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Hypnotic pseudomemories: The effects of stimulus factors and the timing of suggestion report

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HYPNOTIC PSEUDOMEMORIES: THE EFFECTS OF STIMULUS FACTORS AND THE TIMING OF SUGGESTION REPORT

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HYPNOTIC PSEUDOMEMORIES: THE EFFECTS OF STIMULUS FACTORS AND THE TIMING OF SUGGESTION REPORT

by

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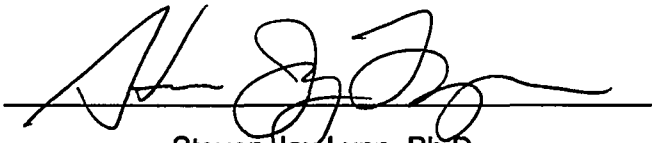

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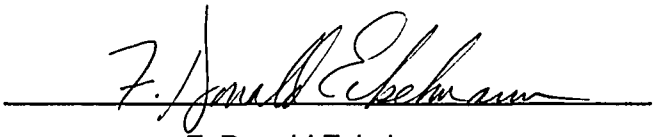

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Abstract

Subjects received false memory suggestions for either an event with a high baserate of occurrence and a low likelihood of being remembered (door slam) or an event with a low baserate of occurrence and a high likelihood of being remembered (telephone ringing). It was predicted that the door slam stimulus would generate a higher pseudomemory rate than the telephone ring. It was also predicted that subjects who reported on their experience of the target events during hypnosis would evidence a higher rate of pseudomemory following hypnosis than subjects who did not report until after hypnosis. 190 highly hypnotizable subjects were age regressed to an earlier session and received a suggestion to hear either a door slam or the telephone in the room ring. Contrary to predictions, the pseudomemory rates did not differ for the 79 subjects who met the initial inclusion criteria. However, when a stringent set of criteria was used which included only those subjects who evidenced considerable involvement in age regression, the pseudomemory suggestion, and hypnotic depth (N = 39), 63.2% of subjects who received the suggestion to hear the door slam reported pseudomemory in response to direct, forced-choice questions following hypnosis, compared with a pseudomemory rate of only 25% for subjects who received the telephone ring suggestion. Subjects who received the door slam suggestion were more likely to report pseudomemory at least once during the testing periods and reported pseudomemory more often on the four measures of pseudomemory than subjects who received the telephone ring suggestion. Pseudomemory subjects reported more pseudomemory in response to non-suggested

events and were less confident about their recall than subjects who did not report pseudomemory. Consistent with previous research, the majority of subjects who reported pseudomemory also reported that the noises were suggested. Subjects' pseudomemory responding was not always consistent with their beliefs about the expectations of the hypnotist and the responses of excellent hypnotic subjects. The hypothesis that subjects who provided an observable report during hypnosis would feel pressured to report pseudomemory following hypnosis was not supported.

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The support of my family made my university experience possible. My wife Helen has patiently put up with the seemingly endless task of completing a doctorate. She has allowed me to indulge myself. Our children Alexander and Rachel know me only as a father who always has a dissertation to work on. I look forward to the opportunity to spend more time with them. It was their inspiration that kept me going.

Thanks also to my mother Liisa and my stepfather Wallace for their support and encouragement

I dedicate this thesis to my father William Morris Weekes, M.A., Q.C. (1925-1985). I regret the fact that he has missed all of the important things that have happened to me in the eight years since his death, but I am grateful for the fact that he was able to travel to Athens with me on one of my first trips and to see for himself the place that was to have such a significant impact on my life.

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Introduction

Historically, the influence of hypnosis on human memory has been a focal point in the scientific study of hypnosis (see Ellenberger, 1970). Beginning with Bernheim (1888/1973), Forel (1889/1973), and Janet (1906), investigators have been intrigued by the phenomenon of hypnotically-induced memories, or pseudomemories, as they are termed today (Laurence & Perry, 1988). Contemporary hypnosis researchers of diverse theoretical stripe have actively begun investigating hypnotic pseudomemories (e.g., Barnier & McConkey, 1992; Labelle, Laurence, Nadon, & Perry, 1990; Labelle & Perry, 1986; Laurence, Nadon, Nogrady, & Perry, 1986; Laurence & Perry, 1983; Lynn, Milano, & Weekes, 1991; Lynn, Rhue, Myers, & Weekes, 1992; Lynn, Weekes, & Milano, 1989; McCann & Sheehan, 1987, 1988; Orne, 1979; Sheehan, Statham, & Jamieson, 1991a, 1991b; Spanos, Gwynn, Comer, Baltruweit, & de Groh, 1989; Spanos & McLean, 1986; Weekes, Lynn, Green, & Brentar, 1992). In large part, this recent interest has been fueled by the increased and controversial application of hypnosis within the forensic arena (Orne, 1979).

Some investigators (e.g., Labelle, et al., 1990; Laurence & Perry, 1983; Orne, 1979) argue that pseudomemory reports, typically exhibited by hypnotic subjects within existing laboratory paradigms, reflect genuine modifications of memory. However, a growing body of research has challenged this viewpoint by emphasizing the pivotal role played by a variety of contextual, social, and stimulus factors in the genesis of pseudomemory reports (e.g., Barnier & McConkey, 1992; Lynn,

et al., 1989, 1991; McCann & Sheehan, 1987, 1988; Spanos et al., 1989; Spanos & McLean, 1986; Weekes et al., 1992).

This dissertation reviews the existing literature on hypnotically induced pseudomemory and highlights a study that investigated the extent to which stimulus factors and social factors influence experimental subjects' reports of pseudomemory.

Historical Cases of Hypnotically-Induced Memory Modification

As early as 1787, the influence of hypnosis on memory was reported by Deleuze and Bertrand (described in Ellenberger, 1970, pp. 113-114) in discussions concerning the phenomenon of posthypnotic amnesia (i.e., the apparent failure of subjects to remember targeted material following the termination of hypnosis). Later, the clinical writings of Bernheim, Janet and Forel reflected their belief that hypnotic suggestions were capable of permanently altering patients' memory for previously experienced events. This phenomenon, which has come to be known as hypnotically-induced pseudomemory, is exemplified in Bernheim's dramatic case of "Marie, G.":

> "...here is the case of a somnambulist, Marie G...., an intelligent woman... I hypnotize her into a deep sleep and say, 'you got up in the night?' She replies, 'Oh, no.' 'I insist upon it; you got up four times to go to the water closet, and the fourth time you fell on your nose. This is a fact, and when you wake up no one will be able to make you believe the contrary.' When she wakes I ask, 'How are you now?' 'Very well,' she answers, 'but last night I had an attack of diarrhea. I had to get up four times. I fell, too, and hurt my nose.' I say, 'You

dreamed that. You said nothing to me about it right now. Not one of the patients saw you.' She persists in her statement, saying that she had not been dreaming, that she was perfectly conscious of getting up, that all the patients were asleep; - and she remains convinced that the occurrence was genuine" (pp. 164-165).

Similarly, Janet (1988/1973) utilized hypnotic suggestion to modify traumatic memories in his patients. He removed the symptoms of hysterical monocular blindness in his patient, Marie, by administering suggestions to change her memory of the experiences which had purportedly caused the problem.

More recently, hypnosis has been used as a technique for modifying memory in such diverse clinical syndromes as premature ejaculation (Erickson, 1935, 1944), phobias (Baker & Boaz, 1983; Lamb, 1985), and anxiety reactions (Miller, 1986), as well as in the study of experimentally-induced conflict (Reyher, 1962; Reyher & Smyth, 1971; Sheehan, 1969; Smyth, 1982).

Forensic Applications of Hypnosis

Hypnosis has been used with increased frequency in recent years within the forensic context as a memory enhancement technique (Ault, 1980; Concour, 1980; Douce, 1979; Gold, 1980; Graham, 1980; Hayward & Ashworth, 1980; Kassinger, 1979; Kleinhauz, Horowitz, & Tobin, 1977; Laurence & Perry, 1983a; Levitt, 1981; Millwee, 1979; Orne, 1979; Reiser, 1978, 1980; Robinson, 1979; Salzberg, 1977; Shafer & Rubio, 1978; Spector & Foster, 1977, 1979; Stratton, 1977; Teitelbaum, 1963a; Teten, 1979; Wilson, 1979). Hypnosis has been used to obtain:

(1) details of crime scenes (Douce, 1979; Kleinhauz, et al., 1977; Kroger & Douce, 1979, 1980; Robinson, 1979; Stratton, 1977), (2) physical descriptions of suspects (Douce, 1979; Kleinhauz, et al., 1977; Kroger & Douce, 1979, 1980; Robinson, 1979), (3) descriptions of weapons (Kleinhauz, et al., 1977), (4) details of conversation (Kroger & Douce, 1979, 1980; Robinson, 1979), and (5) to break amnesic barriers (Davis, 1960; Dilloff, 1977). As well, hypnosis has been touted as a method of determining the truth (Arons, 1967; Danto, 1979; Mutter, 1979; Weinstein, Abrams, & Gibbons, 1970), evaluating sanity or state of mind (i.e., mens rea; Hayward & Ashworth, 1980; Sarno, 1979; Spector & Foster, 1979), preparing witnesses and victims for trial (Bryan, 1962; Hayward & Ashworth, 1980), detecting malingering (Levy, 1955; Teitelbaum, 1963), and obtaining statements and confessions (Arons, 1977 Teten, 1979).

Advocates (e.g., Arons, 1967; Hayward & Ashworth, 1980; Hibbard & Worring, 1981; Kroger & Douce, 1979; Reiser, 1978, 1980; Shafer & Rubio, 1978; Stratton, 1977) attest to the beneficial effects of hypnosis and endorse its routine use as an important adjunct to standard police interview procedures. For instance, Hayward and Ashworth (1980) purport that hypnosis can, "induce a mental state which facilitates recall and enables the subject to produce more information than he would be able to provide in the so-called waking state" (p. 471). Buttressing this claim, Reiser (1980) has reported that, "Of the approximate 70 cases in the data base at that point (June, 1976) it was estimated that in approximately 77%, information was

elicited under hypnosis of importance to the case investigator that was not previously available on routine interview" (p. xv). Similarly, Chief Daryl Gates of the Los Angeles Police Department has reported that between July, 1975 and December, 1978, hypnotically-aided inquiry generated information deemed useful to police investigations in 64% of cases (229/357 cases; Reiser, 1980, p. xii). Additional anecdotal data indicate that new information was obtained using hypnosis in 60% (Kroger & Douce, 1979) and 78% (Wilson, 1979) of forensic cases examined.

The theoretical basis for the forensic use of hypnosis is premised on the assumption that memorial records of experience are permanently stored, are accessible, and are relatively immutable to change (see Reiser, 1980). For example, Reiser's description cited in People v. Shirley (1982) typifies this perspective "[Memory] is like a videotape machine that (1) faithfully records, as if on film, every perception experienced by the witness, (2) permanently stores such recorded perceptions in the brain at a subconscious level, and (3) accurately 'replays' them in their original form when the witness is placed under hypnosis and asked to remember them" (p. 57).

However, this "videotape" model of memory has largely been refuted by contemporary research (e.g., Alba & Hasher, 1983). Alternatively, a reconstructive view of human memory (e.g., Alba & Hasher, 1983; Bartlett, 1932; Goodman & Hahn, 1987; Hintzman, 1978; Loftus, 1975; Loftus & Loftus, 1980) has received considerable support from research. This latter perspective emphasizes the role of the subjects'

beliefs and affect in shaping recall (Loftus, Korf, & Schooler, 1989). For instance, Dawes (1988) notes:

> Our recall is often organized in ways that 'make sense' of the present - thus reinforcing our belief in the conclusion we have reached about how the past has determined the present. We quite literally 'make up stories' about our lives, the world, and reality in general. The fit between our memories and the stories enhances our belief in them. Often, however, it is the story that creates the memory, rather than vice versa (p.107).

Alba and Hasher (1983) describe the process further: "what is encoded, or stored in memory, is heavily determined by a guiding schema or knowledge framework that selects and actively modifies experience in order to arrive at a coherent, unified, expectation-confirming and knowledge-consistent representation of experience" (p. 203).

Selected Laboratory Studies Examining the Effects of Hypnosis on Memory

Although some investigators (e.g., DePiano & Salzberg, 1981; Griffin, 1980; Stager & Lundy, 1985) have reported memory enhancement or "hypermnesia" with hypnosis, observed effects may be dependent upon the type of material targeted for recall. For instance, studies by DePiano and Salzberg (1981) and Dhanens and Lundy (1975) found improved recall performance for meaningful rather than for nonmeaningful stimulus material.

In a series of six studies, Sheehan and his associates (Sheehan & Grigg, 1985; Sheehan, Grigg, & McCann, 1984; Sheehan & Tilden, 1983,

1984, 1986) systematically investigated the impact of misleading information on recall. The investigators adapted Loftus's "misleading information" paradigm (e.g., Loftus, Miller & Burns, 1978) for use in the hypnotic context. Briefly, subjects were presented with a series of slides depicting a purse-snatching incident. Subjects were then subtly presented with misleading information, usually in the form of a leading question for an event that did not actually take place. Subjects were then tested for recall. The studies varied: 1) level of hypnotizability (high, low), 2) type of instruction (hypnosis, waking, simulating), 3) type of memory test (free recall, recognition), and 4) timing of misinformation delivery (before hypnosis, after hypnosis).

Overall, this research found no evidence of increased accurate recall with hypnosis (see also, Buckhout, Eugenio, Licitra, Oliver, & Kramer, 1981; Smith, 1983; Dwyan, 1988; Wagstaff, 1984; Whitehouse, Dinges, Orne, & Orne, 1988; Yuille & McEwan, 1985). .Moreover, these studies demonstrated that, at least under some testing conditions, hypnosis and hypnotic susceptibility interacted to produce increased distortions in memory reports. These results are harmonious with theorizing (e.g., Dwyan & Bowers, 1983; Orne, et al., 1984; Smith, 1983) which suggests that hypnosis may distort the retrieval of information from memory by reducing critical judgment in response to memory tests than under normal (i.e., "waking") circumstances. As a result, hypnotizable subjects evidence an increased propensity to introduce inaccuracies and fabrications into their memory reports, (Diamond, 1980; Dywan & Bowers, 1983; Orne, 1979), evidence increased susceptibility to

leading questioning (Putnam, 1979; Saunders & Simmons, 1983; Zelig & Beidleman, 1981), and, in turn, may be prone to interpret distorted memories as veridical experiences (Orne, 1961, 1979; Sheehan & Tilden, 1983).

Hypnotic Creation of Pseudomemories

As far back as Bernheim, Forel, and Janet, concern was expressed over the forensic use of hypnosis (see Laurence & Perry, 1983, 1988) due to fears that hypnotic suggestion might irrevocably alter memory. Today, this remains a contentious issue, and some investigators (e.g., Diamond, 1980; Laurence & Perry, 1983; Laurence, et al., 1986; Orne, 1979; Putnam, 1979; Zelig & Biedleman, 1981) have forcefully cautioned that hypnotic procedures may facilitate the creation of pseudomemories. These investigators argue that inadvertently suggested memories have the potential to replace original memory traces leaving subjects with the erroneous belief that the suggested events were actual experiences.

Numerous modern examples of pseudomemory are available (e.g., Orne, 1979; Spiegel, 1980). Mr. Justice Kirby, Chairman of the Australian law Reform Committee, provides an illustrative real-life example in which leading questions given during hypnosis appear to have created a memory (Kirby, 1984):

> "...before the accused had seen a lawyer, the police decided to have him hypnotized. A professional hypnotist was brought in. The police told him that they wanted to enhance [the accused's] memory of what he recollected of the evening in question. [The accused] was

then hypnotized. The session was videotaped as police investigative hypnosis guidelines recommended in North Carolina.

At his trial, much play was made by the prosecution of the fact that [the accused], under hypnosis, described seeing a "rake" at the scene of the crime. The prosecution pointed out that no mention had been made of the rake by any report in any of the newspapers. To know about the rake, it was suggested, [the accused] had to have been at the scene. The trial ended before it was discovered that [the accused] did not mention the rake until after the following had occurred whilst he was under hypnosis:

Accused: (describing walking home after the crime). Seems like I grabbed something and ran back to...I walked most of the way because I was so tired.

Hypnotist: (handed a note by the policeman which instructed him to ask about a rake). What did you grab?

Accused: Base of something. Base of something.

Hypnotist: Was it a rake?

Accused: I don't know. It could have been.

Hypnotist: Where did you get the rake from?

Accused: I think I got it from the yard of a house. I was so mad...

Hypnotist: What are you doing with the rake?

Accused: Running down at them...seems like I was fighting them.

Hypnotist: Did they take the rake from you?

Accused: Yeah.

Hypnotist: And what did they do with it?

Accused: I don't know..." (p. 160).

In this instance, the inadvertent creation of a memory for the rake significantly affected the outcome of the trial.

Given that judicial decisions rendered on the basis of hypnotically-aided testimony can lead to exoneration, imprisonment, or even execution (Orne, Soskis, Dinges, Orne, & Tonry, 1985), the potential hazard of pseudomemory in applied forensic settings coupled with theoretical issues relating to the influence of hypnosis on memory has recently attracted the interest of researchers who have sought to delineate the specific conditions in which the phenomenon of pseudomemory occurs.

Laboratory Investigation of Pseudomemory

Orne (1979) has developed a procedure for demonstrating pseudomemory which he believes parallels a typical forensic context:

> First, I carefully establish and verify that a particular subject had in fact gone to bed at midnight on say February 17, and had arisen at 8 a.m. the following morning. After inducing deep hypnosis, it is suggested that the subject relive the night of February 17 - getting ready for bed, turning out the light, and going to sleep at midnight. As the subject relives being asleep, he is told that it is now 4 a.m. and then is asked whether he has heard the two loud noises. Following this question (which is in fact a suggestion), a good subject typically responds that the noises awakened him. Now instructed to look around and check the time, he may say it is exactly 4:06 a.m. If then asked what he is doing, he may describe

some activity such as going to the window to see what happened or wondering about the noises, forgetting about them, and going back to sleep.

Still hypnotized, he may relive waking up at 8 a.m. and describe his subsequent day. If, prior to being awakened, he is told he will be able to remember the events of February 17 as well as all the other things that happened to him in hypnosis, he readily confounds his hypnotic experience with actual memory on awakening. If asked about the night of February 17, he will describe going to sleep, and being awakened by two loud noises. If one inquires at what time these occurred, he will say, 'Oh, yes, I looked at my watch beside my bed. It has a radium dial. It was exactly 4:06 a.m. ...' The subject will be convinced that his description about February 17 is accurately reflecting his original memories" (pp. 322-323; see also Barnes, 1982).

Adapting Orne's (1979) pseudomemory creation procedure, Laurence and Perry (1983) provided the first quantitative investigation of pseudomemory. Highly hypnotizable subjects were asked to select a night of the previous week during which they reported no specific memories of awakening or dreaming. After being hypnotically age-regressed to the night in question, subjects were administered a suggestion to hear "Some loud noises that may sound like back-firings of a car, or door slammings...some loud noises." (p. 524). During hypnosis, 63% (17/27) of subjects reported that they experienced the noise suggestion. After hypnosis, 76.5% of the subjects who previously

accepted the noise suggestion (13/17) demonstrated pseudomemory by maintaining that the sounds had actually occurred or reported that they were uncertain about whether or not the noises were real. Interestingly, some subjects appeared to have convinced themselves that the noises were real. For example, one subject stated, "I'm pretty certain I heard them. As a matter of fact, I'm pretty damned certain. I'm positive I heard these noises" (p. 524). In fact, six subjects were unequivocal that the suggested noises had actually occurred even when told that the noises had been suggested during hypnosis. The remaining 14 subjects correctly reported that the noises had only been imagined. Consistent with Orne (1979), Laurence and Perry (1983) interpreted these findings as compelling evidence that subjects' memories "can be modified unsuspectingly through the use of hypnosis" (p. 524). Moreover, they cautioned that a witness who is initially unsure of his or her memories can become more confident and credible to jurors after exposure to hypnotic procedures.

Replications of the pseudomemory effect using the above design, which has come to be termed the "nocturnal events" paradigm, have been obtained from different laboratories with rates ranging between 69-81% for high hypnotizable subjects (Labelle, et al., 1990; Labelle, Bibb, Bryant, & McConkey, 1989; Labelle & Perry, 1986; Laurence et al., 1986; Lynn, et al., 1992; McCann & Sheehan, 1988, Study 1; Spanos & McLean, 1986; Weekes, et al., 1992).

Hypnotizability. A number of studies have demonstrated a relationship between responsiveness to hypnotic suggestions and

pseudomemory. In two studies using the nocturnal events paradigm, Labelle and her associates (Labelle, et al., 1990; Labelle & Perry,1986) found that pseudomemory rate varied as a function of level of hypnotizability. The highest rate of pseudomemory was demonstrated by high hypnotizables; medium hypnotizables reported pseudomemory but at a somewhat lower rate. Nonhypnotizable subjects did not report pseudomemory. Other studies have reported similar patterns of results with high hypnotizables displaying more pseudomemory than lows (Barnier & McConkey, 1992; McConkey et al., 1990, Sheehan, 1991, Studies 1 & 2; Spanos et al., 1989, Study 1), some medium hypnotizables performing comparably to highs (Sheehan, et al., 1991b), and some medium hypnotizables displaying less pseudomemory than highs, but more than lows (Sheehan, et al., 1991a).

Correlates of pseudomemory. Research also suggests that pseudomemory is related to the ability of subjects to become subjectively involved in a task (i.e., absorption; Labelle, et al., 1990; Labelle & Perry, 1986) and imaginative thinking (Labelle, et al., 1990). From this perspective, highly hypnotizable subjects become so subjectively involved in suggestions that their suggestion-related imaginings are experienced as real (Nadon, Laurence, & Perry, 1987; Tellegen, 1987), become confounded with available memory traces, and subsequently replace the original memories. As a result, when tested after hypnosis, subjects are unable to differentiate suggested memories from veridical experiences and interpret the suggested event as having actually occurred.

Pseudomemory has also been linked to subjects' responsiveness to complex hypnotic suggestions calling for what has been termed dual cognitive functioning or dissociation (Hilgard, 1977). For example, when administered a "hidden observer" suggestion, some subjects report that they experience both a hypnotized "part" of themselves and a "hidden part" replete with special abilities, understanding, or awareness. Similarly, other subjects report that they simultaneously experience themselves both as an adult and as a child (i.e., duality) following the administration of an age regression suggestion to childhood (e.g., Laurence & Perry, 1981; NoGrady, McConkey, Laurence, & Perry, 1983; Orne, 1951; Perry & Walsh, 1978; Spanos, de Groot, Tiller, Weekes, & Bertrand, 1985). These purportedly unique cognitive capabilities have been posited by some theoreticians as being characteristic of deep hypnotic involvement (Bowers, 1991; Hilgard, 1977; Laurence, et al., 1986). It is important to point out, however, that a large body of compelling research has been amassed in recent years which challenges the dissociationist view (see review by de Groot & Gwynn, 1989; Spanos, 1986).

Pseudomemory in hypnotic and nonhypnotic conditions. Several investigators (Gregg, 1986; Lynn, et al., 1989; McCann & Sheehan, 1987, 1988; McConkey and Kinoshita, 1986) have stressed that the inclusion of nonhypnotic control groups is important in pseudomemory research to evaluate the extent to which pseudomemory is specific to hypnosis. Studies comparing pseudomemory rates among hypnotized and nonhypnotized "waking" conditions have produced equivocal results.

Research by Sheehan and his associates (Sheehan, 1991, Studies 1 & 2; Sheehan, et al., 1991a, 1991b) consistently demonstrated higher rates of pseudomemory among hypnotized subjects compared to waking controls given questionnaire filler tasks to equate for the time required to deliver hypnotic inductions. In contrast, studies by Barnier and McConkey (1992) and McConkey, et al. (1990) found that hypnotic and nonhypnotic controls reported equivalent levels of pseudomemory in response to suggested items (see also Spanos et al., 1989).

Differences in pseudomemory found between hypnotic and nonhypnotic treatments may be due to differential demand characteristics between these two conditions. For instance, hypnotic subjects knowingly participate in an hypnosis experiment, receive an hypnotic induction and hypnotic suggestions; the waking condition is not an hypnosis experiment and subjects therefore do not make any attributions regarding their behavior in response to the "hypnosis-like" suggestions they are administered. Weekes et al. (1992) compared the pseudomemory rates of hypnotized and awake task motivated subjects (Barber, 1969; see also Sheehan & Perry, 1976) using the nocturnal events paradigm. In contrast with waking control conditions, task motivation is conceptually closer to hypnosis - subjects are told that the experimenter is interested in subjective experience and they are also told that the experiment is designed to test their ability to imagine and visualize events in tests of imagination. Moreover, the task motivation manipulation is particularly important for the study of pseudomemory insofar as, in the forensic context, subjects' motivated

involvement in the recall task is of paramount importance.

Results indicated that although a greater number of task motivated subjects initially passed the suggestion to hear loud noises, subjects in both conditions exhibited equivalent levels of pseudomemory (69%). Interestingly, the variation in instructional sets between hypnotized and task motivated subjects prompted hypnotic and task motivated subjects to process the pseudomemory suggestion in different ways. For instance, more hypnotized subjects reported novel sounds that were not mentioned in the suggestion (e.g., telephone ring, music, floor creaking, bed squeaking, etc.) than task motivated subjects. These findings are consonant with theorizing (e.g., Sheehan & McConkey, 1982) which suggests that certain hypnotized subjects actively create suggestion-related experiences by way of their distinctive, individualistic processing of suggested information. Conversely, task motivated subjects are more compliance-oriented and adhere more directly with the literal suggestion, with little or no creative elaboration.

Lynn, et al. (1992) administered the pseudomemory suggestion to high hypnotizable hypnotized subjects and low hypnotizables instructed to simulate or "fake" hypnosis (i.e., simulators; see Orne, 1959). Although the use of the simulation paradigm is controversial (see de Groot & Gwynn, 1989; Spanos, 1982; 1986), simulators have been used extensively in hypnosis research and have been touted by some investigators (e.g., Orne, 1959) as a method of separating behaviors that are specific to hypnosis from behaviors that are shaped by the

situational demands inherent within the experimental context.

Both treatments produced equivalent levels of pseudomemory. The findings of these two studies (Lynn, et al. 1992; Weekes, et al., 1992) suggest that pseudomemory reports are neither unique nor specific to hypnosis and further suggest that reports of false memories as veridical are influenced by the situational demands inherent within the experimental context (equivalent pseudomemory responding across hypnotized and simulators was also obtained by Lynn et al., 1989, discussed below).

Social and Contextual Factors. In two studies, Sheehan et al. (1991) found that rapport between hypnotist and subject affected the rate of pseudomemory. In Study 1, hypnotic and nonhypnotic subjects of high and low hypnotizability were assigned to either a reduced rapport condition or a condition that did not attempt to manipulate rapport. In the reduced rapport treatment, following hypnosis the hypnotist reviewed the subject's response record with visible irritation and accused the subject of failing to cooperate during the experiment. The subject was then led to a different room and observed the hypnotist discuss the case with a second experimenter through a one-way screen. A significantly lower rate of pseudomemory was obtained from subjects in the reduced rapport condition during structured (but not free) recall. However, in Study 2, when inhibited rapport was associated with the second experimenter, and not the hypnotist, pseudomemory rate was unaffected.

McCann and Sheehan (1988, Study 1), in a replication of Laurence and

Perry's original (1983) study, found that varying the instructions provided to subjects in the hypnotic context greatly influenced subjects' pseudomemory reports. Subjects in one condition were informed that the hypnotic effects (including the pseudomemory suggestion) would be carried over or persist following the termination of the hypnotic procedures. This manipulation yielded a pseudomemory rate of 70% - comparable to the original 76.5% reported by Laurence and Perry (1983). A second treatment clearly differentiated between hypnosis and waking. This treatment produced a low pseudomemory rate of only 20%.

Spanos and McLean (1986) incorporated the "hidden observer" technique (e.g., Hilgard, 1977) into an adaptation of the nocturnal events paradigm to "breach" or reverse subjects' initial pseudomemory reports. Initially, almost 82% (9/11) of subjects who accepted the false memory suggestion reported pseudomemories. Subjects were then administered hidden observer instructions:

> During deep hypnosis people often confuse reality with things that were only imagined. The hypnotized part of a person's mind accepts suggestions so completely that what was suggested actually seems to have been happening...Yet at the same time that you are experiencing suggestions, there is some other part of your mind, a hidden part, that knows what is really going on...The hidden part can always distinguish what was suggested from what really happened (p. 157).

All but 2 subjects reversed their responding and reported that the

noises had only been suggested to them. When the experimenter instructed subjects that she wished to shift from the "hidden part" back to the hypnotized part, subjects again reported pseudomemories. Spanos and McLean (1986) argued that this pattern of responding clearly indicated that pseudomemory suggestions do not alter memory, that subjects have continuous access to their original memories, and that they retain the ability to discriminate between real and suggested memories. Moreover, these findings demonstrate that social pressure inherent within the experimental setting and memory test procedures play an influential role in shaping subjects' reports (for a neodissociationist interpretation of these findings see Zamansky, 1986).

McConkey et al. (1990) found that the experimental context strongly affected the rate of pseudomemory. Upon immediate testing, approximately 50% of hypnotizable subjects reported pseudomemory. When tested at a later point in the experiment with direct and indirect measures, pseudomemory fell to 42.5% and 35%, respectively. When contacted by telephone at home 4-24 hours later by an experimenter who was not part of the earlier session, the rate decreased dramatically to 2.5%. A subsequent study by Barnier and McConkey (1992) replicated the finding that the overall pseudomemory rate declined from 60% for a false suggestion that a thief depicted in a series of slides was wearing a scarf, to 10% when the experimental context shifted to imply to subjects that the experiment had ended. Similarly, pseudomemory rate for a false suggestion that he had been

carrying a bouquet of flowers, dropped from 27%-3%.

McCann and Sheehan (1987) were also successful in "breaching" pseudomemory. After viewing a short videotape of a simulated bank robbery, subjects were hypnotized and were administered pseudomemory suggestions that falsely suggested that the robber was wearing a mask, was swearing, and had entered the scene from the right. Following hypnosis, half of the subjects were tested for recall first followed by a recognition test which involved viewing four different versions of the robbery (including the original version). The other half were tested for recognition first followed by recall. Results indicated that pseudomemory decreased substantially when recognition testing preceded recall. These findings also suggest that subjects' ability to distinguish what was suggested to them from what they had originally been exposed to was not irretrievably impaired nor lost through the creation of pseudomemories (these findings were replicated by Sheehan et al., 1991a, using a similar design).

Studies by Lynn, et al. (1991) and Weekes, et al. (1992), reported previously, employed a nonhypnotic manipulation which informed subjects that they can successfully distinguish between fantasy and reality through the use of "deep concentration." Unlike Spanos and McLean's (1986) hidden observer manipulation, deep concentration manipulation employed by Weekes, et al. (1992) failed to reverse subjects' pseudomemory reports. This failure may have been due to the fact that hidden observer instructions better legitimize a complete reversal of responding than deep concentration instructions. That is,

hidden observer instructions provide clear demands for subjects to reverse their earlier pseudomemory reports, while simultaneously permitting them to remain in the role of a responsive hypnotized subject, without contradicting themselves. In contrast, subjects in the Lynn et al. (1991) and Weekes et al. (1992) research may have perceived the reversal of their pseudomemory responding following nonhypnotic "deep concentration" instructions as a challenge to the truthfulness of their earlier hypnosis-based pseudomemory report. Accordingly, to preserve the credibility of their earlier responding, subjects continued to report pseudomemories during subsequent testing periods (for related research on breaching of hypnotic amnesia see Spanos, Radtke, & Bertrand, 1985).

In two studies, Spanos et al. (1989) examined the effects of interrogation and cross-examination procedures on the integrity of subjects' pseudomemory responding. During the first session of Study 1, high and low hypnotizables viewed a short video of a simulated corner store robbery. Several days later they viewed another video of a simulated television broadcast in which a suspect was being arrested, charged with the robbery and fingerprinted by police. Importantly, the suspect being arrested by police was <u>not</u> the robber depicted in the original crime. During the third session, subjects were assigned to one of four "interrogation" treatments: hypnosis plus guided imagery, imagery alone, leading questions alone, or a no manipulation control condition. Pseudomemory was scored for those subjects who misattributed physical characteristics of the robber in the original

video with the characteristics of the suspect arrested by police. When compared, pseudomemory rates for hypnosis, imagery, and leading questions conditions did not differ from one another but were higher than for controls. In addition, high hypnotizables evidenced more pseudomemory than lows. However, during a final session involving a simulated courtroom "cross-examination," subjects were challenged regarding the veracity of their misattributions after swearing on a Bible. During this final testing period, the pseudomemory reports (i.e., misattributions) of high and low hypnotizables converged.

In Study 2, high hypnotizables participated in the same two preliminary sessions as in Study 1. In session three, subjects were administered hypnosis and guided imagery procedures in which a number of incorrect physical characteristics of the offender were suggested. During the fourth and final session subjects were assigned to one of three treatment conditions: 1) hidden observer treatment, 2) cross-examination, or 3) benign interview. The hidden observer treatment allowed subjects to disavow their earlier tesimony without discrediting themselves. In a stringent cross-examination condition similar to Study 1, subjects swore on a Bible and were admonished to tell the truth. In a benign interview condition, subjects were simply asked about their earlier testimony. Subjects in the hidden observer and benign interview conditions evidenced the greatest reductions in pseudomemory relative to the stringent cross-examination condition which forcefully challenged the veracity of subjects' responding.

Whereas in some studies (Labelle et al., 1990; Lynn et al., 1989;

McCann & Sheehan, 1988, Studies 1 & 2; Weekes, et al., 1992) memory testing occurred immediately upon waking, others have examined the persistence of pseudomemory effects after sizable time delays. For instance, in their original 1983 article, Laurence and Perry found identical rates (76%) when subjects were tested for pseudomemory either immediately or after 7 days. Sheehan and his colleagues (McCann & Sheehan, 1988, Study 3; Sheehan et al., 1991b) found similar pseudomemory effects for both high and medium hypnotizable subjects tested after 1 and 2-week intervals.

Subjects' confidence in their pseudomemory reports. A number of studies by Sheehan and his colleagues (Sheehan, et al. 1991a, 1991b) found that subjects who reported pseudomemory were less confident in the accuracy of their recall than those subjects who did not report pseudomemory. Sheehan et al. (1991b) presented subjects with a videotaped bank robbery. Subjects were then hypnotized and presented with suggestions for three false memory items: that the robber was wearing a mask, that he entered the picture from the right, and that he swore during the hold up. Subjects who reported pseudomemories for the mask and swearing suggestion were less confident in the accuracy of their recall than subjects who did not report pseudomemory. In a related study, subjects were presented with a recognition task in which they were asked to identify the video they had seen from one of four versions. Those subjects who did not recognize the correct video were less confident than those who chose the correct video. High hypnotizables who chose the incorrect video were less confident than

medium hypnotizables.

In short, these findings suggest that despite the fact that subjects report that an event suggested during hypnosis did occur (i.e., report pseudomemory), they are less certain about the accuracy of their recall compared with subjects who do not report pseudomemory. The fact that subjects were not confident about their recall suggests that original memory traces may still be available to subjects to some degree.

Use of objectively verifiable target events. Orne's original (1979) pseudomemory paradigm (adapted by Laurence & Perry, 1983) used loud noises occurring during the night of a previous week - an event that is not available for independent verification by the experimenter. This relatively nonspecific stimulus event may have provided subjects with considerable latitude in generating individualized reports of their purported experiences. Indeed, as discussed previously, Weekes et al. (1992) found that hypnotized subjects generated a variety of sounds not specified in the suggestion wording (see also Spanos & McLean, 1986). McCann and Sheehan (1988, Study 1) have noted that the nocturnal events paradigm does not allow for a precise determination of the effect of suggestion on memory due to the fact that it is not possible to verify subjects' original experiences. Moreover, subjects may be less certain about whether the suggested event actually occurred. As a result, they may be prone to report pseudomemory when the target is not available for verification.

Finally, Lynn et al. (1989) have criticized the use of pseudomemory

suggestions that focus upon experiences that purportedly occurred while subjects were asleep as being unrepresentative of the typical forensic context likely to be encountered by eyewitnesses and victims.

McCann and Sheehan (1988, Study 2) used verifiable stimulus materials. Subjects were exposed to a videotape depicting a bank robbery. In a second session, hypnotized subjects were age regressed back to the earlier session during which they had viewed the video and were administered false suggestions that the robber was wearing a mask and was swearing. Under these conditions, the pseudomemory rate was only 23%.

In two studies, Lynn, Milano, and Weekes (1991, in press) obtained similar low rates of pseudomemory. Hypnotized and simulating subjects were age regressed back to a hypnosis screening session held one week earlier and were given a suggestion that a telephone in the room rang several times. In the Lynn et al. (in press) study, 22.2% of hypnotizable subjects and 25% of simulators reported that a telephone actually rang in response to the forced-choice item. Also employing the telephone ring suggestion, Lynn, et al. (1991) found that by the final recall trial none of the 47 subjects exhibited pseudomemory.

Use of age regression suggestions. Most pseudomemory research presented subjects with false memory suggestions embedded within age regression suggestions (e.g., Laurence & Perry, 1983). Close examination of the wording of age regression suggestions reveals that it is implicit within the structure of the typical age regression suggestion that the procedure will enhance recall and that subjects'

memories for events will be "sharp and true." Moreover, combination pseudomemory/age regression suggestions used in previous research (e.g., Laurence et al., 1986; Laurence & Perry, 1983; McCann & Sheehan, 1987, 1988), have stressed to subjects that the mind is like a videotape recorder that stores memories on a permanent basis.

Lynn et al. (1989) departed from the traditional age regresssion and pseudomemory suggestion paradigm. Hypnotized subjects and simulators were administered a suggestion to hear a telephone ring and a brief conversation during the actual hypnosis session, thereby creating a verifiable stimulus event that was within subjects' immediate field of experience and not embedded within an age regression suggestion. Pseudomemory rate for the suggestion condition was compared with a condition in which subjects heard an actual telephone ring and conversation, a condition in which subjects received a suggestion and heard a telephone ring and conversation, and a condition in which subjects neither heard a telephone nor received a suggestion. On open-ended reports, only 11.5% of subjects who received a suggestion to hear a phone ring, indicated that a phone rang; none did so in response to a forced-choice item. By contrast, in the conditions in which a telelphone actually rang, 91% of hypnotized and 86% of simulating subjects reported that a phone did ring during the session.

Similar results were obtained in a study by Barnier and McConkey (1992). Subjects were hypnotized immediately after viewing a series of slides depicting a purse-snatching. After repeated recall trials,

subjects demonstrated a very low rate of pseudomemory in response to false suggestions (that the robber swore and the victim was carrying a bouquet of flowers).

Taken together, the findings of studies by Lynn and his colleagues and Barnier and McConkey (1992) are harmonious with McCann and Sheehan's (1987,1988) findings that deeply hypnotized subjects retain the ability to discriminate between reality and suggested fantasy. Moreover, low pseudomemory rates are evident when the to-be-remembered events are objective, open to public verification, and occur within subjects' direct experience.

Criteria for pseudomemory. In Laurence and Perry's initial investigation, subjects were classified as demonstrating pseudomemory if they reported that the suggested events occurred or reported that they were uncertain whether the events actually took place. However, uncertainty about whether a target event actually occurred does not indicate that the subject has accepted a suggestion as a veridical occurrence; rather, lack of certainty may simply mean that the subject is unsure about his or her recall. A number of researchers have argued that uncertainty or confusion about a target event is insufficient evidence to constitute a "pseudomemory" (Barnier & McConkey, 1992; Lynn, et al., 1989, 1991). Although a number of studies indicated that they only scored subjects as reporting pseudomemory if they clearly indicated that the target event actually occurred or was present (e.g., Barnier & McConkey, 1992; Lynn, et al., in press, 1991, Lynn, et al., 1992, Lynn, et al., 1989; Weekes, et al, 1992),

the majority of pseudomemory studies do not indicate what criteria of certainty, if any, was used when calculating pseudomemory.

Extent of subjects' experience of pseudomemory suggestions. In hypnosis research, subjects' responses to hypnotic test suggestions are frequently scored in a binary, or simple pass/fail basis (e.g., the objective dimension of the Harvard Group Scale of Hypnotic Susceptibility, Shor & Orne, 1962). However, considerable variability exists with respect to the extent to which hypnotic subjects experience suggested effects. In fact, individual differences in subjective experience occur even among highly responsive subjects (Spanos, de Groot & Gwynn, 1987). Review of pseudomemory research indicates that almost every published report has failed to examine the impact of the extent of subjects' experience of target suggestions on pseudomemory rate. For instance, research using the nocturnal events paradigm simply asked subjects to indicate whether or not they heard the target noises (e.g., "Tell me when you hear them [the noises] and if they wake you up," Laurence & Perry, 1983) rather than attempting to quantify the extent of subjects' involvement in age regression, the pseudomemory suggestion, and hypnosis. Research using other paradigms also assessed subjects' experience of target stimuli on a present/absent basis (e.g., McCann & Sheehan, 1988, Studies 2 and 3).

To date, only two published studies have examined the extent to which subjects experienced suggested effects. In addition to posthypnotic, open-ended and forced-choice measures, Lynn et al. (1989) assessed the extent to which subjects had a lifelike experience

of a telephone ringing during the session. In a related study, Lynn, et al. (1991) age regressed subjects to a previous session and administered a suggestion to hear a telephone ringing. Subsequently, subjects were asked to indicate the extent to which they were hypnotized during age regression. However, close examination of this measure reveals that it was related to subjects' estimation of their depth of hypnosis and not the extent to which they experienced the suggestion to hear a telephone ring.

It is conceivable that the extent of subjects' experience of key hypnotic effects such as age regression suggestions, pseudomemory suggestions, and hypnotic depth affect their subsequent pseudomemory reports. For example, a subject who is unable to experience a suggestion to hear a telephone ringing while age regressed to a previous session may be less likely to report, after hypnosis, that the phone actually rang, compared with a subject who has a compelling experience of a telephone ringing.

The design of the study presented in this report permitted an analysis of pseudomemory rate as a function of the extent to which subjects experienced the suggested effects.

In summary, the research reviewed above suggests that although hypnotically-suggested pseudomemory appears to be linked to subjects' capacity to respond to hypnotic suggestion, pseudomemory reports are not limited to hypnosis, and they are influenced by contextual, social and stimulus factors. Highly hypnotizable subjects retain the ability to accurately discriminate between reality and fantasy, and they are

influenced by the changing situational demands inherent in the experimental context.

Rationale for the Present Study

The nature of the target stimulus. To date, pseudomemory research has examined the influence of a number of factors including the use of objectively verifiable stimulus events on pseudomemory rate. However, relatively little attention has been devoted to studying the manner in which subjects' perceptions of target stimuli affect their pseudomemory reports.

A variety of auditory and visual stimuli have served as the target of pseudomemory suggestions, for example, loud noises, car backfirings, door slams, telephone rings, swearing, moustaches, masks, scarves, and bouquets of flowers. Close examination of these stimuli suggests that they may vary on a number of dimensions, including the likelihood that an event would be remembered by subjects, as well as the likelihood that the target would plausibly occur within the situational context, such as a door slamming versus a telephone ringing during an experiment.

Previous research has failed to systematically vary the perceived attributes of the suggested stimuli and examine the concomitant effects on pseudomemory rate. The present research proposed that events that are not particularly salient and have a high base rate of occurrence in everyday life are likely to be associated with relatively high pseudomemory rates. In contrast, events that are salient, distinctive, and have a relatively low base rate of occurrence in the

suggested context are likely to be more immune to the biasing effects of pseudomemory suggestions. Support for this position originated with the classical "von Restorff effect" (von Restorff, 1933; Wallace, 1965). Specifically, conspicuous stimuli are more readily available from memory due to the fact that they have undergone more extensive cognitive processing (Bellezza & Cheney, 1973; Bellezza & Hofstetter, 1974; Wallace, 1965).

Let us consider two of the stimuli that have been used in competing pseudomemory paradigms and the associated pseudomemory rates. In research inspired by Orne's original (1979) pseudomemory demonstration, the target event was a loud noise such as a door slamming or a car backfiring (e.g., Labelle & Perry, 1986; Labelle, et al., 1990; Laurence & Perry, 1983; Lynn, et al., 1990; McCann & Sheehan, 1988, Study 1; Weekes, et al., 1992). Presumably, these events have a high base rate of occurrence in everyday life and are not particularly distinctive. Thus, subjects would not believe that they would be likely to accurately remember an event of this nature. With such events, it may not be evident whether the events occurred or failed to occur on a particular occasion. Under these circumstances, it would be expected that subjects would be vulnerable to the effects of leading questions that promote pseudomemory responding by implying that the event actually occurred (e.g., "Tell me when you hear the noise;" see also Spanos & McLean, 1986). Indeed, research using relatively common everyday events have documented pseudomemory rates ranging between 69-81%.

In another line of pseudomemory research, Lynn, et al. (1989) used a very different pseudomemory suggestion. The target event involved subjects' hearing a telephone ringing and a conversation with the experimenter that occurred during the experiment. In sharp contrast to the rates secured with Orne's paradigm, Lynn, et al. (1989) demonstrated that the pseudomemory rate does not exceed 11.5% (on open-ended reports) when a telephone ring is used as the target event. The present research was motivated by the hypothesis that properties of the target event--the perceived likelihood of the event's occurrence within the suggested context and the subjects' perception of the probability that the event will be remembered--are related to pseudomemory rate.

To put it simply, if subjects are certain that they would have remembered an event (had it occurred in reality), then they would be less prone to be influenced by leading questions during hypnosis. On the other hand, if the event is mundane and has a high probability of occurrence, when in doubt, subjects would be more influenced by leading questions that imply the event's actual occurrence. In related research, McCloskey and Zaragoza (1985) have demonstrated that when subjects are uncertain or cannot remember whether an event actually took place, they are more vulnerable to the effects of misleading information (see also, Belli, 1989).

The likelihood that a particular event or physical characteristic of an offender is remembered by subjects also has important practical implications for the forensic use of hypnosis. Highly salient events,

such as the appearance or actions of an offender may remembered by witnesses with a high degree of certainty, and, as a result, may be less vulnerable to pseudomemory distortion. By contrast, a more subtle detail that the witness does not remember well and feels less certain about may be more easily influenced by inadvertent hypnotic suggestion.

In the present study, subjects received either a suggestion for a target event with a high baserate of occurrence and a low perceived likelihood of being remembered, a door slam, or a suggestion for a target event with a low base rate of occurrence and a high perceived likelihood of being remembered, a telephone ringing. It was predicted that a higher rate of pseudomemory would be evident in the group which received the door slam suggestion.

Empirical support for the above choice of target events was provided by pilot testing with nonhypnotic subjects. 64 undergraduates were asked to imagine that they were completing questionnaires as part of a psychology experiment. Subjects were provided with a description of the physical characteristics of the room and objects contained within it, including a telephone located on a table in a front corner. They then completed a questionnaire consisting of fifteen events (e.g., "A jet airplane flew overhead") and were asked to provide two separate ratings for each event. First, subjects rated the likelihood of the event occurring within the experimental context on a 5-point scale with anchors 1 = Not at all likely to occur, 3 = somewhat likely to occur, and 5 = very likely to occur. Next, subjects rated the

likelihood that they would remember the event if it actually occurred on a 5-point scale with anchors 1 = I definitely would not remember, 3 = unsure, and 5 = I definitely would remember. Critical items pertaining to a door slamming out in the hallway and a telephone in the room ringing were embedded within the questionnaire.

Examination of the mean ratings for the fifteen events displayed in Appendix 1 indicate considerable variability in subjects' ratings of the events. However, the door slam and the telephone ring stimuli were amongst those events that differed the most from one another. Indeed, subjects rated the door slam as significantly more likely to occur (M = 4.14; SD = .94) than a telephone ringing within the experimental context (M = 2.1; SD = 1.05), $t(63) = 13.48$, $p < .0001$. Similarly, subjects reported that they would be less likely to remember a door slam (M = 2.1; SD = .99) than a telephone ringing (M = 4.08; SD = 1.04), $t(63) = 11.93$, $p < .0001$. For both the door slam and the telephone ringing, subjects' ratings of the likelihood of the event occurring in the experimental context were negatively correlated with their ratings of the likelihood that they would remember the events if they actually occurred (door slam: $r = -.26$, $p < .03$; telephone ring: $r = -.28$, $p < .02$). These findings suggest that as the perceived likelihood of the event occurring increases subjects are less likely to remember whether the event actually occurred. Thus, the door slam and telephone ring events were chosen for use in the present study for both theoretical and empirical reasons.

For the present study, subjects participated in a two-session

experiment. During the initial session subjects were screened for hypnotizability. In a second session held one week later, highly hypnotizable subjects were rehypnotized, age regressed back to the previous screening session, and were administered suggestions to either hear a telephone ring or a door slam. Following hypnosis, pseudomemory was assessed using open-ended questions, forced-choice questions, and continuous measures which assessed subjects' certainty that the target event did or did not occur.

The study also included an additional group of highly hypnotizable subjects who participated in a parallel hypnotic procedure. Importantly, this group of subjects did not receive a pseudomemory suggestion. The additional sample was included in the experiment for several reasons. First, the group provided a manipulation check on subjects' certainty that the target noises did or did not occur, in the absence of a pseudomemory suggestion. Second, the additional sample provided baserate levels of pseudomemory that may have resulted simply from subjects' inability to remember whether the suggested noises actually occurred. This group was referred to as the "baserate" group.

Timing of pseudomemory report. Hypnotists working in experimental and forensic settings alike, commonly request that subjects provide overt feedback on their experience of suggestions during hypnosis. Lynn, et al. (1991) have pointed out that subjects who publicly report that they accept (i.e., experience) pseudomemory suggestions during hypnosis may feel committed, when tested

posthypnotically, to report that the target event actually occurred (see also Spanos & McLean, 1986).

In order to better comprehend this argument, it is useful to review the manner in which the typical pseudomemory experiment unfolds. Referring to Orne's (1979) paradigm, the subject is initially requested to identify a night of the previous week when he or she does not recall awakening or dreaming. The subject is then hypnotized and age regressed back to the night identified and is administered a suggestion to hear loud noises. During the administration of the suggestion, the hypnotist asks the subject to provide a verbal report on the extent to which they are experiencing the suggestion (e.g., "Tell me whether you hear the noises"). Typically, highly hypnotizable subjects "pass" the suggestion by reporting to the hypnotist that they hear the noises at least to some extent. The subject is then awakened and is asked whether the suggested event actually occurred or was only imagined (i.e., tested for pseudomemory). Spanos and McLean (1986) have argued that subjects may interpret the pseudomemory test as a challenge to their earlier responding, and, in order not to contradict themselves and to preserve their self-presentation as responsive hypnotic subjects (see Spanos, 1983, 1986), they report that the noises actually occurred. By contrast, subjects who are not required to report on their experience of the suggestion until after hypnosis are not as compelled to report a pseudomemory.

All but two published pseudomemory studies required subjects to provide overt endorsements <u>during</u> hypnosis regarding the extent to

which they experienced the false memory suggestions. In the studies by Lynn et al. (1989, 1991), hypnotized subjects did not report on whether they accepted the false memory suggestion until after hypnosis. Interestingly, these two studies have yielded the lowest pseudomemory rates in the literature suggesting that subjects who do not report on their experience until after hypnosis do not experience the same social pressure to report pseudomemories as subjects who report during hypnosis.

The second objective of the present study was to compare the pseudomemory rate of subjects who were required to provide an observable report on the extent to which they experienced the false memory suggestion during hypnosis with subjects who did not report on their experience until after hypnosis. Subjects in one condition provided an overt, observable report by raising their index finger. Subjects in a second condition were not asked to report on their experience until after the termination of the hypnotic procedure. It was predicted that subjects who reported on their experience of the pseudomemory suggestion during hypnosis would respond in a consistent manner when questioned following hypnosis. Subjects who were not asked to report during hypnosis would not experience the same social demands to maintain consistent responding after hypnosis.

In addition to the pseudomemory measures outlined previously, the present study also assessed the extent of subjects' experience of age regression, the target noise suggestion, and hypnotic depth. Additionally, subjects reported their beliefs about the experimenter's

expectations regarding their behavior during the experiment, their perceptions of the performance of excellent hypnotic subjects, and their perceptions of the purpose of the study and the experimenter's hypotheses.

Method

Experimental Design

A 2(suggestion type: door slam vs. phone ring) x 2(observable report: during hypnosis vs. no report) x 2 (order of administration of pseudomemory questionnaires: forced-choice first vs. rating scale first) experimental design was used. The study also incorporated an additional group of subjects who participated in a parallel experimental procedure, but who did not receive a pseudomemory suggestion (baserate group).

Subjects

One hundred and ninety highly hypnotizable volunteers (57 males and 133 females) ranging in age from 18 to 22 years (M = 18.32; SD = .75 years) participated in a two-session hypnosis experiment in return for course credit. Subjects were undergraduates who were recruited through the Ohio University Psychology Department's subject pool of students enrolled in an introductory psychology course. It was necessary to test a total of 1256 subjects to secure the final group who met the criteria for inclusion in the experiment (described below).

Inclusion criteria. Consistent with previous research (Lynn, et al., 1991), subjects were included in the present study if they met three criteria: (1) reported that experienced age regression at least "to some extent" (scored 3 or more on the 5-point scale); (2) reported that they experienced either a door slamming or a telephone ringing at least "to some extent" (scored 3 or more on the 5-point scale); reported that they were hypnotized during Session 2 at least "to some extent" (scored 3 or more on the 5-point scale). Data collection continued until there

were approximately 10 subjects in each of the 8 main cells of the experimental design. Using these criteria, it was necessary to test 151 subjects to secure a group of 79 subjects who met the criteria.

Subjects in the baserate group were included in the study if they met the above criteria for age regression and hypnotic depth. 39 subjects were tested to obtain a group of 15 who met the criteria.

Hypnotizability. Level of hypnotizability was determined using the 12-item Harvard Group Scale of Hypnotic Susceptibility (HGSHS:A, Shor & Orne, 1962), a standardized, group test of hypnotizability. The HGSHS:A generates three interrelated hypnotizability measures consisting of an objective subscale (HGSHS:Q score) representing the extent to which subjects self-reported a behavioral response to test suggestions, a subjective score (HGSHS:S) representing the extent to which subjects were able to imagine suggestions, and an involuntariness score (HGSHS:I) representing the extent to which subjects perceived their responding to be involuntary or beyond their direct control. For the objective dimension, each of the 12 suggestions was scored on a pass/fail basis (i.e., with scores of 0 or 1), then summed, yielding a total score ranging from 0 to 12. Consistent with standard scoring procedures, high hypnotizables were identified as those subjects who passed 9 or more of the 12 test suggestions on the objective dimension. Degree of subjective involvement and involuntariness were calculated for each suggestion, separately, using continuous scales with the following reponse options: 0 = not at all, 1 = to a slight extent, 2 = to some extent, 3 = to a great extent. Responses were then summed to produce a total score ranging from 0 to 36 for

each dimension.

Procedure

Data was collected over the course of a 15-month period. All experimental sessions were conducted in a standardized fashion by the same experimenters.

Experimental Sessions

Session 1: Hypnotizability Screening

Hypnotizability screening was conducted in a classroom with large groups ranging in size from 30 to 80 participants. This session served the dual purpose of screening subjects for hypnotizability and establishing the context for the targets of the pseudomemory suggestions (administered in Session 2, see below) - either a door slam or a telephone ring. Prior to subjects' arrival, a telephone was placed in full view on a table located in the left front corner of the classroom.

At the beginning of the session, subjects were informed that our research was attempting to evaluate how Ohio University students compare with other hypnosis subjects across the United States. Following this introduction, subjects completed a consent form (see Appendix 2). In accordance with standardized procedures, subjects were administered a tape recorded version of the HGSHS:A. Following the completion of the hypnosis session, subjects self-scored their responses to the HGSHS:A, and were given a standard debriefing. To enhance the credibility of a telephone ring in the experimental context and to call subjects' attention to the telephone, at the end of the screening session subjects were asked to "Drop your questionnaires off by the phone over on the table as you leave." Subjects identified as

highly hypnotizable were invited to return the following week for a second session.

The experimenter who conducted the screening sessions verified that no contaminating noises such as actual door slams and telephone rings occurred during the screening session.

Session 2: Pseudomemory Suggestion Session

The second session was conducted approximately one week later. The session was held in a different room with small groups of between 2 and 8 subjects. Treatment group assignment was decided at random prior to the beginning of each session.

Pre-Hypnotic Questionnaires

Upon arrival for this session, subjects were greeted by a different experimenter and were told that "We would like to see how you respond on a different scale of hypnotic susceptibility today."

Open-ended questionnaires: Spontaneous pseudomemory reports (pre-hypnotic). Two open-ended questionnaires were administered which asked subjects to: (1) "Describe everything that occurred during last week's session and your thoughts, feelings, and reactions to your experiences"; (2) "Describe any events, sounds, or noises that you remember hearing during last week's session." Subjects were also asked to rate their confidence in the accuracy of their answers to each questionnaire, separately, on 5-point scales where 1 = not at all confident, 3 = somewhat confident, and 5 = extremely confident. Questionnaires were then collected.

Criteria for spontaneous pseudomemory. Subjects' open-ended reports were content analyzed by two judges who rated the responses

as belonging to one of four categories: 1) target noise occurred (spontaneous pseudomemory), 2) uncertain whether target noise occurred, 3) target noise did not occur, and 4) no mention of target noise. One judge was naive with respect to the hypotheses and methodology of the present experiment and was blind regarding subjects' group assignment. Interrater agreement for these ratings was 100%.

Prehypnotic Instructions

In accordance with most other pseudomemory studies, subjects were administered the following prehypnotic instructions regarding the ability of hypnosis to enhance recall (adapted from Lynn, et al., 1991 and Sheehan, et al., 1991a):

> Before we begin, I'd like to tell you a little about hypnosis. Hypnosis is a very powerful tool; one of the facts about hypnosis is that it can help you remember forgotten events. Hypnosis can actually help you remember events you have forgotten.
>
> It was once thought that your mind operates like a videotape recorder. Current research suggests that your mind actually stores information in much the same way a computer does. Your memories are permanently stored in your mind. Even though your conscious mind may have forgotten certain events and details, your unconscious mind has remembered them. Hypnosis has the power to help you remember your memories. And hypnosis has the power to relax you. In short, hypnosis can help you remember past events. It can help you access forgotten information.

Hypnotic Procedures

Hypnotic Induction

The experimenter administered a tape recorded version of the hypnotic induction from the Stanford Profile Scales of Hypnotic Susceptibility, Form 2 (Weitzenhoffer & Hilgard, 1967), adapted for group administration (Appendix 3). The induction consisted of suggestions for drowsiness and relaxation and was followed by deepening instructions which instructed subjects to imagine themselves walking down a "magnificent spiral staircase." They then received "warm up" suggestions for arm levitation (Appendix 4) and arms moving apart (Appendix 5), followed by additional deepening instructions (Appendix 6).

Subjects were then age regressed back to the previous week's session. Subjects in the main experimental design (i.e., not including the comparison group) were administered a suggestion to hear either a door slam (n = 81) or a telephone ringing (n = 70). In addition, 90 subjects were asked to report during hypnosis whether they experienced the suggestion by raising their right index finger in a discernible manner. The remaining 61 subjects did not report on their experience until after hypnosis.

Age regression suggestion: I would like to help you return, in your imagination, to the session last week when you were hypnotized for the first time. You can go back in time and have a lifelike experience of this time during the last session. You can experience yourself as going back in time...back to the time when you were filling out questionnaires at the end of the last session. I will count to five. With each count you will go back, further in time...right back

to the time of the last session. 5...going back...4...3...going further back...2...almost there...1...right back to the last session...you can have a vivid experience now. That's right, experience yourself back in the last session, filling out questionnaires after participating in hypnosis. As you reexperience yourself filling out the questionnaires, you also begin to have a clear memory of the surroundings and the events that took place in the room at that time. I want you to pay particularly close attention to your surroundings. You become aware of the location of your seat in the room, and the other people who are seated around you. You also become aware of whether the room is brightly lit or dim...you become aware of details in the room such as the large desk and lectern at the front of the class, the blackboard, and the clock on the wall.

Pseudomemory Suggestions

Door slam/Phone ring (additional instructions for observable report condition contained within brackets): In particular, I would like you to pay close attention to any sounds that you might hear. Listen carefully and you will become more and more aware. As you vividly reexperience yourself filling out the questionnaires you hear the sound of a door slam once out in the hallway/the telephone in the room ring once. Listen carefully to the door slam/phone ring. Hear the door slam/phone ring once now. (As) you hear the sound of a door slam/phone ring more and more clearly, (the index finger on your right hand will begin to rise, until when you hear the door slam/phone ring very clearly, the index finger on your right hand will be fully extended upward so that it can be clearly seen to

indicate to me that you hear the door slam/phone ring). You hear the door slam/phone ring loud and clear...you hear the door slam/phone ring loudly and clearly. (As) you hear the door slam/phone ring more and more loudly and clearly (your index finger rises higher and higher). You are still filling out questionnaires and you hear the door slam/phone ring...(pause). Ok, the door slamming/phone ringing has stopped now and you are continuing to fill out the questionnaires...

Age progression:

That's fine. Now you can relax and drift forward to the present. You are no longer reexperiencing the events of last week's session. Come into the present...into the present...you have come into the present. You are in the present, and you are deeply hypnotized, and you remember clearly all of the events that occurred while you were filling out the questionnaires last week."

Subjects were then administered standard "wake-up" instructions to terminate the hypnosis procedures (see Appendix 7).

Post-Hypnotic Questionnaires and Dependent Measures

Following the completion of the hypnotic procedures, a series of questionnaires were administered. Previous questionnaires were collected before the next questionnaire was distributed.

Open-ended questionnaires: Spontaneous pseudomemory reports (post-hypnotic). Subjects were re-administered the same two open-ended questionnaires they had completed at the beginning of the session which instructed them to: (a) "Describe everything that occurred during last week's session and your thoughts, feelings, and reactions to your experiences"; (b) "Describe any events, sounds, or

noises that you remember hearing during last week's session." Confidence ratings were also obtained.

Criteria for pseudomemory. Subjects' responses were content analyzed for spontaneous reports of pseudomemory using the response categories described previously. Interrater agreement was 100%.

Experience of age-regression. Subjects were asked to indicate the extent to which they experienced age regression: "In today's experiment you were asked to 'age regress' to a time last week when you were filling out questionnaires after hypnosis. To what extent were you able to experience all of the events of last week's session?:" (anchors: 1 = not at all, 3 = to some extent, 5 = to a great extent).

Experience of pseudomemory suggestion. Next, subjects indicated the extent to which they experienced the target noise (door slam/phone ring): "Were you able to have an experience of a door slamming (phone ringing) when you were asked to 'age regress' back to last week's session? I was _____ able to experience a door slamming (phone ringing)." (anchors: 1 = not at all, 3 = to some extent, 5 = to a great extent).

Pseudomemory: Forced-choice items. On the next questionnaire, subjects responded to each of the following forced-choice items: "Carefully review your experience about what occurred during last week's session and what occurred during today's session." (1) "Circle as many alternatives as you feel apply, that is, you can circle more than 1 alternative, if appropriate": A. A door (phone) actually slammed (rang) in last week's session. This event did occur last week. B. In today's session, the hypnotist did suggest a door slam (phone ring). C.

A door (phone) did not actually slam (ring) in last week's session. This event did not occur last week. D. In today's session, the hypnotist did not suggest a door slam (phone ring). (2) "Choose either A or B, that is, choose only one option:" A. The door (phone) did actually slam (ring) in last week's session. B. In today's session, I imagined that a door slammed (phone rang) during last week's session. It did not actually occur in last week's session. The order of the response options for these items was counterbalanced across subjects.

Criteria for pseudomemory. Consistent with concerns raised in the literature regarding the inclusion of uncertain or equivocating subjects in the calculation of pseudomemory rate (Barnier & McConkey, 1991; Lynn, et al. 1989, 1991), subjects in the present study were scored as demonstrating pseudomemory only if they indicated that the target noise actually occurred consistently in response to both of the above questions.

Pseudomemory rating scale. Items relating to the target noises (door slam/phone ringing) were embedded within a 15-item questionnaire adapted from Weekes and Lynn (1991). Instructions informed subjects that, "For each of the events listed below please indicate, using the scale provided, whether the event did or did not actually take place during last week's session, while you were completing the questionnaires." They then rated whether or not the following events actually occurred during the screening session on a 5-point continuous scale with anchors 1 = definitely did not actually occur, 3 = unsure, 5 = definitely did actually occur: 1. A jet airplane flew overhead. 2. The experimenter spilled a box of pencils. 3. A car

honked as it passed by on the street. 4. A girl in the hallway yelled out, "Hey you guys, wait up for me!" 5. The telephone in the room rang. 6. The ventilation system hummed. 7. Students whispered to one another while they filled out questionnaires. 8. People yelled to one another on the street outside. 9. A girl in the hallway yelled out, "Hey you, give me back my purse!" 10. A police car raced past the building with its siren blaring. 11. A door slammed out in the hall. 12. A school bell rang in the hallway. 13. A tile from the ceiling fell down. 14. A person in the class had a coughing fit. 15. Two cars collided in the parking lot.

Only the items relating to a door slamming and a telephone ringing were analyzed in the present study. The bi-polar nature of this scale allowed for a continuous measure of the extent to which subjects were certain that the target event did or did not actually occur.

Order of questionnaire administration. The order of the administration of the pseudomemory rating scale and the forced-choice pseudomemory items were counterbalanced, thus forming the third independent variable for this experiment. 78 subjects received the forced-choice questions first; 73 subjects received the questionnaire containing the rating scale first.

Additional questionnaire measures. Subjects also responded to the following questions: (a) "How deeply hypnotized were you during today's session?" (anchors: 1 = not at all hypnotized, 3 = somewhat hypnotized, 5 = deeply hypnotized); (b) "When it was suggested to you that you were back in last week's session, did you feel as if you were alternating between the present and your experience of last week?"

(anchors: 1 = not at all, 3 = some of the time, 5 = much of the time); (c) "Did you feel as if you were simultaneously in the present and experiencing last week's session?" (anchors: 1 = not at all, 3 = some of the time, 5 = much of the time).

Next, subjects responded to the items: "For each of the following statements circle as many alternatives as you feel apply." (1) "The experimenter expected me to:" A. Believe that a door (phone) actually slammed (rang) in last week's session. B. Believe that in today's session the hypnotist did suggest a door slam (phone ring). C. Believe that a door (phone) did not actually slam (ring) in last week's session. D. Believe that in today's session the hypnotist did not suggest a door slam (phone ring). (2) "Excellent hypnotic subjects would:" A. Believe that a door (phone) actually slammed (rang) in last week's session. B. Believe that in today's session the hypnotist did suggest a door slam (phone ring). C. Believe that a door (phone) did not actually slam (ring) in last week's session. D. Believe that in today's session the hypnotist did not suggest a door slam (phone ring). Once again, the order of response options A-D for these items was counterbalanced.

Pseudomemory: Final open-ended report. Subjects were given the opportunity to describe their experience further in response to the question: (a) "What, if anything, would you like to add about your experience of hearing noises during the last session?"

Criteria for pseudomemory. Subjects were scored as evidencing pseudomemory if they reported that the target noise occurred. Interrater agreement was 100%.

Finally, subjects were asked, "What is the purpose of this

experiment/What are the experimenter's hypotheses?" All subjects' responses could be coded as falling into one of the following four categories: 1) the purpose of the study was to modify memory; 2) the purpose of the study was to enhance or improve memory; 3) the purpose of the study was to investigate susceptibility or hypnotic effects; 4) don't know. Interrater agreement was 92%. The disagreements were resolved through discussion.

Following the completion of the questionnaires subjects in all conditions were debriefed completely, thanked for their participation, and dismissed. During the debriefing, subjects were told that the purpose of the present study was to investigate the extent to which hypnotic suggestions impact on subjects' memory for events. Importantly, due to the fact that their friends and classmates may participate in future sessions, they were admonished to refrain from discussing the experiment with any other individuals who may be about to participate in the experiment.

Summary of Procedures for the "Baserate" Group

The present study incorporated an additional group of hypnotizable subjects who participated in a parallel two-session experiment. During Session 1, subjects were screened for hypnotizability. In Session 2, they received the same prehypnotic instructions regarding the effect of hypnosis on memory followed by hypnotic induction (Appendix 1), suggestions for arm levitation (Appendix 2), arms moving apart (Appendix 3), deepening (Appendix 4), age regression, and age progression (modified slightly), and wake up (Appendix 5). Importantly, however, they did not receive the pseudomemory suggestion.

Subjects completed the pre- and posthypnotic open-ended items, the questionnaire containing the pseudomemory rating scale, hypnotic depth and subjective experience questions, and the final questions relating to their perceptions of their experience (modified slightly), the purpose of the experiment, and the experimenter's hypotheses.

Summary of Pseudomemory Indices

Pseudomemory was calculated at 5 points during the experiment. The main index of pseudomemory was recorded on the basis of subjects' responses to the forced-choice measures. Spontaneous pseudomemory reports were recorded 3 times - on the basis of subjects' responses to the open-ended questionnaires administered immediately before and after hypnosis as well as in response to the open-ended question which asked subjects if there was anything else they would like to add about their experience of the noise. Finally, pseudomemory was calculated on a certainty scale modified to group subjects into one of the following three categories: 1) certain that the noise definitely did not actually occur (score of 1); 2) unsure about what actually occurred (scores between 2 and 4); 3) certain that the noise defininitely did actually occur (score of 5).

Results

This section presents two sets of results. The first series of analyses used the criteria for inclusion described previously. The data was then analyzed a second time using a more stringent set of criteria (described below). Tables of results are displayed in Appendix 8.

Hypnotizability

A 2(suggestion type) x 2(observable report) x 2(questionnaire order) factorial multivariate analysis of variance (MANOVA) was used to assess differences among the 151 subjects who were assigned to the main experimental conditions on the three hypnotizability measures (objective, subjective involvement, and involuntariness). This analysis revealed a multivariate main effect of "observable report," Wilks' Lambda = .93, $F(3, 141) = 3.29$, $p < .02$. No other multivariate main effects or interactions reached significance (see Table 1).

Univariate analyses of the main effect of observable report indicated that while subjects did not differ with respect to objective hypnotizability (observable report $M = 9.97$, $SD = 1.23$; no report $M = 10.13$, $SD = .94$), $F(1, 143) = .49$, ns, subjects who were not asked to report on their experience until after hypnosis (i.e., no report condition) evidenced significantly higher subjective experience scores ($M = 27.98$; $SD = 3.91$) than subjects who were asked to provide an observable report ($M = 25.74$; $SD = 4.47$), $F(1, 143) = 8.91$, $p < .003$. Similarly, no report subjects demonstrated higher involuntariness scores ($M = 26.39$; $SD = 5.34$) than observable report subjects ($M = 24.04$; $SD = 6.45$), $F(1, 143) = 5.22$, $p < .02$ (see Table 2).

Baserate group. A one-way MANOVA was used to compare the hypnotizability levels of the baserate group (N = 39) with subjects in the door (N = 81) and telephone (N = 70) suggestion conditions. The results of this analysis confirmed that the multivariate effect did not reach significance, Wilks' Lambda = .98, F(6, 370) = .47, ns. Three groups did not differ on the three hypnotizability measures. Means and standard deviations of the three hypnotizability measures for this analysis are displayed in Table 3.

Age Regression, Target Noise Suggestion (Pseudomemory), and Hypnotic Depth

Following hypnosis, subjects were asked to indicate: 1) the extent to which they experienced age regression to the previous week; 2) the extent to which they experienced the target noise suggestion (door slam/phone ring); 3) how deeply hypnotized they were during the session. A 2(suggestion type) x 2(observable report) x 2(questionnaire order) MANOVA conducted on these three dependent variables yielded a multivariate main effect for suggestion type, Wilks' Lambda = .90, F(3, 141) = 5.22, p < .002 (see Table 4).

Subjects who were administered the phone ring suggestion reported more complete experience of age regression (M = 3.51; SD = .88) than subjects who received the door slam suggestion (M = 3.12; SD = 1.08), F(1, 143) = 6.68, p < .01. Phone suggestion subjects were more deeply hypnotized (M = 3.73; SD = .88) than door slam subjects (M = 3.20; SD = 1.21), F(1, 143) = 9.57, p < .002. However, phone subjects (M = 2.70; SD = 1.43) and door slam subjects (M = 2.71; SD = 1.30) did not differ on

the extent of their experience of the noise suggestion ($F < 1$; see Table 5).

Baserate group. A significant multivariate effect was found when the door, telephone and baserate groups were compared on age regression and hypnotic depth, Wilks' Lambda = .88, $F(2, 187) = 12.66$, $p < .0001$. Examination of the univariate analyses displayed in Table 6 revealed significant univariate effects for age regression, $F(2, 187) = 8.24$, $p < .0004$, and hypnotic depth, $F(2, 187) = 17.02$, $p < .0001$. Post hoc analysis (Newman Keuls, $p < .05$) indicated that subjects who were assigned to the telephone suggestion condition reported greater age regression ($M = 3.51$; $SD = .88$) and hypnotic depth ($M = 3.73$; $SD = .88$) than door suggestion subjects, who, in turn, reported experiencing greater age regression ($M = 3.12$; $SD = 1.08$) and depth ($M = 3.20$; $SD = 1.21$) than subjects in the baserate group (age regression $M = 2.72$; $SD = 1.02$; depth $M = 2.46$; $SD = 1.17$).

Distribution of Subjects Across Conditions

The overall distribution of subjects across factors is presented in Table 7. It was important to determine if subjects assigned to the various conditions met the inclusion criteria at differential rates. A 2(suggestion type) x 2(observable report) x 2(questionnaire order) logit analysis comparing the total frequencies of subjects across the three independent variables (i.e., suggestion type, observable report, questionnaire order) revealed that subjects in the no report condition met the inclusion criteria at a higher rate than observable reports subjects, $X^2(1) = 3.70$, $p < .05$ (see Table 8). Indeed, it was only

necessary to test 61 subjects in the no report condition to secure a final group of 38 subjects (pass rate of 62.3%) whereas it was necessary to test 90 subjects in the observable report condition to secure a final group of 41 subjects who met the inclusion criteria (pass rate of 45.6%). All other effects were nonsignificant.

A total of 79 subjects in the main experimental design met the a priori criteria for inclusion. Table 9 displays the distribution of these subjects.

Baserate group. 38.5% of subjects (15/39) tested in the baserate group met the criteria for inclusion. Subjects assigned to the door suggestion condition (50.6%; 41/81), phone suggestion condition (54.2%; 38/70) and the baserate group did not differ with respect to the rate at which they met the criteria for inclusion, $X^2(2) = 2.58$, ns.

Manipulation Check: Baserate Group

The target events used in this study (door slam/telephone ring) were successful in influencing subjects' confidence about whether the suggested events actually occurred. Using the pseudomemory rating scale, subjects assigned to the baserate group reported greater uncertainty about the door slam ($M = 1.6$; $SD = .91$) whereas they were more certain that a phone did not ring during the screening session ($M = 1.13$; $SD = .52$), $t(14) = 2.17$, $p < .05$.

Pseudomemory Effects

Spontaneous pseudomemory reports. On open-ended questionnaires administered prior to hypnosis, not a single subject spontaneously reported either a telephone ring or a door slam. Low rates of

pseudomemory were observed in response to the open-ended questionnaires administered after hypnosis. A 2(suggestion type) x 2(observable report) logit analysis conducted on subjects' open-ended responses did not yield any significant effects (see Table 10). Only 12.2% of door slam subjects (5/41) and 10.53% of phone ring subjects (4/38) spontaneously reported that the target noise occurred, $\underline{X}^2(1) = .66$, ns. Of those subjects who did not report a pseudomemory, 3 door slam subjects and 3 phone ring subjects expressed uncertainty about whether or not the target noise actually occurred. A single door slam subject and 2 phone ring subjects explicitly denied that the target noise occurred.

12.5% of observable report subjects (5/40) and 10.26% of no report subjects (4/39) spontaneously reported the target noise, $\underline{X}^2(1) = .51$, ns.

Baserate group. None of the subjects in the baserate group reported a target noise during either questionnaire administration period.

Confidence. The low rate of pseudomemory demonstrated in response to the open-ended questionnaires precluded the use of a higher-order statistical test such as factorial ANOVA to analyse subjects' confidence ratings. However, in an attempt to partially examine subjects' confidence in their responding, confidence ratings of subjects who reported a pseudomemory ($\underline{N} = 9$) were compared with those of subjects who did not report pseudomemory ($\underline{N} = 70$). A $\underline{t}$-test performed on these data did not reach significance. Indeed, subjects who reported pseudomemory were as confident in the accuracy of their

responding (M = 4.28; SD = .87) as subjects who did not report pseudomemory (M = 4.33; SD = .70), t(77) = -.20, ns. Despite the radically unequal numbers of subjects in the two groups being compared, the respective variances were equivalent, F'(8, 69) = 1.54, ns.

Forced-choice items. A 2(suggestion type) x 2(observable report) x 2(questionnaire order) logit analysis was performed to examine the incidence of pseudomemory across conditions in response to direct questioning, the main index of pseudomemory. In this instance, pseudomemory was scored if subjects reported consistently that the target noise occurred in response to both forced-choice questions. Table 11 confirms that this analysis failed to yield any significant effects.

Indeed, 34.1% of subjects (14/41) who received the door slam suggestion demonstrated pseudomemory compared with 18.4% of subjects (7/38) who received the phone ring suggestion, $X^2(1) = .37$, ns. Of those subjects who were scored as not reporting pseudomemory, 1 subject in the door slam condition and 4 subjects in the phone condition equivocated by reporting that the target noise occurred in response to only one of the two questions.

Also, pseudomemory rate failed to differ in response to the observable report manipulation: 30% of subjects (12/40) in the observable report condition reported pseudomemory compared with 23.1% of subjects (9/39) in the no report condition, $X^2(1) = .05$, ns.

Finally, 30.8% (12/39) of subjects who received the forced-choice

questions prior to the questionnaire using the rating scales; the pseudomemory rate was 22.5% (9/40) when the forced-choice questions were administered following the pseudomemory rating scale, $X^2(1) = .12$, ns.

Confidence. Subjects' confidence in the accuracy of their pseudomemory reports were analyzed using a 2(suggestion type) x 2(pseudomemory report: pseudomemory vs. no pseudomemory) MANOVA. The small number of subjects who reported pseudomemory limited the size of the hierarchical design. These two factors were chosen for inclusion in the analysis since they were deemed to be of primary theoretical interest. Moreover, the Questionnaire Order factor was not reported on the remaining analyses reported in the results section due to the fact that the factor failed to have an impact on subjects' responding.

This analysis did not yield any significant effects (all Fs < 2.0; see Table 12). In short, subjects did not differ with respect to their confidence in their responses to the forced-choice measures.

Received a suggestion? A 2(suggestion type) x 2(pseudomemory report) logit analysis was used to examine subjects' reports of having received a suggestion to hear the target noise. Results indicated that subjects who reported pseudomemory in response to forced-choice questioning (71.4%; 15/21) were less likely to indicate that they had been administered a suggestion than subjects who did not report pseudomemory (87.9%; 51/58), $X^2(1) = 7.44$, $p < .006$. No other effects reached significance (see Table 13).

Pseudomemory rating scale. Subjects' pseudomemory ratings embedded in a larger questionnaire were analyzed using a 2(suggestion type) x 2(pseudomemory report) factorial analysis of variance (ANOVA). Recall that this 5-point scale was constructed so that a score of 1 indicated that the event definitely did not actually occur, a score of 3 meant that the subject was unsure whether or not the event occurred, and 5 indicated that the event definitely did actually occur.

This analysis yielded a main effect for pseudomemory report, $F(1, 75) = 50.47$, $p < .0001$. No other effects were significant (see Table 14). Subjects who reported pseudomemory were more certain that the target event did occur ($M = 4.24$; $SD = .99$) whereas subjects who did not report pseudomemory were more certain that the target event did not occur ($M = 2.07$; $SD = 1.21$).

Baserate group. It was not possible to analyze the responses from the baserate group together with subjects in the door slam and telephone suggestion conditions. Whereas subjects in the baserate group responded to the items relating to both the door slam and telephone ring, only the item relating to respective target event was analyzed for subjects who participated in the door and telephone suggestion conditions.

Accordingly, the following is a descriptive breakdown of the baserate subjects' responses to the pseudomemory rating scale. Importantly, none of the subjects indicated that either of the target events definitely occurred. 66.7% of subjects in the baserate group (10/15) reported that a door definitely did not slam (i.e., scored 1 on

the scale); 33.3% were uncertain (5/15; scored 3 on the scale). 93.3% (14/15) reported that a phone definitely did not ring (scored 1 on the scale). Only one subject who received the telephone suggestion was uncertain about whether the phone actually rang (scored 3 on the scale).

Patterns of pseudomemory responding across measures. None of the subjects in the experiment reported pseudomemory on the open-ended questionnaires administered before hypnosis. With respect to the four measures of pseudomemory administered following hypnosis, the door and telephone conditions did not differ on the number of subjects in each who reported pseudomemory on at least one occasion (door: 17/41; phone: 12/38), $X^2(1) = .83$, ns.

Subjects' responses to each of the posthypnotic indices of pseudomemory were summed to form an aggregate measure representing the number of times subjects reported pseudomemory during the experiment. Results indicated that subjects who received the door suggestion ($M = 1.05$; $SD = 1.30$) and subjects who received the phone suggestion ($M = .76$; $SD = 1.08$) failed to differ on the number of times they reported pseudomemory, $t(77) = 1.06$, ns.

An effort was made to examine the consistency of subjects' pseudomemory responding after their initial pseudomemory report. Examination of the pattern of subjects' reponding revealed that 4 of the 17 subjects (23.5%) who reported pseudomemory in response to the door slam suggestion consistently demonstrated pseudomemory following their initial report. By the same token, only 2 of the 12

subjects (17%) who reported pseudomemory in response to the telephone ring suggestion continued to report pseudomemory consistently. The small number of subjects precluded a statistical analysis of these results.

It is interesting to note that only two subjects in the door suggestion condition reported pseudomemory on every trial (5%). None of the subjects in the telephone suggestion condition reported pseudomemory on every trial.

Recall that subjects responded to a 15-item rating questionnaire. Two of the items related to the target stimuli used in the present experiment (i.e., door slam, telephone ring). In an effort to examine the potential relationship between pseudomemory reports in response to the target stimuli and pseudomemory in response to the other events described in the questionnaire (e.g., "A jet airplane flew overhead"), subjects' responses to the remaining 13 items were scored in a dichotomous fashion according to whether or not they reported pseudomemory. Specifically, subjects were scored as reporting pseudomemory if they indicated that the event "definitely dud actually occur" (score of 5). Subjects who responded by circling options between 1 and 4 were scored as not having reported pseudomemory. Subjects' responses to the 13 items were then summed to form a aggregate measure with scores ranging from 0 to 13 representing the number of events subjects' reported as actually occurring during the first session.

A 2(suggestion type) x 2(pseudomemory report) ANOVA was

conducted on these data. Results indicated that subjects who reported pseudomemory in response to the forced-choice measure also reported pseudomemory in response to more of the items contained in the ratings questionnaire (M = .67; SD = 1.15) than subjects who did not report pseudomemory (M = .21; SD = .45), F(1, 75) = 3.78, p < .05. No other effects in this analysis were significant (see Table 15).

Alternating between sessions/Simultaneously in both sessions. Subjects' experience of alternating between sessions and being simultaneously in both hypnosis sessions was analyzed using a 2(suggestion type) x 2(pseudomemory report) MANOVA. As displayed in Table 16, this analysis did not yield any significant effects (all Fs < 2).

Baserate group. A one-way MANOVA comparing subjects in the door suggestion, phone suggestion and the baserate groups on their perceptions of alternating or being simultaneously in both sessions revealed a significant multivariate effect, Wilks' Lambda = .82, F(4, 180) = 4.66, p < .001. Examination of the univariate analyses indicated significant effects for subjects' perceptions of alternating between sessions, F(2, 91) = 4.15, p < .02, and their perceptions of being in both sessions simultaneously, F(, 91) = 9.07, p < .0003 (see Table 17). Post hoc analysis indicated that baserate subjects experienced less alternating between sessions (M = 2.73; SD = 1.16) and were less likely to report being simultaneously in both sessions (M = 2.67; SD = .80) compared with subjects in the door suggestion (alternating: M = 3.56; SD = .95; simultaneous: M = 3.56; SD = 1.02) and telephone suggestion (alternating: M = 3.60; SD = 1.10; simultaneous: M = 3.45; SD = 1.13)

conditions. These latter two groups did not differ from one another on either of the dependent variables.

Subjects' Beliefs

Subjects' beliefs about the hypnotist's expectations and the responses of excellent hypnotic subjects were analyzed using 2(suggestion type) x 2(pseudomemory report) logit analyses rather than the more complete 4-factor design (i.e., suggestion type, observable report, questionnaire order, pseudomemory report) because of limited sample size. Due to the fact that the belief measures were constructed in such a way as to offer subjects opposing alternatives (e.g., "Believe that a phone actually rang in last week's session" versus "Believe that a phone did not actually ring in last week's session"), subjects' selections to only one of the pairs of response alternatives were analyzed. Examination of the raw data confirmed that all subjects responded consistently when selecting from each pair of alternatives (i.e., no subject contradicted himself or herself by indicating that the hypnotist expected them to both believe and not believe that the target event had been suggested).

1) Beliefs About the Hypnotist's Expectations

Believe that the noise really occurred. The 2(suggestion type) x 2(pseudomemory report) logit analysis conducted on subjects' beliefs about the hypnotist's expectations regarding their pseudomemory responding did not reveal any significant effects (see Table 18). The majority of subjects reported that the hypnotist expected them to believe that the target event actually occurred. Indeed, 82.9% of

subjects in the door suggestion condition (34/41) and 86.8% of subjects in the phone suggestion condition (33/38) indicated that the hypnotist expected them to believe that the target event was real, $X^2(1) = .23$, ns. Subjects' perceptions did not differ according to their pseduomemory reports. 80.9% of subjects who reported pseudomemory (17/21) and 86.2% of subjects who did not report pseudomemory (50/58) indicated that the hypnotist expected them to believe the noises were real, $X^2(1) = .94$, ns.

Believe that they had been administered a suggestion. Subjects did not differ with respect to their beliefs about whether the hypnotist expected them to believe that they had received a suggestion to hear the noises. 78% of door suggestion subjects (32/41) and 68.4% of phone suggestion subjects (26/38) reported that the hypnotist expected them to believe that they had received a suggestion to hear the target noise, $X^2(1) = .94$, ns. Similarly, 61.9% of subjects who reported pseudomemory (13/21) and 77.6% of subjects who did not (45/58), reported that the hypnotist expected them to believe that they had been administered a suggestion. The 2(suggestion type) x 2(pseduomemory report) logit analysis was nonsignificant (see Table 19).

2) Beliefs About Excellent Hypnotic Subjects' Responding

Believe that the noise actually occurred. The 2(suggestion type) x 2(pseudomemory report) logit analysis conducted on subjects' beliefs about the responding of excellent hypnotic subjects was nonsignificant (see Table 20). Most subjects reported that excellent hypnotic subjects would believe that the target event actually occurred,

regardless of suggestion type (door suggestion = 80.5% [33/41]; phone suggestion: 84.2% [32/38], $X^2(1) = .95$, ns.) or pseudomemory status (pseudomemory: 85.7% [18/21]; no pseudomemory: 81% [47/58], $X^2(1) = .23$, ns.).

Believe that they had been administered a suggestion. No significant effects were obtained when subjects' views regarding whether excellent hypnotic subjects would believe that they had been administered a suggestion were analyzed (see Table 21). Indeed, 48.8% of subjects (20/41) in the door suggestion condition and 42.1% of phone suggestion subjects reported that they believed that excellent hypnotic subjects would believe that they had been administered a suggestion, $X^2(1) = .14$, ns. 28.6% of subjects who reported pseudomemory (6/21) and 51.7% of subjects (30/58) who did not report pseudomemory indicated that excellent subjects would believe that a suggestion had been administered, $X^2(1) = 1.11$, ns.

Final Open-Ended Questions

Anything to add about the noises? When asked if there was anything else they would like to add about their experience of the noise, subjects who had previously reported pseudomemory in the response to the forced-choice measure were significantly more likely to report pseudomemory (33.3%; 7/21) than subjects who did not report pseudomemory (5.2%; 3/58), $X^2(1) = 6.52$, $p < .01$. However, the pseudomemory rate failed to differ as a function of suggestion type. 12.2% of subjects (5/41) who received the door suggestion and 13.2% of subjects (5/38) who received the phone suggestion reported

pseudomemory, $\underline{X}^2(1) = .60$, ns (see Table 22).

Baserate group. None of the subjects in the baserate group reported pseudomemory in response to this question.

Purpose/Hypotheses of the study? Examination of the breakdown of subjects' interpretations of the purpose of the experiment indicated that 39% (16/41) of door suggestion subjects and 44.7% of phone suggestion subjects (17/38) indicated that the purpose of the study was to modify memory. 24.2% (10/41) of door suggestion subjects and 34.2% of phone suggestion subjects (13/38) reported that the study was designed to enhance recall. 29.3% of subjects in the door sugestion condition (12/41) and 18.4% of subjects in the phone suggestion condition (7/38) thought that the experiment was intended to assess hypnotic susceptibility. Three subjects in the door suggestion condition and a single subject assigned to the phone suggestion condition indicated that they did not know the purpose of the experiment, $\underline{X}^2(3) = .63$, ns.

43.1% of subjects who reported pseudomemory in response to the forced-choice measure (25/58) and 38.1% of subjects (8/21) who did not report pseudomemory indicated that the purpose of the study was to make them believe that the noises were real. 31% of pseudomemory subjects (18/58) and 23.8% of nonpseudomemory subjects (5/21) indicated that the study was intended to enhance recall. 22.4% of pseudomemory subjects (13/58) and 28.6% of nonpseudomemory subjects (6/21) reported that the study examined hypnotic susceptibility. Two pseudomemory and two nonpseudomemory subjects

did not know the purpose of the study, $\underline{X}^2(3) = 2.75$, ns. These results were nonsignificant (see Table 23).

Baserate group. Unfortunately, inadequate cell frequencies precluded the use of a formal statistical analysis of the data for baserate subjects. However, examination of subjects' reports indicated that none reported that the purpose of the experiment was to make them believe that the noises were real. 40% (6/15) reported that the study was intended to enhance recall. 53.3% (8/15) felt that the study was designed to investigate hypnotic susceptibility. A single subject indicated that he or she did not know the purpose of the experiment.

Use of Stringent Inclusion Criteria

The failure to secure differences in pseudomemory rate for the door slam and telephone ring suggestions may have been due to the use of criteria which retained subjects in the experiment who only partially experienced hypnosis and the critical suggestions. Recall that subjects were included in the study if they experienced age regression, the target noise suggestion and hypnosis to some extent during the session (i.e., scores of 3 or more on the 5-point scales). Not surprisingly, subjects who do not fully experience suggestions are unlikely to report compelling subjective experiences such as pseudomemory. To fully analyze the data, it was important to determine if differences in pseudomemory rate for the two suggestions emerged when only subjects who evidenced complete or almost complete experiences of the suggestions and hypnotic procedures were included in the analysis.

An additional series of analyses was conducted using only those

subjects who responded with either a 4 or 5 on the measures of age regression, target noise, and hypnotic depth. A total of 39 subjects met these criteria.

Only 4 subjects in the baserate group met the stringent criteria. Accordingly, this group was not included in any of the following analyses. The distribution of the subjects who met the stringent inclusion criteria is presented in Table 24.

Spontaneous pseudomemory reports. Once again, low rates were observed when pseudomemory was assessed using open-ended questionnaires. 10.53% (2/19) door slam subjects and 15% (3/20) phone ring subjects spontaneously reported pseudomemory. 14.3% (3/21) observable report subjects and 11.1% (2/18) no report subjects demonstrated pseudomemory. The 2(suggestion type) x 2(observable report) logit analysis failed to yield any significant effects (all X^2s < .10; see Table 25).

Confidence. The small number of subjects (N = 5) who reported pseudomemory precluded statistical analysis of confidence data.

Forced-choice items. Using the stringent inclusion criteria, a 2(suggestion type) x 2(observable report) logit analysis revealed significant differences in pseudomemory rate in response to the forced-choice questions were found between the door and phone suggestion conditions. 63.2% of subjects in the door slam condition (12/19) reported pseudomemory compared with a pseudomemory rate of 25% (5/20) for subjects in the phone ring condition, $X^2(1) = 5.77$, $p <$ .02. None of the other effects in this analysis reached significance

(see Table 26).

Confidence. A 2(suggestion type) x 2(pseudomemory report) MANOVA was conducted on subjects' confidence ratings in response to each of the two forced-choice items. This analysis revealed a multivariate main effect for pseudomemory, Wilks' Lambda = .78, $F(2, 34) = 4.85$, $p < .01$ (see Table 27).

Examination of the univariate analyses revealed that for both confidence ratings, subjects who reported pseudomemory were less confident in the accuracy of their responding ($M = 4.0$; $SD = .79$ and $M = 3.76$; $SD = .90$) than subjects who did not report pseudomemory ($M = 4.64$; $SD = .79$ and $M = 4.5$; $SD = .96$), $F(1, 35) = 7.03$, $p < .01$ and $F(1, 35) = 6.67$, $p < .01$ (see Tables 28 and 29).

Received a suggestion? A 2(suggestion type) x 2(pseudomemory report) logit analysis did not reveal any significant differences with respect to the rate with which subjects reported that they had been administered a suggestion to hear the target noise (see Table 30). 79% of door suggestion subjects (15/19) and 80% of phone suggestion subjects (16/20) reported that they had received a suggestion to hear the target noise, $X^2(1) = .01$, ns. 76.5% of subjects who reported pseudomemory (13/17) and 81.8% of subjects who did not report pseudomemory (18/22) acknowledged the fact that they had received a suggestion, $X^2(1) = .24$, ns.

Pseudomemory rating scale. Subjects' ratings were explored using a 2(suggestion type) x 2(pseudomemory report) ANOVA. The significant main effect of pseudomemory report, $F(1, 35) = 24.1$, $p < .0001$, was

qualified by a significant suggestion type by pseudomemory report interaction, $F(1, 35) = 5.4$, $p < .03$ (see Table 31). The main effect of suggestion type was not significant. Simple main effect analysis of the interaction revealed that phone suggestion subjects who reported pseudomemory were certain that a phone actually rang ($M = 4.20$; $SD = .84$) whereas phone subjects who did not report pseudomemory were certain that a phone did not ring ($M = 1.53$; $SD = 1.12$), $F(1, 35) = 23.38$, $p < .0001$. Door suggestion subjects who did not report pseudomemory were uncertain about whether the noise actually occurred ($M = 2.17$; $SD = 1.25$); phone subjects who did not report pseudomemory ($M = 1.53$; $SD = 1.12$) were certain that a phone did not ring, $F(1, 35) = 4.90$, $p < .04$. The means and standard deviations for this interaction are presented in Table 32.

Patterns of pseudomememory responding. Over the course of the experiment, door suggestion subjects were more likely to report pseudomemory on at least one occasion (73.7%; 14/19) than subjects in the phone suggestion condition (35%; 7/20), $X^2(1) = 5.87$, $p < .02$. Moreover, subjects who received the door suggestion ($M = 1.74$; $SD = 1.33$) reported pseudomemory on more trials than subjects who received the phone suggestion ($M = .85$; $SD = 1.14$), $t(37) = 2.24$, $p < .03$.

Four door suggestion subjects (21%) and one phone suggestion subject consistently reported pseudomemory following their initial pseudomemory report. Only one subject in the door suggestion condition reported pseudomemory on all four post-hypnotic trials. None did so in the telephone suggestion condition.

A 2(suggestion type) x 2(pseudomemory report) ANOVA conducted on the aggregate measure representing the number of events on the ratings questionnaire that subjects reported as actually occurring revealed that subjects who reported pseudomemory in response to forced-choice questioning reported more pseudomemory (M = .53; SD = .62) than subjects who did not report pseudomemory (M = .14; SD = .35) in response to items relating to non-targeted events, $F(1, 35) = 4.08$, $p < .05$ (see Table 33).

Alternating between sessions/Simultaneously in both sessions. A 2(suggestion type) x 2(pseudomemory report) MANOVA was used to investigate potential differences in terms of subjects' perceptions of alternating between the second session and the hypnosis screening session and their perceptions of being in both session at the same time. None of the multivariate effects reached significance (see Table 34).

Subjects' Beliefs

1) Beliefs About the Hypnotist's Expectations

Believe that the noise really occurred. Subjects did not differ with respect to the rate at which they indicated that the hypnotist expected them to believe that the target noise was real. The 2(suggestion type) x 2(pseudomemory report) logit analysis was nonsignificant (see Table 35). Almost 90% of door suggestion subjects (17/19) and 100% of subjects who received the phone suggestion indicated that the hypnotist expected them to believe that the noises were real, $X^2(1) = .08$, ns. 88.2% of subjects who reported pseudomemory (15/17) and 100% of subjects who did not report pseudomemory indicated that the

hypnotist expected them to believe the noise was real, $X^2(1) = .00$, ns.

Believe that they had been administered a suggestion. 80% of door suggestion subjects (15/19) and 55% of phone suggestion subjects (11/20) indicated that the hypnotist expected them to believe that they had been admininstered a suggestion to hear the noise, $X^2(1) = 2.12$, ns. 64.7% of subjects who reported pseudomemory (11/17) and 68.2% of subjects who failed to report pseudomemory (15/22) reported that the hypnotist expected them to believe that they had received a suggestion, $X^2(1) = .65$, ns. The 2(suggestion type) x 2(pseudomemory report) logit analysis was nonsignificant (see Table 36).

2) Beliefs About Excellent Hypnotic Subjects' Responding

Believe that the noise actually occurred. As displayed in Table 37, subjects did not differ with respect to their beliefs about whether excellent hypnotic subjects would believe that the noises were real. Almost 90% of door suggestion subjects (17/19) and 85% of phone suggestion subjects (17/20) indicated that, in their view, excellent hypnotic subjects would believe that the noises were real, $X^2(1) = .24$, ns. 94.1% (16/17) of subjects who reported pseudomemory and 81.8% (18/22) of those who did not, indicated that highly reponsive hypnotic subjects would believe that the noise was real, $X^2(1) = .36$, ns.

Believe that they had been administered a suggestion. Subjects who reported pseudomemory were less likely to indicate that excellent hypnotic subjects would believe that they had received a suggestion (35.3%; 6/17) than subjects who did not report pseudomemory (63.6%; 14/22), $X^2(1) = 4.43$, $p < .03$. No other effects in the logit analysis

reached significance (see Table 38). Indeed, comparable proportions of door (57.9%; 11/19) and phone (45%; 9/20) suggestion subjects reported that responsive hypnotic subjects would believe that they had recieved a suggestion, $\underline{X}^2(1) = 2.42$, ns.

Final Open-Ended Questions

Anything to add about the noises? Subjects who reported pseudomemory on the forced-choice questions were more likely to report that the target event actually occurred (29.4%; 5/17) compared with subjects who did not report pseudomemory (4.5%; 1/22), $\underline{X}^2(1) = 3.73$, $\underline{p} < .05$. No other logit analysis effects were significant (see Table 39). The following are examples of the final open-ended questions for subjects who indicated that the target noise occurred (i.e., reported pseudomemory):

1) "I did hear a phone ring, but it was coupled with the knowledge that the experimenter suggested it to me. However, it was no effort to hear the phone, as the ring seemed to come on its own and without any effort from me. It was not my imagining that made it happen, it just happened."
2) "I know that it was suggested to me in this session to hear a door slam in the last session, but I still believe that the door actually did slam in the last session."

Other subjects took the opportunity to emphasize that the target event did not occur:

1) "I don't remember hearing anything but the hypnotist's voice. I never heard a telephone."

2) "I don't remember hearing a door slam. I remember imagining it, but I don't believe that it actually happened."

Purpose/Hypotheses of the study? Although nonsignificant, examination of the breakdown of subjects' interpretation of the purpose of the experiment indicated that 31.6% (6/19) of door suggestion subjects and 55% of phone suggestion subjects (11/20) indicated that the purpose of the study was to modify memory. 26.3% (5/19) of door suggestion subjects and 25% of phone suggestion subjects (5/20) reported that the study was designed to enhance recall. 36.8% of subjects in the door suggestion condition (7/19) and 20% of subjects in the phone suggestion condition (4/20) thought that the experiment was intended to assess hypnotic susceptibility. A single subject in the door suggestion condition did not know the purpose of the experiment, $X^2(3) = 2.69$, ns.

41.2% of subjects who reported pseudomemory (7/17) and 45.4% of no pseudomemory subjects (10/22) indicated that the purpose of the study was to make them believe that the noises were real. 27.3% of pseudomemory subjects (6/22) and 23.5% of nonpseudomemory subjects (4/17) indicated that the purpose of the experiment was to enhance memory. 27.3% (6/22) of pseudomemory subjects 29.4% (5/17) of nonpseudomemory subjects indicated that the study was examining susceptibility. Finally, one subject who did not report pseudomemory did not know the purpose of the study, $X^2(3) = .16$, ns (see Table 40).

Discussion

The target stimuli employed in the present study, a door slam and telephone ringing, were successful in influencing subjects' certainty regarding whether the event was an actual occurrence. Subjects in the baserate group, who did not receive a pseudomemory suggestion, expressed greater uncertainty about whether a door slammed during the screening session whereas they were more certain that a telephone did not actually ring. These results compliment the findings of the pilot study (Weekes & Lynn, 1991) which demonstrated that subjects were less confident about the accuracy of their recollection of a commonly occurring event such as a door slam and were more confident about the accuracy of their recollection of a highly memorable event such as a telephone ringing during an experiment.

Importantly, none of the subjects in the baserate group reported pseudomemory in the absence of pseudomemory suggestions for the specific target events. These findings indicate that unless it is suggested to them, subjects do not inadvertently report pseudomemories even when administered questionnaires which ask them about their experience of events that may have taken place earlier.

Together, the findings from the pilot study and the manipulation check provided a strong empirical foundation for the prediction that highly hypnotizable subjects who receive a suggestion to hear a door slam would yield a high rate of pseudomemory and that subjects who are administered a suggestion to hear a telephone ringing would yield a low rate of pseudomemory.

Contrary to this prediction, the pseudomemory rate did not differ in response to the administration of the two target stimuli. However, after reconsidering the inclusion criteria used in the present study, the failure to secure differences in the rate of pseudomemory may have been due to the fact that subjects who reported only partially experiencing key hypnotic effects (i.e., age regression, the noise suggestion, hypnotic depth) were included in the study. As a result, the inclusion of subjects who did not fully experience suggested effects may have served to diminish differences in pseudomemory rate when the door and telephone suggestions were compared.

Accordingly, in order to fully evaluate the main hypothesis advanced in this paper it was necessary to eliminate from the analysis those subjects who reported only a partial experience of age regression, the target noise suggestion and hypnotic depth, and to retain only those subjects who indicated that they experienced deep hypnosis and who reported considerable subjective involvement in the experience of age regression, the target noise suggestion, and hypnosis. Indeed, when only those subjects who reported extensive experience of hypnosis and the critical suggestions were analyzed, the prediction was confirmed. In response to direct questioning (i.e., forced-choice, the main index of pseudomemory), subjects who received the suggestion to hear a door slam demonstrated a significantly higher rate of pseudomemory (63.2%) than subjects who received a suggestion to hear a telephone ringing (25%).

The present study's pseudomemory rate in response to direct questioning for the telephone ring suggestion (25%) is very similar to

the pseudomemory rate found in other research using a telephone suggestion embedded within an age regression suggestion (Lynn, et al., in press: 22.2% hypnotized versus 25% simulating) and is higher than the 0% pseudomemory rate found in previous research using the telephone ring suggestion administered without age regression (Lynn, et al., 1989; Lynn, et al., 1991).

In contrast, the 63.2% rate of pseudomemory evidenced by subjects who received the suggestion to hear a door slam is comparable to the high rates of pseudomemory (69%-81%) documented by other researchers using the door slam stimulus in the context of the nocturnal events paradigm (Labelle, et al., 1990; Laurence & Perry, 1983; Laurence, et al., 1986; McCann & Sheehan,1988, Study 1; Spanos and McLean, 1986; Weekes, et al., 1992).

Taken together, the present study incorporated two of the target events used in other pseudomemory research and equated them in terms of their availability for independent verification. However, the stimuli differed in terms of subjects' ratings of the likelihood of the event occurring and the likelihood of the event being remembered. The dramatic differences in pseudomemory rate found in the present study in response to the door slam and telephone ring suggestions parallel the pseudomemory rates reported in other studies using these stimuli and strongly suggest that subjects' level of certainty about the target events is an important factor in the creation of pseudomemory reports.

The present study was designed to provide multiple tests of pseudomemory using different measurement formats. Pseudomemory was measured at five separate points during the second session of the

experiment (once before hypnosis; four times following hypnosis) in response to open-ended, direct, and rating scale measures.

Using the stringent criteria, subjects who received the door slam suggestion were more likely to demonstrate pseudomemory on at least one of the four post-hypnotic tests compared with subjects who received the telephone ring suggestion. Also, subjects in the door slam condition reported pseudomemory more often across trials than subjects in the telephone ring condition. Prior to the use of stringent criteria, no such patterns of pseudomemory were observed.

The low rate of pseudomemory found on open-ended questions (10.5-15%) in the present study is comparable with previous research in which pseudomemory reports in response to open-ended questions ranged from 0% (Lynn, et al., in press; Lynn, et al., 1991) to 12.5% for hypnotized and 10% for simulating subjects (Lynn, et al., 1989). It is important to note, however, that other research used different open-ended formats for assessing pseudomemory. For instance, whereas the open-ended question used in the present study asked subjects to describe everything that occurred during the previous session, the item used by Lynn and his associates (Lynn, et al., 1991, Lynn, et al., in press; Lynn, et al., 1989) asked subjects to describe each of the suggestions and their thoughts, feelings, and reactions in response to each of them. By reference to "suggestion" in the wording of the question, the open report used in the Lynn, et al. studies could have inadvertently linked subjects' reaction to the unreality, rather than the reality of their experience, thereby challenging them at the very outset as to the veracity of their response and reducing the level

of pseudomemory in response to this question.

However, despite the use of different question formats, the results of the present study are consistent with related pseudomemory research employing open-ended response formats. Taken together, the findings from these studies suggest that unless subjects are cued or questioned directly, relatively few subjects who have received pseudomemory suggestions spontaneously report the suggested event actually occurred. Moreover, the fact that pseudomemory rates in response to open-ended questioning in the present study mirrored the rates reported in other studies suggests that the low rates found in previous research are unlikely to be attributable to the cue characteristics of the wording of open-ended questions.

Previous investigations have assessed pseudomemory through the use of either direct questioning alone (e.g., Barnier & McConkey, 1992; Labelle, et al., 1989; Labelle, et al., 1990; Labelle & Perry, 1986; Laurence, et al., 1986; Lynn, et al., 1992; McCann & Sheehan, 1988, Study 1; Sheehan, et al., 1991c; Spanos & McLean, 1986; Weekes, et al., 1992) or open-ended and direct questioning combined (Lynn, et al., 1991; Lynn, et al., in press; Lynn, et al., 1989). The present study extends the existing research by incorporating a novel measure of pseudomemory which permitted subjects to report the extent to which they were certain that the target noise either did or did not occur. Although the pseudomemory rate for the rating scales did not differ as a function of suggestion type, results indicated that subjects who received the door suggestion but did not report pseudomemory were less confident about the accuracy of their experience than subjects in

the telephone suggestion who did not report pseudomemory.

Overall, subjects who reported pseudomemory were less confident in the accuracy of their responses to forced-choice questioning compared to subjects who did not report pseudomemory. This finding is harmonious with previous research (Barnier & McConkey, 1992; Sheehan, et al., 1991a, 1991b) which demonstrated that subjects who reported pseudomemory are frequently unsure about the accuracy of their experience. Together, these studies challenge the view that hypnotic suggestions simply replace existing memories (e.g., Laurence & Perry, 1983; Laurence, et al., 1986; Orne, 1979; Orne, et al., 1988). The fact that subjects who report pseudomemory are uncertain about the accuracy of their recall suggests that subjects may not be entirely convinced that the events suggested during hypnosis were veridical. Moreover, these findings suggest that the original memory traces may still be available and that pseudomemory subjects' low levels of confidence may indicate that they are conflicted about what actually happened, particularly in the face of repeated questioning (see also, McCann & Sheehan, 1988).

Few subjects consistently reported pseudomemory on the different measures following the administration of the suggestion. In fact, only one subject who received the door suggestion reported pseudomemory on all four of the items administered following hypnosis; none of the subjects who received the phone suggestion did so. This finding may reflect differences in pseudomemory rate inherent in the different measurement techniques used in the study. Alternatively, the pattern of inconsistency found may reflect the fact that subjects are generally

uncertain about what actually happened during the previous screening session.

Interestingly, the present study found that subjects who reported pseudomemory in response to direct, forced-choice questions reported more pseudomemory in response to questionnaire items relating to events that were not targetted by suggestion. One possible explanation is that subjects who report pseudomemory for events targetted by suggestion evidence a heightened tendency to report pseudomemory in reponse to a variety potential events. These findings are novel in the current literature pertaining to pseudomemory and the report bias hypothesis warrants further investigation.

Using the initial criteria for inclusion, subjects who received the suggestion to hear a telephone ring reported more extensive involvement in age regression and greater hypnotic depth than subjects who received the door suggestion. In turn, subjects in the door suggestion condition reported more extensive age regression and hypnotic depth than subjects in the baserate group, who did not receive a pseudomemory suggestion. Door suggestion and phone suggestion subjects experienced more alternating between sessions and experienced themselves simultaneously in both sessions whereas subjects in the baserate group did not report these experiences of dualism. It may be that providing subjects with a specific event to focus on (i.e., door slamming/telephone ringing) may have served to enhance their experience of age regression and hypnosis. Moreover, the level of difficulty inherent in the pseudomemory suggestions may be evidenced by subjects' reports of being in both sessions at the same

time (see also, Spanos, et al., 1989). Indeed, the pattern of results across measures suggests that the three conditions may differ in terms of level of cognitive effort and subjective involvement required by subjects. For instance, the task of creating a convincing cognitive representation of a telephone ringing may have required extensive concentration and cognitive effort relative to that required to create a lifelike experience of a door slamming. Age regression back to the previous session with no specific imaginings may have required the least amount of effort. As a result, subjects' response to the demands inherent within the tasks may have influenced their retrospective ratings of the extent of age regression and hypnotic depth.

The prediction that subjects who provided an observable report during hypnosis on their experience of the target noise suggestion would feel compelled to respond consistently and report the suggested target event as a veridical occurrence (i.e., report pseudomemory) following hypnosis was not supported. Subjects who were asked to report during hypnosis and those who were not asked to report on their experience until after hypnosis responded in an identical manner. These results suggest that, at least when using the methodology employed in the present study, requesting subjects to provide a public report on their subjective experience of pseudomemory suggestions does not increase the subsequent rate of pseudomemory reported by experimental subjects.

However, close examination of the procedure suggests that the failure to secure differences may have been due to the fact that the task set out for subjects in the observable report condition was simply

to indicate whether they experienced the noise described by the suggestion and not whether they believed that the event actually occurred. When tested posthypnotically, they may not have felt as compelled to report the suggested event as an actual occurrence had they been required to report the noise as real during hypnosis.

In addition, it is likely that some subjects enacted an observable response whereas others did not. Unfortunately, the procedure used in this study did not require that subjects' behavioral responses be recorded (i.e., record whether or not they raised their index fingers in a discernible manner). As a result, it was not possible to compare the responses of subjects who did provide an observable report with those who did not.

Finally, testing subjects in groups may have served to diminish the intensity of the social pressure subjects felt had the experiment been conducted on an individual, "one-to-one" basis.

Taken together, the procedure employed in the present study could be modified for future studies in at least two ways to provide a stronger test of the hypothesis that subjects who make public acknowledgements regarding their experience of pseudomemory suggestions may feel committed to continue to report posthypnotically that the event occurred in reality. First, rather than simply reporting on the extent to which they experience a suggestion, subjects could be asked to report whether they believe that the noise indicated by the suggestion was real (i.e., pseudomemory). They could then be retested for pseudomemory during posthypnotic inquiry. Second, subjects could be tested on an individual basis or the pseudomemory responding of

subjects tested individually could be compared against those who were tested in a group setting.

The present study found that subjects who did not provide an observable report met the initial criteria for inclusion in the experiment at a higher rate than subjects who were asked to report. This finding was unanticipated. However, due to the fact that the key hypnotic suggestions employed in the study (e.g., age regression and noise suggestion) required extensive imaginal skills and subjective abilities, subjects in the no report condition may have had an advantage over the subjects in the observable report condition, due to the fact that the results from initial hypnosis screening indicated that they demonstrated superior abilities to become subjectively involved in hypnotic tasks (i.e., higher scores on subjective involvement and involuntariness measures) than subjects assigned to the no report condition.

Alternatively, subjects' involvement in the experience of age regression may have been interrupted or distracted by having to raise a finger. Moreover, receiving a request to make an observable report may have cued subjects back to the present, thereby diminishing their absorption or involvement in the experience of the earlier hypnosis session. Accordingly, when asked following hypnosis to report retrospectively, subjects in the observable report condition reflected back on their experience of age regression and indicated lower levels of involvement in the hypnotic procedures. In short, these findings suggest that interrupting subjects' cognitive processing of complex hypnotic suggestions may degrade the extent of their subjective

involvement in the suggested experiences. Regardless, neither differences in subjective dimensions of hypnotizability nor the degree of subjects' subjective involvement in suggestions affected the rate of pseudomemory reported by subjects.

The fact that the majority of subjects in both suggestion conditions indicated on posthypnotic questionnaires that the experimenter had also suggested the noises clearly indicates that even those subjects who reported pseudomemory did not become spontaneously amnesic for the events that occurred during the second hypnosis session. To the contrary, subjects were keenly aware of the procedures and the fact that they had been administered a suggestion to hear the noise. This finding may reflect the coexistence of real and suggested memories (for a similar argument see also, McCann & Sheehan, 1988; Weekes, et al., 1992).

The finding might also reflect subjects' beliefs about the nature of hypnosis: That it is possible to believe that the noise actually occurred, while, at the same time, recognize that they had been administered a suggestion to hear the noise. From this perspective, reporting pseudomemory and the suggestion to hear noises would not be seen by subjects as either contradictory or illogical. To the contrary, subjects acknowledged the fact that the age regression and noise suggestions were salient components of the procedure and they were simply providing feedback on the events and hypnotic procedures that took place.

Finally, subjects might have deduced that the experiment was intended to distort memory, and that the tacit implication of the

procedure was that they were to conclude that they had heard real noises, despite the fact that the sounds were suggested. Indeed, the fact that the noise suggestion was obviously a major component of the second session coupled with the repeated emphasis on posthypnotic questionnaires regarding subjects' experience of the target noise, may have contributed to their reports of having received a suggestion and also their pseudomemory reports.

Support for these latter two possibilities can be found in subjects' interpretations of the purpose of the experiment. Almost one third of subjects who received the door suggestion and 55% of telephone suggestion subjects reported that the purpose of the study was to distort their memory (i.e., to make them believe that something that did not actually occur in reality, did occur). Moreover, just over one quarter of the subjects tested (both door and phone subjects) indicated that the purpose was to enhance or improve their memory.

Support for these contentions was also garnered through an examination of subjects' beliefs about the hypnotist's expectations regarding their behavior. Subjects appear to have understood that the intention of the noise suggestion was to influence their memory. Most subjects reported that the hypnotist expected them to believe that the noises were real. In doing so, subjects' pseudomemory responding did not parallel their beliefs about the hypnotist's expectations. However, by reporting that the hypnotist also expected them to believe that they had been administered a suggestion, subjects endorsed the belief that it is possible to both believe that the event described in the suggestion actually occurred and to recognize that an hypnotic suggestion had been

administered.

Compared to subjects who did not report pseudomemory, more pseudomemory subjects expressed the belief that excellent hypnotic subjects would fail to recognize that they had been administered a suggestion. This finding is particularly interesting in light of the fact that they themselves had been previously identified as excellent hypnotic subjects. However, in doing so, subjects may have compared their own experience of remembering the administration of a suggestion to hear noise with the tacit implications of the procedures (i.e., that they were to report the noise as real but not remember the suggestion), and concluded that a truly responsive hypnotic subject would fail to recognize the administration of a pseudomemory suggestion. In contrast, subjects who did not report pseudomemory may have believed that it was unlikely for subjects to go through the procedures and fail to recognize that the fact that a suggestion had been administered.

Theoretical implications. Initial theorizing (e.g., Laurence and Perry, 1983; Orne, 1979) posited a direct relationship between the administration of false memory suggestions and alterations in subjects' memory through the creation of pseudomemories. Although this basic perspective is still maintained by some investigators (e.g., Labelle, et al., 1990), a growing body of research has challenged these original contentions by highlighting the pivotal role played by a variety of social, contextual factors and stimulus factors in influencing subjects' pseudomemory reports. At the extreme, several years ago, Spanos and McLean (1986) observed that none of available data provide

convincing evidence to support Laurence and Perry's (1983) conclusion that pseudomemory reports reflect genuine distortions of memory (for a similar argument, see McCloskey & Zaragoza, 1985). Indeed, more recent research with nonhypnotic control groups underscores Spanos and McLean's statement by demonstrating comparable rates of pseudomemory without the use of hypnosis (e.g., Barnier & McConkey, 1992; Lynn, et al., 1992; Lynn, et al., 1989; Spanos, et al., 1989; Weekes, et al., 1992).

Taken together, the available research suggest that understanding hypnotic pseudomemory is a considerably more complex task than was originally described by Laurence and Perry (1983) and Orne (1979). However, as pointed out by McConkey and Kinoshita (1986), the field still awaits a convincing research design that answers the question of the extent to which hypnotic suggestions truly distort memory. Although McConkey, et al. (1990) found that pseudomemory rate decreased dramatically when subjects were contacted at home following the termination of the experiment, a more rigorous test of the hypothesis that pseudomemory suggestions alter memory might subtly test subjects' memory for events in a context that is completely removed from the experimental setting and all persons associated with the experiment.

The majority of pseudomemory studies published to date have suggested to subjects that events that did not occur in reality, did in fact occur. In contrast, studies by Lynn, et al. (1991) and Barnier and McConkey (1992) administered suggestions for events that did occur (e.g., pencils spilling, offender was wearing a moustache). In short, in

these latter two studies, subjects received suggestions indicating that a verdical event did occur rather than indicating that the event did not occur. Future research could usefully examine the incidence of pseudomemory when subjects are administered suggestions that indicate that events that actually occurred, did not occur.

The present study focuses not so much on the issue of whether pseudomemory reports are real or illusory as it does on identifying characteristics of the target stimulus in determining subjects' reports of pseudomemory. When subjects are uncertain about whether an event actually occurred, the likelihood that they will report the suggested event as a veridical occurrence is increased. In contrast, when subjects are more certain that a suggested event did not occur in reality, the likelihood that they will interpret a suggested event as a veridical occurrence is greatly reduced. In other words, when the contents of hypnotic suggestions conflict with the memory for events that subjects are certain did not take place, they are unlikely to report pseudomemory.

This pattern of pseudomemory is similar to recent findings from general memory research using the traditional interference paradigm. In short, characteristics of the stimulus have an impact on the extent to which subsequent information interferes with the accurate retrieval of the original information (Tversky & Tuchin, 1989). Findings are also consistent with the "von Restorff effect" (von Restorff, 1933; Wallace, 1965) in which distinctive events such as telephones ringing undergo extensive cognitive processing and, as a result, are more readily available in memory to subjects.

The extent to which subjects experience suggested effects had an impact on resultant pseudomemory rates. Indeed, the present study initially failed to unearth differences in pseudomemory rate in response to the door and telephone suggestions when the data included subjects who did not report extensive involvement in age regression, the pseudomemory noise suggestion and hypnotic depth. However, dramatic differences in pseudomemory rate emerged when those subjects were removed leaving only subjects who reported extensive involvement in the hypnotic procedures.

A number of factors limit the impact and generalizability of the present study's findings. First, although they were selected for both theoretical and empirical reasons, only two stimulus events were used in the present study. The implications of the present study are that other events that vary according to their perceived likelihood of occurring and perceived likelihood of being remembered will have a differential impact on subjects' pseudomemory reports. Indeed, the findings of the pilot study suggest that there is considerable variability in subjects' perceptions of a variety of events. Future replications that systematically vary other target events will strengthen the results of this study.

Second, the target events used in this study were differentiated on the basis of subjects' ratings of the likelihood of the event occurring and the likelihood of the event being remembered, rather than on a more concrete measure of memorability. A more rigorous test of the difference in subjects' ability to remember the events would be to have an actual door slam and telephone ring during an experimental session

and then assess subjects' recall of the events in a subsequent session, held one week later.

Implications for the clinical and forensic use of hypnosis. The present study's results have important implications for the clinical and forensic use of hypnosis. Let us consider each of these areas in detail. Hypnosis is frequently used as an assessment and therapeutic technique in clinical psychology and psychiatry. One important clinical application of hypnosis is to uncover repressed or dissociated memories of early developmental traumas such as sexual abuse and severe physical punishment (Loftus, 1993; Powell & Boer, 1993; Spanos, Weekes & Bertrand, 1985; Wakefield & Underwager, 1992). From this perspective, hypnosis is used to verify the childhood antecedents of the client's adult symptoms, such as dissociation or multiple personality (Allison, 1974; Gruenewald, 1977; Herzog, 1984). In short, hypnosis is used as a clinical tool to purportedly gain access to events and experiences that are viewed as actually having occurred, but are unavailable in memory due to repression or dissociation.

After a careful analysis of the client's presenting symptomatology, the therapist may suspect that the client was physically or sexually abused as a child. Given the clinical importance of identifying abuse in determining appropriate treatment, therapists are invested in undertaking a thorough examination of the client's childhood experiences. Upon examination, however, the client may initially deny any history of abuse. The therapist may inform the client that cognitive mechanisms such as repression or dissocation operate to block their memory for the trauma and that hypnosis is an efficient

tool to gain access to unconscious experiences. After considering the therapist's interpretation of their experiences, the client may begin to express uncertainty about what actually happened. The present findings suggest that, when questioned subsequently during hypnosis, the likelihood may be increased that the client will interpret the event as a veridical experience, thereby creating a pseudomemory. In short, the client's false memory for abuse may be subtly cultivated with hypnosis due to the fact that they were uncertainty about their past experiences. The risk may be further increased if the client interprets the purported traumatic event as being consistent with their own interpretation of their adult functioning (Dawes, 1988; Loftus, 1993; Loftus, et al., 1989).

In addition to the clinical diagnosis and treatment of childhood sexual and physical abuse, the increased number of civil lawsuits brought forward by adults against their parents in recent years underscores the need for the accurate identification of developmental trauma (Loftus, 1993; Wakefield & Underwager, 1992).

Although the present study did not attempt to create a forensic context, the findings have important implications for hypnotic procedures used in the course of forensic interviews. Highly salient events occurring during a crime may be relatively immune to the influence of suggestions conveyed during hypnotic interviews due to the fact that these events are remembered by witnesses with a high degree of accuracy and certainty. However, commonplace events and subtle details that are not remembered with certainty by witnesses may be open to the influence of inadvertent or deliberate suggestion.

Finally, aside from the theoretical debate surrounding the issue of whether hypnotic suggestions actually alter subjects' memories for previously experienced events, the fact that some subjects report false events as if they actually occurred calls into question the use of an interview technique that runs a serious risk of manipulating subjects' testimonials. Indeed, given the fact that current research has failed to uncover a memory enhancement effect with hypnosis (Buckhout, et al., 1981; Dwyan, 1988; Sheehan & Grigg, 1985; Sheehan, et al., 1985; Sheehan & Tilden, 1983; 1984, 1986, Smith, 1983; Wagstaff, 1984; Whitehouse, et al., 1988; Yuille & McEwan, 1985), one wonders why some investigators continue to make use of hypnosis to assist witnesses' recall.

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Appendices

Appendix 1

Means and standard deviations of items on the events questionnaire (pilot study)

Item	Perceived Likelihood of Occurring	Perceived Likelihood of Being Remembered
1. A jet airplane flew overhead.	2.86(1.12)	2.58(1.17)
2. The experimenter spilled a box of pencils.	2.33(.96)	4.09(1.11)
3. A car honked as it passed by on the street.	4.03(.89)	1.69(.85)
4. A girl in the hallway yelled, "Hey you guys, wait up for me!"	3.11(1.08)	2.27(1.09)
5. The telephone in the room rang.	2.09(1.05)	4.07(1.04)
6. The ventilation system hummed.	4.45(.77)	2.09(1.24)
7. Students whispered to one another while they filled out questionnaires.	3.89(1.05)	2.25(1.13)
8. People yelled at one another on		

the street.	3.78(1.03)	2.11(.98)
9. A girl in the hallway yelled out, "Hey you, give me back my purse!"	1.59(.81)	4.45(1.01)
10. A police car raced past the building with its siren blaring.	2.81(.89)	3.78(1.03)
11. A door slammed out in the hall.	4.14(.94)	2.06(.99)
12. A school bell rang in the hallway.	2.89(1.53)	2.79(1.35)
13. A tile from the ceiling fell down.	1.45(.77)	4.76(.76)
14. A person in the class had a coughing fit.	3.90(.99)	2.87(1.09)
15. Two cars collided in the parking lot.	2.0(.91)	4.81(.47)

Appendix 2

HUMAN SUBJECT CONSENT FORM

Title of Research: Hypnosis

Principal Investigator: Dr. Steven Jay Lynn Department: Psychology

Hypnotist: _____

I. Federal and University regulations require us to obtain your signed consent for the performance of investigative procedures. After reading the statement below, you are asked to indicate your permission by your signature.

II. STATEMENT OF PROCEDURE (brief description of the procedure, benefit, duration, and known risks): You will be taking part in a standardized hypnotic procedure which thousands of other students have undergone. The purpose of this study is to find out more about the nature of hypnosis. Our subjects have found our procedure to be both interesting and stimulating. We want you to enjoy and to learn from your hypnotic experience. Research indicates that participation in a standardized group hypnosis such as this one involves risks no greater than taking an exam or attending a college class. The experiment will take about one hour and fifteen minutes. Some participants may be invited to return for a second session scheduled next week. This session will also involve responding to additional hypnotic suggestions.

I CERTIFY THAT I HAVE READ AND FULLY UNDERSTAND THE STATEMENT OF PROCEDURE, AND THAT I MAY TERMINATE MY SERVICE AS A SUBJECT AT ANY TIME. I FURTHER CERTIFY THAT I AM AT LEAST EIGHTEEN YEARS OF AGE.

_____ _____

SIGNATURE OF SUBJECT DATE

SEX: M F AGE: ____

CAMPUS
ADDRESS_____

PHONE_____

Appendix 3

Hypnotic Induction

Please hold your right arm straight out in front of you at shoulder height. That's it....Now look at your hand, and pay close attention to it and your arm, noticing particularly the various sensations you may experience in them. I would like you to be interested in seeing what sort of experiences you may have today. As you know, a person is usually not aware of all of their sensations because they are not paying attention to the parts of the body where they are taking place. But if you concentrate on a part, as you are concentrating on your arm and hand, then you become aware of many different things which were there all along and of other things which are beginning to happen. Perhaps, as I have been talking, you have noticed a feeling of warmth, or perhaps a tingling feeling in your hand, or your arm, or in both....Perhaps you have noticed a feeling of tension. Perhaps you have noticed something I have not mentioned.....Neither you nor I know for sure just what sensations you may experience, but you can find out if you just let yourself have these experiences. I will be very interested in finding out what kind of experiences you have, and you too can be very interested in finding out more about what experiences you can have. Most people soon experience a feeling of heaviness in their hand and arm when held out in this way, a feeling which tends to increase with time and tends to pull the arm down....Perhaps you have already noticed such a growing feeling of heaviness...this downward pull....in any case you will soon feel it and your hand and arm will soon begin to move down as the heaviness and pull grow...

I am about to count. As I count..... your hand will move down. Your hand and arm are moving down, getting heavier and heavier...That's right, going down....down....down.....I am going to count to twenty, and

this will help your hand to go down..

One. Your hand is moving down...more and more down.....Two .....moving even more....Three .....still further down....And as your hand continues its downward motion you begin to get sleepy....drowsy....In a little while you are going to go into a deep hypnotic sleep.....a sleep in which you will be able to hear me no matter how deeply asleep you are.....Four .....going down, it will eventually find a comfortable resting place.....Five.....and the hand continues to lower and you continue to go deeper and deeper into the hypnotic sleep.....There is a general heaviness coming over your entire body.....Six.....there is a heaviness in your feet.....and your legs....Seven, there is a heaviness in your arms and hands....Eight.....There is a feeling of relaxation accompanying this heaviness.....Nine....your right hand keeps moving down....down.....down.....as you go deeper and deeper into this hypnotic sleep.....ten, eleven, getting more and more sleepy....Twelve....

IF SUBJECT'S EYES ARE OPEN, CONTINUE WITH:

Your eyelids are especially heavy and if they are not already closed they are closing...closing....getting so heavy....soon they will close tightly while your hand continues to lower....If your eyes are not already closed they will most likely be closed before your hand reaches your lap.....

IF EYES ARE CLOSED (OR AS SOON AS THEY CLOSE):

Thirteen....more and more sleepy....more and more relaxed....Fourteen....soon you will be deep asleep.....

IF EYES STILL OPEN:

Soon your eyes will be closed....Closing, your eyes are closing.....Now close your eyes... That's right, they are now closed and will remain closed until I ask you to open them again....You will go deeper and deeper as I continue to count.

CONTINUE:

Fifteen.....deeper and deeper asleep.....Sixteen, going deeper and deeper into the hypnotic sleep....Seventeen.....(more and more down).....more and more asleep.....Eighteen.....so relaxed, so sleepy.....Nineteen..... (if you hand and arm are not down already they soon will be...soon your hand will touch your lap or your leg....and then your right arm and hand will relax completely) and then your whole body will relax even more and you will be deeply and soundly asleep.....Twenty.....Deep asleep!

IF HAND HAS NOT YET REACHED THE LAP, OR HAS NOT GONE DOWN AT ALL, SAY:

Just let your hand and arm rest now comfortably on the resting surface. Let your hand and arm relax.

CONTINUE:

And now you can relax all over and really go into a deep hypnotic sleep. You will remain deeply asleep until I tell you to wake up. You will be able open your eyes and move while remaining deeply hypnotized if I should ask you to do this. Whatever you do or experience you will not awaken until I tell you to do so .

Now I want you to imagine that your are standing on the top step of a beautiful spiral staircase. Picture this large, winding staircase in your mind. It is a large spiral staircase, just like one you might see in a large castle or a mansion, and you are standing on the very top step. In a moment, I am going to be quiet for a little bit. At that time, I want

you to imagine walking slowly down the staircase, becoming much more hypnotized with every step. You will become much more deeply hypnotized with every step that you imagine taking down the staircase. Now, walk slowly down the stairs, and drift deeper and deeper into hypnosis with every step. You will sink deeper and deeper with every step. (Allow 1 minute)

Alright, now you can stop walking and remain so deeply hypnotized, relaxed, and comfortable and secure. Every so often, I will say the word deeper, and you can let yourself become even more deeply hypnotized, so deeply, deeply hypnotized, in a deep hypnotic sleep, you will be able to experience so much, relax, and enjoy all of the sensations and experiences you will have in response to each of the suggestions I will now give you.

Appendix 4

Arm Levitation

And now for the first suggestion, please extend your left arm straight out in front of you...up in the air with the palm of your hand down. Left arm straight out in front of you...straight out...up in the air with the palm of your hand down. That's it...left arm straight out in front of you...palm down. I want you now to pay close attention to this hand...the feelings in it...and what is happening to it. As you pay attention to it, you are more aware of it than you have been...you notice whether it is warm...or cool...whether there is a little tingling in it...whether there is a tendency for you fingers to twitch...ever so slightly. That's right...I want you to pay close attention to this hand because something very interesting is about to happen to it...it is beginning to get light...lighter and lighter...as though something was pulling the hand and the arm up. You can picture balloons pulling on it. You are holding onto a bunch of helium balloons...and as it feels lighter and lighter, it begins to move...as if something were pulling it up. A little bit up...more and more up...up...and as I count it gets lighter and lighter and goes up and up. 1...up...2...up...3...up...4...up...more and more up...5...up...6...up...7...8...lighter and lighter...up...more and more...9... up...10... lighter and lighter...up...more and more... That's fine. Just let your hand just go back to its original resting position and relax...you hand back to its original resting position and relax...

Appendix 5

Arms Moving Apart

For the next suggestion, I would like you to place both hands up in the air, straight out in front of you, palms facing inward...palms facing toward each other. Hold your hands about a foot apart...about a foot apart. Both arms straight out in front of you, hands about a foot apart...palms facing inward...about a foot apart. Now I want you to imagine a force repelling, moving your hands apart, away from each other. As you think of this force pushing your hands apart, they will move apart...slowly at first, but they will move apart, further and further apart, as though a force were acting on them...moving...moving...further, further...(allow about 10 seconds before proceeding). That's fine. Now place your hands in their resting position and relax...your hands back in place on a comfortable resting surface and relax...just relax.

Appendix 6

Deepening Instructions

And now I would like you to go even deeper, deeper...you can relax even more as you drift even more deeply and soundly into your hypnotic sleep, deep and restful, deep and calm, go even deeper, deeper into your hypnosis. Nothing will disturb you. You feel so calm, secure, and relaxed, deep in your hypnotic sleep...

Appendix 7

Wake-up Procedure

You are going to wake up in a few minutes. I will begin counting backwards from ten to one. As I do so, you will gradually wake up, but for most of the count you will still remain in the state you are now in. When I get to "1" you will be fully alert, and you will be in your normal state of wakefulness. After you open your eyes, you will feel fine. I shall now count backwards from 10. At "1" you will be refreshed, wide awake and in a good mood. Ready?

10-- 9-- 8-- 7-- 6-- 5-- 4-- 3-- 2-- 1. Wide awake! Open your eyes. Wide awake!

Any remaining drowsiness which you may feel will quickly pass.

Appendix 8

Table 1

MANOVA summary table for hypnotizability measures

Source	Wilks' Lambda	Num. df	Den. df	F	p
Suggestion type	.99	3	141	.22	ns
Observable report	.93	3	141	3.29	.02
Questionnaire order	.96	3	141	1.80	ns
Suggestion x Report	.96	3	141	2.00	ns
Suggestion x Order	.97	3	141	1.26	ns
Report x Order	.99	3	141	.39	ns
Suggestion x Report x Order	.96	3	141	1.74	ns

Table 2

Univariate main effects for observable report variable on hypnotizability measures

Dependent Measure	SS	df	MS	F	p
Objective	.62	1	.62	.49	ns
Error	179.7	143			
Subjective	161.38	1	161.38	8.91	.003
Error	2590.53	143			
Involuntariness	194.36	1	194.36	5.22	.02
Error	5319.40	143	.		

Table 3

Means and standard deviations of the three hypnotizability measures for subjects who recieved the door suggestion, phone suggestion, and the baserate group

	Hypnotizability measure		
Condition	Objective	Subjective	Involuntar-iness
Door suggestion	10.0 (1.30)	26.6 (4.31)	24.8 (6.32)
Phone suggestion	10.1 (.87)	26.7 (4.49)	25.2 (5.91)
Baserate group	10.0 (.94)	25.5 (3.32)	23.9 (4.59)

Table 4

MANOVA summary table for age regression, noise suggestion and hypnotic depth

Source	Wilks' Lambda	Num. df	Den. df	F	p
Suggestion type	.90	3	141	5.22	.002
Observable report	.95	3	141	2.57	.06
Questionnaire order	.99	3	141	.43	ns
Suggestion x Report	.99	3	141	.13	ns
Suggestion x Order	.98	3	141	1.00	ns
Report x Order	.98	3	141	1.13	ns
Suggestion x Report x Order	.99	3	141	.27	ns

Table 5

Univariate main effects for suggestion type on age regression, noises suggestion and hypnotic depth

Dependent Measure	SS	df	MS	F	p
Age Regression	6.34	1	6.34	6.68	.01
Error	135.60	143	.95		
Noise Suggestion	.04	1	.04	.02	ns
Error	270.64	143	1.89		
Hypnotic Depth	10.84	1	10.84	9.57	.002
Error	162.01	143	1.13		

Table 6

Univariate main effects of age regression and hypnotic depth for door suggestion, phone suggestion and baserate subjects

Dependent Measure	SS	df	MS	F	p
Age Regression	16.4	2	8.2	8.24	.004
Error	186.15	187	.99		
Hypnotic Depth	40.49	2	20.24	17.02	.001
Error	222.37	187	1.19		

Table 7

Distribution of subjects across conditions

	Questionnaire Order	
	Forced-choice - Rating scale	Rating scale - Forced-choice
Door		
Observable report	27	20
No report	17	17
Phone		
Observable report	19	24
No report	15	12
Baserate group	39	

Table 8

Logit analysis summary table for inclusion criteria

Source	df	X^2	p
Suggestion type	1	.15	ns.
Observable report	1	3.70	.05
Questionnaire order	1	.33	ns.
Suggestion x Report	1	.20	ns.
Suggestion x Order	1	.00	ns.
Report x Order	1	.80	ns.
Suggestion x Report x Order	1	.64	ns.
Residual	1	3.02	.08

Table 9

Distribution across conditions of subjects who met inclusion criteria

	Questionnaire Order	
	Forced-choice - Rating scale	Rating scale - Forced-choice
Door		
Observable report	11	10
No report	9	11
Phone		
Observable report	10	9
No report	9	10
Baserate group	15	

Table 10

Logit analysis summary table for spontaneous pseudomemory reports

Source	df	X^2	p
Suggestion type	1	.66	ns.
Observable report	1	.51	ns.
Suggestion x Report	1	.67	ns.
Residual	1	30.51	.001

Table 11

Logit analysis summary table for forced-choice pseudomemory reports

Source	df	X^2	p
Suggestion type	1	.37	ns.
Observable report	1	.05	ns.
Questionnaire Order	1	.12	ns.
Suggestion x Report	1	.00	ns.
Suggestion x Order	1	.41	ns.
Report x Order	1	.04	ns.
Suggestion x Report x Order	1	.52	ns.
Residual	1	16.16	.001

Table 12

MANOVA summary table of subjects' confidence ratings for forced-choice questions

Source	Wilks' Lambda	Num. df	Den. df	F	p
Suggestion type	.99	2	74	.34	ns.
Pseudomemory report	.95	2	74	1.87	ns.
Suggestion x Pseudomemory	.97	2	74	1.15	ns.

Table 13

Logit analysis summary table for subjects' reports of having received a suggestion

Source	df	X^2	p
Suggestion type	1	.67	ns.
Pseudomemory report	1	7.44	.006
Suggestion x Pseudomemory	1	1.09	ns.
Residual	1	19.80	.001

Table 14

ANOVA summary table of pseudomemory rating scale

Source	SS	df	MS	F	p
Suggestion type	1.11	1	1.11	.85	ns.
Pseudomemory report	65.76	1	65.76	50.47	.001
Suggestion x Pseudomemory	1.75	1	1.75	1.34	ns.
Error	97.72	75	1.30		

Table 15

ANOVA summary table of non-suggested events

Source	SS	df	MS	F	p
Suggestion type	1.58	1	1.58	3.24	.07
Pseudomemory report	1.84	1	1.84	3.78	.05
Suggestion x Pseudomemory	.79	1	.79	1.62	ns.
Error	36.52	75	.49		

Table 16

MANOVA summary table of subjects' experience of alternating between sessions/simultaneously in both sessions

Source	Wilks' Lambda	Num. df	Den. df	F	p
Suggestion type	.99	2	74	.10	ns.
Pseudomemory report	.95	2	74	1.97	ns.
Suggestion x Pseudomemory	.99	2	74	.23	ns.

Table 17

Univariate main effects for subjects' reports of alternating between sessions/simultaneously in both sessions

Dependent Measure	SS	df	MS	F	p
Alternating	9.12	2	4.56	4.15	.02
Error	100.1	91			
Simultaneous	19.63	2	9.81	9.07	.003
Error	948.42	91			

Table 18

Logit analysis summary table for subjects' ratings of hypnotist's expectations about whether they would believe that the noises were real

Source	df	X^2	p
Suggestion type	1	.23	ns.
Pseudomemory report	1	.94	ns
Suggestion x Pseudomemory	1	2.08	ns.
Residual	1	20.98	.001

Table 19

Logit analysis summary table for subjects' ratings of hypnotist's expectations about whether they would believe the noises were suggested

Source	df	X^2	p
Suggestion type	1	.94	ns.
Pseudomemory report	1	1.94	ns.
Suggestion x Pseudomemory	1	1.78	ns.
Residual	1	7.44	.006

Table 20

Logit analysis summary table for subjects' ratings of whether excellent hypnotic subjects would believe that the noises were real

Source	df	X^2	p
Suggestion type	1	.95	ns.
Pseudomemory report	1	.23	ns.
Suggestion x Pseudomemory	1	2.02	ns.
Residual	1	19.09	.001

Table 21

Logit analysis summary table for subjects' ratings of whether excellent hypnotic subjects would believe that the noises were suggested

Source	df	X^2	p
Suggestion type	1	.14	ns.
Pseudomemory report	1	1.11	ns.
Suggestion x Pseudomemory	1	.03	ns.
Residual	1	2.81	.001

Table 22

Logit analysis summary table for final pseudomemory item (Open-ended)

Source	df	X^2	p
Suggestion type	1	.60	ns.
Pseudomemory report	1	6.52	.01
Suggestion x Report	1	1.27	ns.
Residual	1	17.47	.001

Table 23

Logit analysis summary table for subjects' interpretation of the purpose/hypotheses of the study

Source	df	X^2	p
Suggestion type	3	.63	ns.
Pseudomemory report	3	2.75	ns.
Suggestion x Report	3	1.26	ns.
Residual	3	12.34	.006

Table 24

Distribution across conditions of subjects who met the stringent inclusion criteria

	Questionnaire Order	
	Forced-choice - Rating scale	Rating scale - Forced-choice
Door		
Observable report	5	5
No report	3	6
Phone		
Observable report	7	4
No report	6	3
Baserate group	4	

Table 25

Logit analysis summary table for spontaneous pseudomemory reports (stringent criteria: N = 39)

Source	df	X^2	p
Suggestion type	1	.02	ns.
Observable report	1	.09	ns.
Suggestion x Report	1	.02	ns.
Residual	1	15.55	.001

Table 26

Logit analysis summary table for forced-choice pseudomemory reports (N = 39)

Source	df	X^2	p
Suggestion type	1	5.77	.02
Observable report	1	.24	ns.
Suggestion x Report	1	.86	ns.
Residual	1	.97	ns.

Table 27

MANOVA summary table of subjects' confidence ratings for forced-choice questions (N = 39)

Source	Wilks' Lambda	Num. df	Den. df	F	p
Suggestion type	.96	2	34	.64	ns
Pseudomemory report	.78	2	34	4.85	.01
Suggestion x Pseudomemory	.94	2	34	.99	ns

Table 28

ANOVA summary table of subjects' confidence ratings for forced-choice measures: First rating ($N = 39$)

Source	SS	df	MS	F	p
Suggestion type	.57	1	.57	.93	ns.
Pseudomemory report	4.36	1	4.36	7.03	.01
Suggestion x Pseudomemory	.58	1	.58	.93	ns.
Error	21.73	35	.62		

Table 29

ANOVA summary table of subjects' confidence ratings

for forced-choice measures: Second rating

(N = 39)

Source	SS	df	MS	F	p
Suggestion type	.78	1	.78	.87	ns.
Pseudomemory report	6.01	1	6.01	6.67	.01
Suggestion x Pseudomemory	.34	1	.34	.38	ns.
Error	31.56	35	.90		

Table 30

Logit analysis summary table for subjects' reports of having received a suggestion (N = 39)

Source	df	X^2	p
Suggestion type	1	.01	ns.
Pseudomemory report	1	.24	ns.
Suggestion x Pseudomemory	1	1.24	ns.
Residual	1	9.78	.002

Table 31

ANOVA summary table of pseudomemory rating scale

(N = 39)

Source	SS	df	MS	F	p
Suggestion type	.85	1	.85	.77	ns.
Pseudomemory report	26.57	1	26.57	24.08	.001
Suggestion x Pseudomemory	5.96	1	5.96	5.40	.03
Error	38.63	35	1.10		

Table 32

Means and standard deviations for pseudomemory rating scale for the interaction of suggestion type and pseudomemory report

	Pseudomemory Report	
Suggestion Type	Pseudomemory	No Pseudomemory
Door	3.67 (.89)	2.71 (1.25)
Phone	4.20 (.84)	1.53 (1.12)

Table 33

ANOVA summary table of non-suggested events

(N = 39)

Source	SS	df	MS	F	p
Suggestion type	.07	1	.07	.30	ns.
Pseudomemory report	1.01	1	1.01	4.08	.05
Suggestion x Pseudomemory	.06	1	.06	.25	ns.
Error	8.07	35	.25		

Table 34

MANOVA summary table of subjects' experience of alternating between sessions/simultaneously in both sessions ($N = 39$)

Source	Wilks' Lambda	Num. df	Den. df	F	p
Suggestion type	.96	2	34	.61	ns.
Pseudomemory report	.93	2	34	1.33	ns.
Suggestion x Pseudomemory	.96	2	34	.63	ns.

Table 35

Logit analysis summary table for subjects' ratings of hypnotist's expectations about whether they would believe that the noises were real (N = 39)

Source	df	X^2	p
Suggestion type	1	.08	ns.
Pseudomemory report	1	.00	ns.
Suggestion x Pseudomemory	1	.91	ns.
Residual	1	14.13	.002

Table 36

Logit analysis summary table for subjects' ratings of hypnotist's expectations about whether they would believe that the noises were suggested (N = 39)

Source	df	X^2	p
Suggestion type	1	2.12	ns.
Pseudomemory report	1	.65	ns.
Suggestion x Pseudomemory	1	1.02	ns.
Residual	1	3.07	.08

Table 37

Logit analysis summary table for subjects' ratings of whether excellent hypnotic subjects would believe that the noises were real (N = 39)

Source	df	X^2	p
Suggestion type	1	.24	ns.
Pseudomemory report	1	.36	ns.
Suggestion x Pseudomemory	1	1.74	ns.
Residual	1	12.73	.004

Table 38

Logit analysis summary table for subjects' ratings of whether excellent hypnotic subjects would believe that the noises were suggested (N = 39)

Source	df	X^2	p
Suggestion type	1	2.42	ns.
Pseudomemory report	1	4.43	.03
Suggestion x Pseudomemory	1	.12	ns.
Residual	1	.01	ns.

Table 39

Logit analysis summary table for final pseudomemory item

(Open-ended; N = 39)

Source	df	X^2	p
Suggestion type	1	.02	ns.
Pseudomemory report	1	3.73	.05
Suggestion x Pseudomemory	1	1.28	ns.
Residual	1	20.71	.001

Table 40

Logit analysis summary table for subjects' interpretation of the purposes/hypotheses of the study

(N = 39)

Source	df	X^2	p
Suggestion type	3	2.69	ns.
Pseudomemory report	3	.16	.05
Suggestion x Pseudomemory	3	.88	ns.
Residual	3	6.91	.07