Hypnotically Created Memory Among Highly Hypnotizable Subjects

Abstract. *A pseudomemory of having been awakened by some loud noises during a night of the previous week was suggested to 27 highly hypnotizable subjects during hypnosis. Posthypnotically, 13 of them stated that the suggested event had actually occurred. This finding has implications for the investigative use of hypnosis in a legal context.*

In recent years, the increasing use of hypnosis to enhance the memories of victims and witnesses of crime (*1, 2*) has created controversy both within the professional hypnosis societies (*3*) and within the judicial system (*4*). The main issue concerns the alleged hypermnesic effect when hypnosis is used for memory enhancement. Data suggest that at times, this use of hypnosis may unwittingly create pseudomemories of crimes which, subsequent to hypnosis, come to be believed as true by the person hypnotized (*5*). Other data suggest, in addition, that hypnosis increases the frequency of both correctly and incorrectly recalled material (*6, 7*).

Hypnosis carries the implicit request to set aside critical judgment, without abandoning it completely, and to indulge in make-believe and fantasy (*8*). To the extent that a person is able to do this, such a procedure may lead to major alterations, even distortions, of perception, mood, or memory (*9*). Indeed, the person who is especially skilled at this task can be perceived as deluded in a descriptive, nonpejorative sense (*10*). Further, the fantasy of hypnosis may be so compelling and subjectively real that some investigators have described it as believed-in imaginings (*11*) and as imaginative involvement (*12*).

Given this basic characteristic of hypnosis, care is necessary when it is used in legal investigations. In common with all situations in which hypnosis is used, the setting may convey strong demand characteristics (*13*). The candidate for investigative hypnosis, a victim or witness of a crime, has generally undergone extensive routine police questioning without having provided sufficient information to furnish a positive identification of a suspect. Such a person, particularly a victim, is ordinarily highly motivated to help the police apprehend the guilty. In this context, hypnosis is usually represented as being effective in enhancing memory; some investigative hypnosis inductions represent mind as a videotape recorder and hypnosis as a means of reaching material that is stored veridically at a level not immediately available to consciousness.

In addition, such investigative hypnosis procedures virtually require fantasy; using the metaphors of televised sport, the hypnotist sometimes tells subjects that they can "zoom in," "freeze frame," and relive the events of a crime in slow motion (*1*). If an individual is asked to zoom in on an image that, in the original experience the retina could not resolve, there is no other source but fantasy for enhanced detail. This task requires the subject to see something beyond his or her capacity and is a powerful and indirect suggestion to hallucinate (*14*). Since, further, the subject ordinarily perceives the hypnotist as an expert, a process of confusing fantasy with fact may occur unwittingly and unknown to either subject or hypnotist.

In order to evaluate the extent to which an investigative use of hypnosis may have contaminated the memory of a victim or witness, Orne has proposed guidelines for conducting investigative interviews (*15*). These include videotaping all interactions (including those before and after hypnosis) between the subject and hypnotist; the hypnotist, who would be the only person with the subject during any sessions, would be required to be professionally trained and only minimally informed in writing of the events in question. This latter requirement is particularly important; for instance, if the hypnotist knows that two gunshots were fired at 4 a.m. on the night in question, it would seem natural to inquire if the subject had heard any loud noises. This seemingly benign procedure may create a pseudomemory which will persist posthypnotically and become unshakable.

The phenomenon of memory creation in highly hypnotizable individuals was first reported in the 19th century by Bernheim (*16*). He described how, during hypnosis, he suggested to a female subject that she had awakened four times during the previous night to go to the toilet and had fallen on her nose on the fourth occasion. After hypnosis, the subject insisted that the suggested events had actually occurred, despite Bernheim's insistence that she had dreamed them. Another version of this hypnotic item of pseudomemory creation has been constructed independently by Orne (*15*). No experimental study, however, has investigated this phenomenon systematically. We have evaluated memory creation among highly hypnotizable individuals, since they seem particularly vulnerable to memory distortion (*17*). Given the demand characteristics of the investigative hypnotic context, however, even witnesses and victims who are not especially responsive to hypnosis may be vulnerable also to such memory contaminants (*6, 18*). Many individuals with low susceptibility to hypnosis have imagery that is as vivid as that of highly responsive individuals (*19*).

To investigate this phenomenon, 280 subjects were screened for hypnotizability on the Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A) (*20*). Subjects who seemed highly hypnotizable were subsequently screened on the more stringent Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C) (*21*) to confirm their HGSHS:A scores. Of the initial 280 subjects, 27 were selected for the present study on the basis of their SHSS:C performance. The age range for the total sample of 16 females and 11 males was 21 to 48 years (mean ± standard deviation, 27.85 ± 7.26). Their HGSHS:A scores ranged from 6 to 12 (9.86 ± 1.83) and their SHSS:C scores ranged from 9 to 12 (10.74 ± 0.98) (*22*). Subjects were classified as highly hypnotizable only if they passed the posthypnotic amnesia item of the SHSS:C and most of its other 12 items (*23*).

The memory creation item used was modeled on the one described by Orne (*15*). Subjects were asked during hypnosis to choose one night of the previous week, and to describe their activities especially during the half-hour before they went to sleep; they were ascertained to have had no specific memories of awakening or of dreams occurring during the specified night. Through the use of an age-regression technique, subjects were instructed to relive the designated night and asked whether they had heard some loud noises (suggested auditory hallucination) that had awakened them. All but ten subjects reported hearing the noises, and they were encouraged to describe them in detail. The regression was then terminated and the hypnosis session concluded.

Subjects were divided into two groups. For the first group of ten subjects, the suggestion was tested immediately after the hypnosis session; for the second group of 17 subjects, it was tested 7 days later. The procedures for test-

ing the creation of a memory were otherwise identical for the two groups. A second experimenter interviewed the subjects posthypnotically in order to ascertain their perceptions of the study and to obtain their reports of what had happened during the hypnosis session. Since there was no difference between the two groups in frequency of their response to the memory creation item, the data were pooled.

Of the 27 highly hypnotizable subjects tested, 13 accepted the suggestion and stated after hypnosis that the suggested event had actually taken place on the night they had chosen, whereas 14 did not. The latter subjects stated correctly that the noises had been suggested by the hypnotist, but a few of them reached this conclusion by quite idiosyncratic means. One, for instance, decided that the event was suggested since the noise was far more vivid than any noise that he felt could occur in reality.

Of the 13 subjects who reported the suggested memory as real, six of them were unequivocal in their certainty that the suggested event had actually occurred; the remaining subjects came to this conclusion on the basis of a reconstruction of events. One subject, for example, recalled being physically startled. She stated:

> "I'm pretty sure it happened because I can remember being startled. It's the physical thing I remember. . . . I'm making an assumption that it was a noise but I was conscious of the different cars. It must have been something like that. I can remember the startle."

Even when they were told that the hypnotist had actually suggested the noises to them during hypnosis, these subjects still maintained that the noises had actually occurred. 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."

The results support Orne's contention that the memories of victims and witnesses of crime can be modified unsuspectingly through the use of hypnosis. They suggest, further, that an initially unsure witness or victim can become highly credible in court after a hypnotic memory "refreshment" procedure. Although Orne's procedural safeguards permit evaluation of the degree to which a hypnotic procedure may have inadvertently altered a person's memory, such safeguards do not prevent such memory modification from occurring. Indeed, there is no way to differentiate what actually happened during a crime from what a person recalls of it during hypnosis, other than the obtaining of independent verification of the hypnotically elicited recall (*17*).

The pseudomemory of some loud noises is harmless when suggested in the laboratory. In the more emotionally charged investigative situation, where motivation to please is enhanced, it assumes greater importance; a pseudomemory of a trivial event that has become inadvertently connected with the events of a crime is more likely to persist in permanent memory storage and not decay in the manner of a posthypnotic suggestion. Such "recall" could lead to a false but positive identification and to all of the legal procedures and penalties that this implies. Accordingly, the utmost caution should be exercised whenever hypnosis is used as an investigative tool.

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14. In a recent reported legal case, a witness of a murder provided identification during hypnosis of a youth, who was subsequently prosecuted. The case was rejected by the court because of testimony that the witness had been 270 feet away from the incident in conditions of semidarkness; an ophthalmologist testified that positive identification would not have been possible beyond 25 feet under the prevailing light conditions [*People* v. *Kempinski*, No. W80CF 352 (Circuit Court, 12th District, Will County, Illinois, 21 October 1980; unreported); (*2*)].
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22. The SHSS:C Kuder-Richardson reliability coefficient; $r = 0.85$ (*21*).
23. Hypnotizability is a stable characteristic of the individual, with from 10 to 15 percent of the population having high susceptibility, 10 to 15 percent low susceptibility, and the remaining 70 to 80 percent moderate susceptibility to various degrees [E. R. Hilgard, *Hypnotic Susceptibility* (Harcourt, Brace & World, New York, 1965); C. Perry, *Int. J. Clin. Exp. Hypn.* **25**, 125 (1977)].
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Detection of Antibodies to Herpes Simplex Virus with a Continuous Cell Line Expressing Cloned Glycoprotein D

Abstract. *The gene for glycoprotein D of herpes simplex virus type 1 (HSV-1) was expressed in stable mammalian cell lines. Glycoprotein D produced in these cells has a number of antigenic determinants in common with the native glycoprotein. Cell lines expressing glycoprotein D were used in an enzyme-linked immunosorbent assay to detect human antibodies to glycoprotein D. This strategy should prove useful in determining the extent to which the immune response to HSV-1 is directed toward glycoprotein D.*

Analysis of the immune response to a number of infectious agents has been limited by the fact that it is often difficult to culture pathogens in quantities sufficient to permit the isolation of important cell surface antigens. The advent of molecular cloning has overcome some of these limitations by providing a means whereby gene products from pathogenic agents can be expressed in virtually unlimited quantities in a nonpathogenic form. Surface antigens from such viruses as influenza (*1*), foot-and-mouth disease (*2*), hepatitis B (*3*), vesicular stomatitis virus (*4*), rabies (*5*), and herpes simplex viruses (*6, 7*) have now been expressed in *Escherichia coli* and *Saccharomyces cerevisiae*, and, in the future, promise to provide improved subunit vaccines. However, the expression of surface anti-