $p < .05$. During waking, low and high hypnotizables did not differ significantly from one to another,

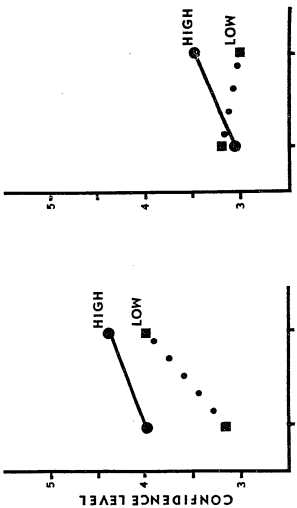

FIGURE 1

MEAN CONFIDENCE LEVELS FOR CORRECT AND INCORRECT RESPONSES ACROSS HYPNOTIC LEVELS AND CONDITIONS

t (38) = .54, while during hypnosis, the highs were significantly more confident of their incorrect responses than the lows, t (58) = 2.59, $p < .02$. Overall, high hypnotizables during hypnosis were significantly more confident of their incorrect answers than were highs in waking, t (48) = 2.02, $p < .05$. By contrast, the low hypnotizables showed somewhat less confidence for their incorrect responses in the hypnosis conditions, although it was not significant, t (48) = 1.09.

Confidence of False Presuppositions

A 2 (low vs. high hypnotic level) x 2 (hypnosis vs. waking) analysis of variance was performed for the mean confidence level when false presuppositions were given during the direct inquiry. Figure 2 demonstrates that there was a significant interaction between hypnotic level and condition, F (1,47) = 4.61, $p < .05$. There were no significant main effects ($F > 1$). Subsequent mean analyses revealed that low and high hypnotizables did not differ significantly in the waking condition, t (14) = 1.26, but during hypnosis the high hypnotizables were significantly more confident of their responses containing false presuppositions than were the lows, t (33) = 2.04, $p < .05$.

Confidence of Leading Questions

A similar 2 x 2 analysis of variance was performed for mean confidence levels of positive responses to leading questions. Once again, there was a significant interaction between hypnotic level and condition, F (1,25) = 7.72, $p < .05$. There was no significant main

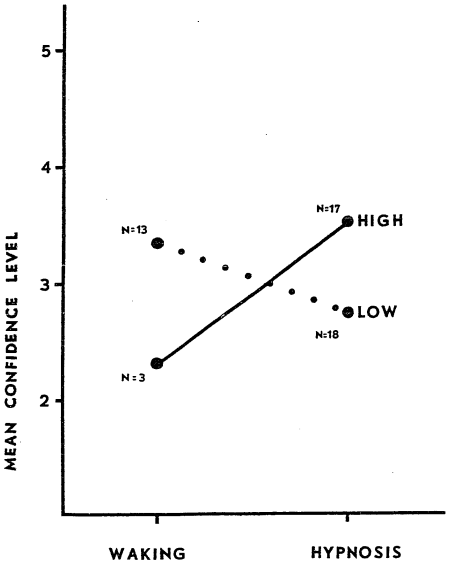

FIGURE 2

MEAN CONFIDENCE LEVEL FOR SUBJECTS IN WAKING AND HYPNOSIS WHO INCORPORATED FALSE PRESUPPOSITIONS

effect for condition ($F < 1$) or for hypnotic level, $F(1,25) = 3.00$. A subsequent analysis of means demonstrated that although the confidence of low and high hypnotizables did not differ in the waking state, $t(90) = .70$, it was significantly different under hypnosis, $t(16 = 3.64$, $p < .01$. Figure 3 demonstrates that when hypnotized, highly hypnotizable subjects increased their confidence slightly, although not significantly, $t(14) = 1.36$, while low hypnotizables became significantly less confident, $t(11) = 2.65$, $p < .05$, of their answers to leading questions.

In summary, the high hypnotizables consistently increase their confidence levels during hypnosis for correct responses, false presuppositions, and leading questions. In contrast, when hypnotized, the low hypnotizables show an increase in confidence levels only for correct responses.

VISUO-SPATIAL SKILLS AS POSSIBLE MODERATORS

To assess whether visuo-spatial skills may be moderators of eyewitness accuracy, and/or susceptibility to false presuppositions and leading questions, the relationship between four visuo-spatial tasks and the various scores (accuracy, false presuppositions, and leading questions) were assessed.

Relationships to Hypnotic Susceptibility

First, it is of value for subsequent consideration to examine relationships between the visuo-spatial tasks and hypnotic susceptibility. Table 9 gives the means and standard deviations for high and

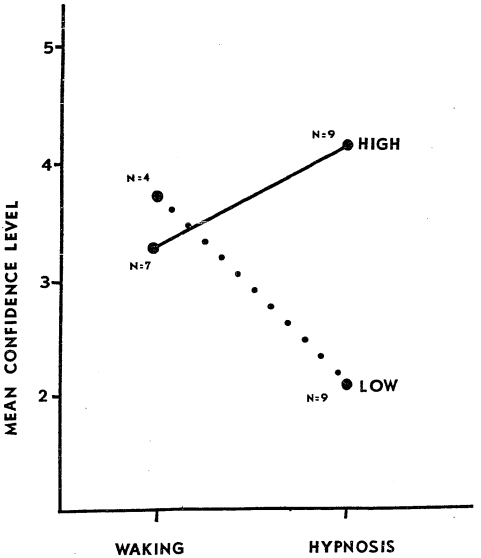

FIGURE 3
MEAN CONFIDENCE LEVEL FOR SUBJECTS IN WAKING AND HYPNOSIS AND RESPONDED TO LEADING QUESTIONS

TABLE 9

MEANS AND STANDARD DEVIATIONS FOR VISUO-SPATIAL MEASURES
FOR HIGH AND LOW HYPNOTIZABLE SUBJECTS

VISUO-SPATIAL MEASURE	HIGH HYPNOTIZABLE		LOW HYPNOTIZABLE	
	Mean	Sd	Mean	Sd
Mental Rotations Test	19.99	8.92	17.19	7.76
Map Memory Test	21.17	2.73	21.86	2.83
Vividness of Visual Imagery Questionnaire (VVIQ)	61.82	10.02	57.08	14.34
Individual Differences Questionnaire (IDQ)	32.72	3.80	28.66	6.07

low hypnotizable subjects. On the Individual Differences Questionnaire Imagery Scale, high hypnotizables (M = 32.72. Sd = 3.80) scored significantly higher than low hypnotizables (M = 28.66, Sd = 6.07), t (98) = 4.01, p < .001. Similarly, on the Vividness of Visual Imagery Questionnaire (VVIQ) the high hypnotizables (M = 61.82, Sd = 10.02) scored significantly higher than lows (M = 57.08, Sd = 14.34), t (97) = 1.90, p < .05). On the Mental Rotations Test (MRT), high hypnotizables (M = 19.99, Sd = 8.92) tended to score higher than low hypnotizables (M = 17.19, Sd = 7.76), although not significantly, t (98) = 1.67, P < .10. There were no significant differences on the Map Memory Test (MMT) between high (M = 21.17, Sd = 2.73) and low (M = 21.86, Sd = 2.83) hypnotizables t (98) = 1.24.

Accuracy

The Individual Differences Questionnaire Imagery Scale showed a significant correlation with degree of accuracy (r = .18, p < .05). Degree of accuracy did correlate somewhat, but not significantly, with the Vividness of Visual Imagery Questionnaire (r = .15, p < .07). There was no significant correlation with degree of accuracy for the Mental Rotations Test (r = .08) or the Map Memory Test (r = .12).

False Presuppositions

Due to the small subject size in some cells and no difference between high and low hypnotizables as to their responsiveness to false presuppositions, hypnotic level was collapsed. Separate 2 (waking vs.

hypnosis conditions) x 2 (did or did not incorporate false presuppositions) ANOVAs were performed for the four visuo-spatial measures. Presented in Table 10 are the means and standard deviations of each visuo-spatial measure for subjects who did and did not incorporate false presuppositions in direct inquiry.

Subjects who incorporated false presuppositions into the direct inquiry scored significantly lower on the Mental Rotations Test ($M = 16.6$, $Sd = 8.2$, $N = 39$) than those who did not ($M = 23.17$, $Sd = 6.7$, $N = 21$), $F(1,56) = 8.82$, $p < .005$. As expected there was no difference between subjects in the waking and hypnosis conditions ($F > 1$). There was no significant interaction.

On the Map Memory Test, subjects who incorporated false presuppositions ($M = 21.6$, $Sd = 2.4$, $N = 39$) showed a non-significant trend to score lower than those subjects who did not ($M = 22.8$, $Sd = 1.3$, $N = 21$), $F(1,56) = 3.14$, $p < .10$. Because this test is relatively easy, a number of subjects scored perfectly and thus a low ceiling may have inhibited a true expression of individual variation in Map Memory Test skills.

There were no significant main effects or interactions for the VVIQ or the IDQ between those subjects who did and did not incorporate false presuppositions.

Leading Questions

The means and standard deviations for each visuo-spatial measure for subjects responding and not responding to leading questions in the Direct Inquiry are presented in Table 11. Similar ANOVAs to those

TABLE 10

MEANS AND STANDARD DEVIATIONS FOR VISUO-SPATIAL MEASURES FOR SUBJECTS' RESPONSE TO FALSE PRESUPPOSITIONS

VISUO-SPATIAL MEASURE	DID NOT INCORPORATE FALSE PRESUPPOSITION			INCORPORATED FALSE PRESUPPOSITION		
	(N)	Mean	Sd	(N)	Mean	Sd
Mental Rotations Test						
WAKING	(6)	24.83	7.35	(14)	15.14	7.24
HYPNOSIS	(15)	22.50	7.24	(25)	18.14	9.31
Map Memory Test						
WAKING	(6)	23.00	1.22	(14)	22.18	1.88
HYPNOSIS	(15)	22.73	1.56	(25)	21.14	2.98
Vividness Of Visual Imagery Questionnaire						
WAKING	(6)	46.5	24.6	(14)	58.79	15.02
HYPNOSIS	(15)	58.92	9.59	(25)	61.00	11.03
Individual Differences Questionnaire						
WAKING	(6)	29.0	7.78	(14)	30.57	5.00
HYPNOSIS	(15)	31.80	4.87	(25)	31.96	4.88

TABLE 11

MEANS AND STANDARD DEVIATIONS FOR VISUO-SPATIAL MEASURES FOR SUBJECTS' RESPONSE TO LEADING QUESTIONS

VISUO-SPATIAL MEASURE	DID NOT RESPOND TO LEADING QUESTIONS			DID RESPOND TO LEADING QUESTIONS		
	(N)	Mean	Sd	(N)	Mean	Sd
Mental Rotations Test						
WAKING	(30)	18.38	9.13	(10)	18.38	9.13
HYPNOSIS	(52)	18.86	7.72	(8)	18.38	9.98
Map Memory Test						
WAKING	(30)	21.52	3.09	(10)	22.2	1.18
HYPNOSIS	(52)	21.51	3.36	(8)	21.72	2.68
Vividness of Visual Imagery Questionnaire						
WAKING	(30)	54.80	14.34	(10)	59.50	10.0
HYPNOSIS	(52)	59.82	11.51	(8)	64.8	9.94
Individual Differences Questionnaire						
WAKING	(30)	29.0	7.78	(10)	30.57	5.0
HYPNOSIS	(52)	31.80	4.87	(8)	31.96	4.88

performed for false presuppositions (with hypnotic level collapsed) revealed no differences between those subjects who did and did not respond to leading questions on any of the visuo-spatial measures.

CHAPTER IV

DISCUSSION

The unreliability of eyewitness memory was once again clearly demonstrated in the present study. Over half of the sample (63%) incorporated one or more of the false presuppositions and 28% responded to leading questions. High hypnotizable subjects were significantly more accurate in their responses overall than were low hypnotizables, regardless of condition. Hypnosis had no significant effect upon response accuracy, and there were no significant interactions with hypnotic level. Nor did hypnosis have a significant effect upon the degree to which subjects responded to false presuppositions or leading questions. Likewise, hypnotic susceptibility level had no significant moderating effect. In contrast, hypnosis did have a significant effect upon confidence level and this effect was significantly moderated by hypnotic level. Certain visuo-spatial skills were seen to moderate responsiveness to false presuppositions, but not leading questions.

MEMORY DISTORTION IN HYPNOSIS

The idea that hypnosis or hypnotic susceptibility contributes to memory distortion when a false presupposition is given was not supported by the results of this experiment. There were no significant effects across conditions for how frequently subjects recalled a false presupposition in the Direct Inquiry or Free Recall formats. However, examination of subjects' responses highlights the possibility that

hypnosis may not necessarily make subjects more susceptible to incorporating false information, but may intensify the degree to which they are willing to elaborate on this information. Hypnosis did not increase the number of subjects that responded to false presuppositions, but it did significantly increase the confidence level for them and also appeared to increase the degree of elaboration.

Elaborativeness was assessed post hoc by analyzing the verbal descriptions given. In waking the confabulations were less detailed than in hypnosis. When asked what the thief did when he left the victim, common responses from waking subjects who had been told that a person joined the thief were:

> ...He met with somebody, that's all I can remember. (low hypnotizable subject)
>
> ...He took the wallet, then they smiled at each other, then he walked off and met another lady. (low subject)
>
> ...He crossed the street and met with some other person. (low subject)
>
> ...He went to the corner and was going to cross the street at which time someone came over to talk to him. (high subject)
>
> (Later, when asked to describe the person this subject responded:
>
> ...Can't remember him.)

Only one waking response gave much detail. This low hypnotizable subject recalled:

> ...seemed like he was talking to somebody he knew, looked like they knew each other. He was a middle age guy, starting to bald. The old guy was wearing glasses, maybe a pair of jeans and jacket.

By contrast, ten out of forty responses in hypnosis were considered to

be embellished. Three lows and seven highs gave these. Take for instance a story presented in free recall by a low hypnotizable in hypnosis who had been given the false information that there was a person who joined the thief after the theft:

> ...(the thief) went to a bar, I think, and talked to a bunch of guys in the bar and the bartender.

Later, when asked in the direct inquiry to describe the person who joined the thief, the subject responded:

> ...He had on a mechanics outfit.

Another description, again from a low hypnotizable in hypnosis, was first in free recall:

> ...He (the thief) said goodbye and walked on and met his cohort at the corner.

The comments of this subject elucidate how previous memories may be combined with the memory of the slide presentation to create confabulation. This "amalgamation" of memory was also reported by Putnam (1979) who found that one of his subjects confabulated letters of a license plate in hypnosis. The subject later recalled, in waking, that the letters were actually those of a friend's license plate.

It is interesting to speculate on why this subject confabulated a story that then minutes later, in the waking state, she denied. Did she associate what she "might have seen. . .before" with the slide presentation and then combine the two into one event? Would she have confused the two events had she not been in hypnosis? As Orne (1981) has noted, hypnotic subjects may weave truth and fantasy together. They may use prior information and all available cues in an inconsistent and unpredictable fashion. In the subsequent waking state the

subject was able to identify and correct her confused associations. But had she been in an actual investigative situation she may have been given instructions in hypnosis to the effect that her confabulated story would become solidified, and she might not have questioned herself. Karlin (1983) provides an example of how a victim's sketchy memory may have been solidified by. . ."hypnotic suggestions, her beliefs about hypnosis, the prestige of doctor, and the encouragement of the police. . ." (p. 8).

What role hypnosis and hypnotic susceptibility play in the extent to which a subject is willing to embellish misled perceptions is not known, but warrants further investigation. If hypnosis enhances visual memory processing (e.g., Crawford & Allen, 1983) then it could also create a situation in which confabulation (false memories) becomes more vivid and embellished. The resulting story, obtained through hypnosis, could be high convincing. Stalnaker and Riddle's (1932) subject, who so aptly mimicked Longfellow's second stanza of the Village Blacksmith, stands in testimony to this. Orne (1981) points out that in most cases it is not possible to differentiate memory distortion or confabulation from accurate memories in eyewitness reports. A well embellished, but distorted eyewitness account, strengthened by hypnotic suggestion, could pose a particular problem in a court situation where the trier of fact may have little to go on except the believability of a witness's report. Believability of a witness's account in forensic studies has been shown to be influenced by the confidence level of the eyewitness (Wells, Lindsay, & Furguson, 1979).

MEMORY ENHANCEMENT IN HYPNOSIS

Supporting several other studies in the hypnosis/eyewitness literature (Putnam, 1979; Zelig & Beidleman, 1981; Sheehan & Tilden, 1983), the present research demonstrated that hypnosis did not enhance memory accuracy and there were no moderating effects from hypnotic level. Interestingly, high hypnotizables in both waking and hypnosis conditions, were significantly more accurate in their responses to objective questions than were lows. That high hypnotizable subjects demonstrated better recall abilities might be explained by imagery ability differences. There is evidence that imagery assists memory, particularly memory of a pictorial nature (Ernest, 1977). High hypnotizables in the normal waking state have reportedly been more able to image things (for review, see Sheehan, 1979). In the present study high hypnotizable subjects reported greater imagery abilities than did low hypnotizable subjects.

Although hypnosis did not improve the recall ability of high hypnotizables, post-hoc analysis of subjects' exit interviews highlights the possibility that highly hypnotizable subjects in hypnosis recall more salient or colorful items, perhaps to the exclusion of detailed memory of more peripheral things. During the exit interview, subjects were asked how they recalled the information asked for. High hypnotizables who had been in hypnosis described vivid images and impressions. The experience of "color" was reported spontaneously by seven high hypnotizables, five of them during hypnosis and two during waking. There were no reports of "color" offered by low hypnotizables in any condition. The following comments were made by high

hypnotizables about their hypnotic recall experiences:

> ...I just remembered colors, what people were wearing, what they looked like - I had a picture of the guy who stole the wallet and the victim in my mind as you asked the questions. The other people weren't as strong. I think that's because I was concentrating on those two...
>
> ...Probably the colors. Like the color of the purse, the color of the pocket book. (E: Did you see the colors?) Yes (E: Did you see the slides?) Not really. I saw the colors of the building but I wasn't really aware of what it was...
>
> ...Just visual pictures in my mind...colors and things I remember seeing...
>
> ...I just formed impressions of the colors and attitudes of the people...

The comments offered by these highly hypnotizable subjects about their hypnosis experience suggest a vivid and holistic cognitive processing mode. Contrast them to this comment made by a low hypnotizable who had been asked to recall the slides in hypnosis?

> ...I couldn't see anything. I was supposed to see a picture, I didn't, I didn't see the slide. It was just details I had in my mind, but it wasn't in pictures, it was like remembering a question on a test.

Similarly, this low hypnotizable reported:

> ...I don't think I pictured it (the slide), more of a verbal memory, because I remember saying to myself what she (the victim) had on, then I'd remember it.

The above verbal responses suggest that during hypnosis high hypnotizables, but not lows, shifted from a more detail-oriented recall strategy to a more imaginal and holistic-oriented strategy. Sanders and Simmons (1982) similarly noted that subjects during hypnotic recall of eyewitnessed events appeared to be more aware of the salient fea-

tures of an event and perhaps less aware of specific details. There is recent evidence that hypnosis may facilitate a shift from a more analytic and linear cognitive strategy for processing information to a more holistic and imaginal cognitive strategy, and that this shift is moderated by hypnotic level (Crawford & Allen, 1983; Crawford, Nomura, & Slater, 1983; for review, see Crawford, 1982). These findings and the present research indicate that there may be individual differences in the ability to recall central and peripheral information in an eyewitness paradigm. It would be of value to do future research which investigates eyewitness testimony in light of moderating factors of cognitive strategies, type of information recalled (peripheral vs. central), condition (waking vs. hypnosis), and hypnotic level.

LEADING QUESTIONS

In the present study, hypnotic state and hypnotic level had no significant effect upon responsiveness to leading questions. While Putnam (1979) and Zelig and Beidleman (1981) concluded that hypnosis increased the likelihood that subjects would be misled by leading questions, both of these studies were based on a small sample size (16 and 36 respectively) and did not examine hypnotic susceptibility level as an independent variable. Sheehan and Tilden (1983), on the other hand, examined hypnotic susceptibility in a study of 96 subjects. They found that neither hypnotic level nor a hypnotic recall technique influenced subjects' responsiveness to leading questions.

Subjects in the present study showed less of a tendency to respond to leading questions than they did to false presuppositions. Only 27% of the subject population responded to one or more of the leading questions, while 63% of the presupposition groups responded to one or more of the false statements presented.

That two of the leading questions contained blatantly false information may be the reason that they were rejcted by the majority of subjects. Loftus (1979) has noted that blatant misinformation is more often rejected by subjects and causes them to be more resistant to other more subtle misinformation that they ordinarily would be inclined to accept. In the present study, while some of the subjects did indeed reject the blatantly false information presented in the leading questions, this did not seem to cause them to scrutinize all of the false information given them. Over half of the subjects in the presupposition groups incorporated one or more false presuppositions into their responses after they had been asked all of the leading questions. None of the subjects reported in the exit interview that they were suspicious of the experiment or felt that they had been tricked, although some expressed doubt in the accuracy of their own memories. Still, given Loftus' (1979) observations, one might wonder if more subjects would have incorporated false information had the leading questions not been present.

CONFIDENCE LEVELS

Degree of confidence for both accurate and inaccurate information was significantly affected by both condition and hypnotic level.

Across all conditions high hypnotizables were more confident of their accurate responses than were lows. Therefore, high hypnotizable subjects were both more accurate and more confident of their correct responses than were low hypnotizables. For incorrect or misled (leading questions and false presuppositions) responses, high hypnotizables were less confident than lows when they were in the waking state. When hypnotized, high hypnotizables became more confident of their incorrect or misled responses while low hypnotizables became less confident. Thus, in hypnosis, high hypnotizables were more confident of their incorrect or misled responses than low hypnotizable subjects.

Hypnosis has been reported to increase the confidence that subjects place in their memories (DePiano & Salzberg, 1981; Putnam, 1979; Sheehan & Tilden, 1983). This increase in confidence might be attributed to a relaxing quality of the hypnotic state (Hilgard & Hilgard, 1975) which might engender a sense of well being and hence confidence. Heightened confidence has been particularly noted for high hypnotizables, despite the fact that what they remember is often inaccurate (Putnam, 1979; Zelig & Beidleman, 1981; Sheehan & Tilden, 1983). Putnam (1979) reported that hypnotized subjects, although less accurate in their responses to leading questions, believed that they were more accurate than they would have been without hypnosis. Sheehan and Tilden (1983) noted similar results, and pointed out that this increase in confidence carried over into the waking state after hypnotic state instructions had been removed.

Dywan and Bowers (1983) have suggested that the inflated confidence during hypnosis noted in high hypnotizables may be explained by the vivid imagery that they experience in hypnosis. Support for this idea comes from recent evidence that high hypnotizables may be more able to image things (for review see Sheehan, 1979). Dywan and Bowers speculate that this vivid imagery might be experienced not only for events that these highly hypnotizable subjects have actually witnessed, but for their own associations to these events as well. Consequently, they could probably be as confident of their false associations as they are of their accurately recalled material.

That high hypnotizables may feel as confident of information correctly remembered from a witnessed event recalled in hypnosis as they do of information incorrectly recalled, has important implications in a courtroom setting. Eyewitness research has shown that juries are more willing to believe a witness who appears confident than one who has less confidence (Wells, Lindsay, & Ferguson, 1979). Believability in a witness might further escalate if the juror holds the belief that hypnosis improves recall (Orne, Soskis, Dinges, & Orne, in press).

VISUO-SPATIAL SKILLS

That high hypnotizables are more accurate in their recall of objective events than low hypnotizables was demonstrated in the present research. Results also suggested that this accuracy in recall was slightly related to self-report imagery measures: the VVIQ, which measures imagery vividness, and the IDQ-imagery scale, which assesses

the degree to which a person thinks in imaginal terms. This link is further supported by the finding that high hypnotizables were significantly more accurate than lows in their recall of objective information and that high hypnotizables scored higher than lows on the VVIQ and IDQ-imagery scale questionnaires. In total, this provides suggestive evidence for a possible relationship between memory accuracy and self-reports of imaginal processing abilities (for review, see Ernest, 1977).

There is also evidence that subjects who responded to a false-presupposition were less skilled on the visuo-spatial tasks that contained a spatial memory component (Mental Rotations Test and Map Memory Test) than those who did not demonstrate susceptibility to false presuppositions. Thus, spatial memory skill appears to be a variable defining individual differences in subjects' vulnerability to misleading information.

That subjects with high visuo-spatial ability perform memory tasks significantly better than those with low ability has been cited in the literature (e.g., Ernest, 1977). Dywan and Bowers (1983) has suggested that visuo-spatial abilities, as assessed by the VVIQ, may moderate the relationship between hypnosis and eyewitness memory. The results of the present investigation support this hypothesis and suggest that the self-report questionnaires of imagery abilities (VVIQ and IDQ-imagery scale) may serve as predictors of eyewitness accuracy. Furthermore, as expected, the present findings suggest that subjects who have less adequate spatial memory (as defined by the Mental Rotations Test and Map Memory Test) may be more susceptible to leading questions and false

information. While the relationship between visual-spatial skills and eyewitness memory is far from determined, it deserves increased attention in the hypnosis/eyewitness literature.

CHAPTER V

SUMMARY AND CONCLUSIONS

In sum, the results of this study demonstrated that high hypnotizables in both waking and hypnosis could better recall the details of a witnessed event than low hypnotizables, and that this difference may be moderated by underlying imagery ability differences. A post-hoc analysis of subjects' responses highlights the possibility that hypnosis might enhance the intensity of visual imagery and create a shift into a more impressionistic, or holistic, cognitive processing style. It was observed that highly hypnotizable subjects in hypnosis may zero in on salient or colorful aspects of a witnessed event but be less aware of peripheral details. When confronted with false information, high hypnotizables in hypnosis were not more likely to incorporate it into their memory than low hypnotizables or than those subjects in waking. However, when they did incorporate the false information, their stories appeared more embellished with details than accounts offered by other subjects particularly during hypnosis.

Results also demonstrated that hypnosis and hypnotic level can affect the confidence that subjects place in their memories. Highly hypnotizable subjects in hypnosis were very confident of what they remembered, more so than lows, despite the fact that what they remembered may have been wrong or misled. Low hypnotizable subjects were more confident of their accurate responses curing hypnosis but appropriately decreased their confidence when they answered wrong or were misled.

These conclusions placed in the context of an eyewitness situation argue that hypnosis could be a risky and inexact technique if used to enhance recall of a witnessed event. First of all, a witness asked to recall an event in hypnosis may not remember more of what took place than if he or she were in the waking state. Further, there is a possibility that hypnosis can enhance visual imagery in highly hypnotizable subjects. The drawback here for eyewitness testimony is that this visual imagery may be not only for feature items that were witnessed in an event, but also may include associated items that were not witnessed and did not actually exist. Unfortunately, we have no way to discriminate between true memories and false memories which are presented in a courtroom situation. Moreover, as the present research as well as previous research demonstrates, hypnotic subjects could probably be as confident of their vividly imagined false memories as they are of their accurately recalled ones. Placed on a witness stand, an eyewitness whose false memories had been reinforced by hypnotic suggestion could appear highly confident and resistant to cross-examination that might otherwise discredit the testimony.

All conclusions drawn from the present study must be tempered by the understanding that some of the findings and observations are based on limited and suggestive evidence. Further research is needed to explore cognitive differences between waking and hypnosis as moderated by hypnotic level, the relationship between hypnotic eyewitness memory and imagery abilities, and whether there is a qualitative difference between hypnosis and waking memory distortion.

In addition, it is possible that the present study has little or no generalizability to an actual eyewitness experience. Certainly the suddeness of a crime is difficult to replicate in a laboratory setting. Such factors as level of attention, emotional reactions, and motivation might be different in persons who participate in a laboratory eyewitness situation and those who have witnessed a crime. Ethical constraints limit the extent to which experimental subjects can be exposed to the stress of even a simulated crime.

Information gleaned from laboratory experiments combined with studies arising from applied settings should give increasing insight into how the legal system might best utilize the technique of hypnosis and avoid its misuse.

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APPENDIX

APPENDIX A

HYPNOTIC INDUCTION AND REGRESSION INSTRUCTIONS

STANDARD HYPNOSIS CONDITION AND AGE REGRESSION INDUCTION

I am now going to give you instructions to enter a deep state of hypnosis. Please make yourself comfortable in the chair, remaining seated upright with your arms either on the arms of the chair or in your lap. Now, please close your eyes and keep them closed until I tell you to open them. I am going to give you some instructions which will help you gradually to enter a state of hypnosis.

Just listen carefully to my voice. If your thoughts wander away from it, that is all right, but bring your attention back to it. Sometimes my voice may seem to change a little, or sound as if it were coming from far off. That is all right. Just keep listening to my voice as you become more and more relaxed. Wahtever you feel is happening, just let it happen.

Relax more and more. As you think of relaxing, your muscles will relax. Starting with your right foot, relax the muscles of your right leg. . . .Now the muscles of your left leg. . . .just relax all over. Relax your right hand, your forearm, upper arm, and shoulder. . . . That's it. . . .Now your left hand. . . .and forearm and upper arm . . . .and shoulder. Relax your neck, and chest. . . .more and more relaxed. . . .completely relaxed.

As you become relaxed, your body will feel sort of heavy or perhaps numb. You will begin to have this feeling of numbness or

heaviness in your legs and feet. . . .in your hands and arms. . . . throughout your body. . . .as though you were settling deep into the chair. You are getting more and more relaxed.

You are relaxed, very relaxed. By letting yourself go you can become even more relaxed. You can reach a state of deeper, more complete relaxation. You are becoming increasingly relaxed and hypnotized. It is easier to bring back your thoughts from other things and to attend only to my voice. More and more deeply relaxed.

You are relaxed, very relaxed. Your whole body feels so comfortable and good. You feel a pleasant warm tingling throughout your body. Keep your thoughts on what I am saying; listen to my voice. Soon there will be nothing to think of but my voice and my words, while you relax more and more. You feel so good and comfortable. Going deeper and deeper into a state of hypnosis in which you would like to be today.

You feel pleasantly relaxed as you continue to listen to my voice. Just keep your thoughts on what I am saying. You are going to get much more relaxed. Soon you will be very deeply hypnotized and you will not wake up until I or Ms. Rainer tell you. . . .Soon I shall begin to count from one to twenty. As I count you will feel yourself going down farther and farther into a deep state, a state in which you will be able to do all sorts of things I ask you to do without waking up . . . .One-- you are going to go more deeply. . . .Two-- down, down into a deep state. . . .Three--four-- more and more. . . .Five--six-- seven-- you are sinking into a deep, deep state. Nothing will disturb

you. I would like you to hold your thoughts on my voice and those things I ask you to do. You are finding it easy just to listen to the things I tell you. . . .Eight--nine--ten-- halfway there--always deeper. . . .Eleven--twelve--thirteen--fourteen--fifteen-- although deep you can hear me clearly. You will always hear me distinctly no matter how deep you feel yourself to be. . . .Sixteen--seventeen--eighteen-- deep. . . .Nineteen and twenty. Deep. You will not wake up until I or my assistant tells you to. You will wish to remain in this comfortable state and proceed with the experiences and tasks I describe to you.

You will be able to speak easily, and remain just as hypnotized now. It is easy to interact with the environment around you and remain as deeply hypnotized as you are now. No matter what you do, you will remain hypnotized until one of us tells you otherwise. . . .

HYPNOTIC REGRESSION

Now I want to tell you something interesting. Perhaps you know this, but a hypnotized person can recall past events much better than when he is not hypnotized, and in fact often has total recall for things completely forgotten. I am now going to give you instructions to return to yesterday when you were watching the slide presentation so that you may remember everything that you saw. After that, another researcher will come in and ask you questions about the slides that you saw. I am going to count to five and at five you will find yourself once again watching the slides on the screen just as you did yesterday.

But, this time you will find that you can look at each slide as long as you wish in order to obtain the information that you need. You will be able to zoom in on details of the slide, much like a movie camera zooms in on certain parts of a scene. Or, you will see the entire slide. It will be just as clear as when you saw it the first time. After my counting to five, another researcher will come in and ask you questions about the slides you saw. You will be able to see the slides on the screen in your mind's eye and find the answers to the questions asked. Ok, now I am going to count to five. At the count of five you will be back to yesterday. One. . . .you are going to remember quite clearly all of the things you saw. . . .Two. . . .the memory is beginning to come back. . . .coming back. . . .you are beginning to remember. . . . Three. . . .soon you will remember what it was you saw. . . .Four. . . . you are remembering, more and more clearly. . . .Five!. . . .you are now watching the slide presentation. Ms. Rainer will now come in and ask you some questions. You will watch the slide presentation in your mind's eye and pick out the information to answer the questions asked.

APPENDIX B

RECALL QUESTIONS

FREE RECALL QUESTIONNAIRE

Please answer each of the following requests in detail. No detail is too small to deserve mention. After answering each question, I would like you to indicate how confident you are of your answer on a scale of one to five where one represents a gues and five represents absolute certainty.

1.) Describe the young woman's (the victim's) appearance for me.

How confident are you? 1 2 3 4 5

2.) Describe the man's (the thief's) appearance for me.

How confident are you? 1 2 3 4 5

3.) Tell me what the thief did after he left the victim. Where did he go? What did he do?

How confident are you? 1 2 3 4 5

4.) Tell me about the people who talked to the victim after the incident. What did they look like? What were they wearing?

How confident are you? 1 2 3 4 5

DIRECT QUESTIONNAIRE

E. Now I would like you to consider and review the slide sequence that you saw yesterday. After answering each question, I would like you to indicate how confident you are of your answer on a scale of one to five where one represents a guess and five represents absolute certainty.

Where did the incident take place? (not scored)

NOW CONSIDER:

1.) At the very beginning of the sequence, the victim passed under an overhanging sign. What did it say? 1 2 3 4 5

2.) In the first slide, where several gum ball machines in front of a store. What color were they? 1 2 3 4 5

3.) What was on display in the store window in the first slide? 1 2 3 4 5

4.) Consider now the victim. What kind of top was she wearing? 1 2 3 4 5

5.) What color top was she wearing? 1 2 3 4 5

6.) Did the victim have pants or a skirt on? 1 2 3 4 5

7.) What color? 1 2 3 4 5

8.) What color hair did the victim have? 1 2 3 4 5

9.) Did she have anything on her head or face? 1 2 3 4 5
Yes____ No____ If yes, what?

10.) Did the victim carry a purse? Yes____ No____ 1 2 3 4 5
If so, where did she carry it?

11.) If yes, what color was it? 1 2 3 4 5

12.) Was the victim carrying anything else? 1 2 3 4 5
Yes____ No____ If yes, what was it?

13.) If yes, what color was it? 1 2 3 4 5

14.) The victim and her friend stopped to look in 1 2 3 4 5
a store window. What was on display in the window?

15.) Now consider the victim's friend (the woman with 1 2 3 4 5
her before the theft). What color hair did the
victim's friend have?

16.) What kind of top was the victim's friend wearing? 1 2 3 4 5

17.) Was she wearing pants or a skirt? 1 2 3 4 5

18.) Was the victim's friend carrying a purse? 1 2 3 4 5
Yes____ No____ What color was it?

19.) Was the victim's friend carrying anything else? 1 2 3 4 5
Yes____ No____ If yes, what?

20.) What color was it? 1 2 3 4 5

21.) Where was the thief standing before the theft? 1 2 3 4 5

What was he standing next to?

22.) What did the thief take from the victim? 1 2 3 4 5

23.) What color was it? 1 2 3 4 5

24.) When the victim saw the thief take the wallet 1 2 3 4 5
out of the purse, what did she do?

25.) Now consider the thief. Did the thief have any facial hair? Yes____ No____ If yes, describe. 1 2 3 4 5

26.) What color hair did he have? 1 2 3 4 5

27.) Was he wearing anything on his head? Yes____ No____ If so, what? 1 2 3 4 5

28.) If so, what color was it? 1 2 3 4 5

29.) What color was the thief's jacket? 1 2 3 4 5

30.) Was there anything written on the jacket? Yes____ No____ If so, what was written on it? 1 2 3 4 5

31.) What color were the thief's pants? 1 2 3 4 5

32.) Where was the gun on the thief's body? 1 2 3 4 5

33.) With which hand did the thief steal the wallet? 1 2 3 4 5

34.) Was there a vehicle parked next to the scene of the crime? Yes____ No____ If so, what type was it? 1 2 3 4 5

35.) If so, what color was the vehicle? 1 2 3 4 5

36.) If so, what were the colors of the license plate? 1 2 3 4 5

37.) If so, what were the letters and/or numbers on the license plate? 1 2 3 4 5

38.) What did the thief do after the theft? 1 2 3 4 5

39.) Describe the person who joined the thief after the theft. 1 2 3 4 5

40.) How many people came up to assist the victim after the theft? 1 2 3 4 5

41.) Describe the people who came to assist the victim after the theft. (If the answer does not include gender, ask, "What sex were they?") 1 2 3 4 5

APPENDIX C

EXIT INTERVIEW

1.) Did you have any idea of what the experiment was about before coming here today? If yes, explain.

2.) Did you make any attempts to remember the slide sequence after you left yesterday? If so, what did you do?

3.) How did you recall the memory for the slides? What techniques did you use to recall the information?

Other comments: