

## MODELS OF POSTHYPNOTIC AMNESIA \*

John F. Kihlstrom

*Department of Psychology and Social Relations  
Harvard University  
Cambridge, Massachusetts 02138*

The term "posthypnotic amnesia" refers to the temporary inability of the hypnotized subject to remember, after hypnosis, the events that had transpired while he or she was hypnotized. Over the years, several parallels have been drawn between posthypnotic amnesia and other disorders of memory that are observed in the psychological clinic and the experimental laboratory, and in the psychopathology of everyday life. In each case, the person finds it difficult or impossible to gain access to certain critical memories through the ordinary process of active recall. Nevertheless, it is apparent that the critical memories are stored essentially intact, because the amnesia can be lifted and accurate recall restored. Even during the amnesic period itself, the unrecalled memories can be observed to affect behavior and experience, if only indirectly. All of this takes place in the apparent absence of any defect or alteration in central nervous system functioning. These broad phenotypic similarities uniting the various *functional* amnesias may imply genotypic similarities as well. Thus, the study of posthypnotic amnesia may serve as an important avenue of approach to a variety of topics in normal and pathological memory functioning.

Since the development of standardized hypnotic procedures for laboratory use (e.g., the Stanford Hypnotic Susceptibility Scale, Forms A, B, and C; the Revised Stanford Profile Scales of Hypnotic Susceptibility, Forms I and II; and the Harvard Group Scale of Hypnotic Susceptibility, Form A), research has yielded a great deal of information concerning the major parameters of posthypnotic amnesia (see the reviews by Cooper<sup>14</sup> and Hilgard<sup>32, 33</sup>). We know, for example, that posthypnotic amnesia is temporary and can be canceled or lifted by the administration of a prearranged reversibility cue.<sup>12, 43, 49</sup> Furthermore, the extent of the initial amnesia and the degree to which the lost memories can be recovered after the suggestion has been canceled, are both highly correlated with hypnotic susceptibility;<sup>32, 42, 49</sup> factor-analytic studies suggest, in fact, that amnesia lies at the core of the domain of hypnosis.<sup>32</sup> Moreover, the quantitative differences in recall observed during amnesia are matched by qualitative differences between the vague and fragmentary memory of subjects with complete or partial posthypnotic amnesia and the clearly detailed memories of those who are not amnesic.<sup>21, 40</sup> Finally, posthypnotic amnesia must be specifically suggested to the subject: in contrast to many other functional amnesias, it rarely occurs in a truly spontaneous fashion.<sup>35</sup>

In attempting to understand the phenomenon of posthypnotic amnesia, a number of conceptual models of the amnesic process have been developed.

\* Based on research supported in part by grant MH 19156 from the National Institutes of Health, United States Public Health Service, and in part by grants from the Institute of Experimental Psychiatry, the Harvard Graduate Society, and the Joseph H. Clark Bequest to Harvard University.

Analogies to posthypnotic amnesia have been drawn from ordinary forgetting, the withholding of secret information, the repression of unpleasant memories, and the experience of having memories "on the tip of the tongue." Whether they have been explicitly formulated or remained only implicit, these four broad models have guided the vast majority of studies of posthypnotic amnesia, and each has contributed greatly to our understanding of the amnesic process, both what it is, and what it is not. In this paper, I propose to sketch the primary features of each of these models of amnesia, summarize the major findings of the research which has ensued from them, and draw some conclusions of my own about the nature of posthypnotic amnesia.

#### AMNESIA AS FORGETTING

One of the most stimulating models of amnesia has been suggested by the experience of ordinary forgetting. In this model, posthypnotic amnesia is likened to the process of gradual decay or erosion of memory traces that apparently occurs in everyday life. Of course, it was recognized at the outset that the reversibility of amnesia rendered the forgetting model, in its strict sense, inappropriate. Memories that can be recovered have not been lost from storage; therefore, as Hull<sup>34</sup> noted (p. 132), "amnesia is not a phenomenon of retention." Moreover, recent work in normal memory has called the entire trace-decay theory of forgetting into question.<sup>65, 74</sup> Nevertheless, it is useful to study amnesia *as if* it were a storage problem, recognizing the limitations of the model but employing the techniques developed by those working in the classic verbal learning tradition initiated by Ebbinghaus. Despite the fact that few if any investigators have seriously proposed that amnesia involves a functional ablation of memories, the forgetting model and its associated strategies of inquiry have yielded a wealth of important information concerning the manner in which posthypnotic amnesia affects memory processes.

A good example of this sort of research is the extensive and careful investigation carried out by Williamsen *et al.*<sup>80</sup> In their study, subjects learned a list of six familiar words and received a number of different tests of memory. TABLE 1 presents the major results of three particularly important groups of subjects. The *amnesic* group contained highly hypnotizable subjects who learned the words during hypnosis, with memory testing carried out during suggested posthypnotic amnesia. The *simulator* group consisted of unsusceptible subjects who were instructed to simulate the behavior of a deeply hypnotized subject, and who then went through the same study-test sequence as the amnesic group. The *control* subjects, while hypnotizable, did not receive an induction of hypnosis but rather carried out the learning and memory tests in the normal waking state.

For the purposes of the present discussion, the relevant comparisons are between the amnesic subjects and the controls; the behavior of the simulators will be considered later. (1) On the first test, which required the subjects to actively recall the critical material, the amnesic subjects did quite poorly relative to the controls; as expected, these hypnotizable subjects responded positively to the suggestion for posthypnotic amnesia. (2) Then the experimenters took the six critical words and six similar words that had not been presented, deleted letters so that they were difficult to decode, and showed the partial words to the subjects. Both groups had a great deal of difficulty with the new,

neutral words. Despite their inability to recall the recently learned material, however, the amnesic subjects achieved almost as many solutions with the old, critical material as the control subjects, and almost as rapidly. (3) For the third test, the subjects were asked to free-associate to words that were first-associates of the six critical and six neutral words. Again despite their previous difficulty in recalling the study items, the amnesic subjects gave the critical words as associates as often, and as quickly as did the controls. (4) Then the six critical, six neutral, and six new "dummy" words were presented to the subjects with instructions for them to pick out those words that had been learned during hypnosis. The amnesia suggestion was still effective, as can be seen in the substantial difference in accuracy between the amnesic and the control subjects; it is nevertheless also apparent that for the amnesic subjects

TABLE 1  
RESULTS OF VARIOUS TESTS OF POSTHYPNOTIC MEMORY \*

Memory Test	Hypnotized	Group Simulator	Control
Initial Recall	1.3	0.0	5.4
Partial Words—Critical			
Correct Solutions	3.5	1.7	4.6
Time	15.7	24.4	10.5
Partial Words—Neutral			
Correct Solutions	0.9	1.2	1.0
Time	23.4	22.7	23.8
Word Associations—Critical			
Number Correct	4.8	4.6	4.6
Time	1.2	1.8	1.2
Word Associations—Neutral			
Number Correct	3.5	3.7	3.7
Time	1.1	1.2	1.1
Recognition			
Number Correct	2.9	0.0	5.5
Time	51.9	33.9	46.0
Final Recall (Postamnesia)	4.6	4.2	5.4

\* Adapted from Tables 1–4 of Williamsen *et al.*<sup>90</sup> Time given in seconds.

as a group, recognition memory is clearly superior to recall memory. (5) Finally, the amnesia suggestion was canceled and at this point a recall test was given, on which the subjects in the amnesia and control groups showed equivalent levels of memory.

Other, less extensive studies lead to similar conclusions. Strickler,<sup>72</sup> working in Hull's laboratory, taught subjects paired-associate nonsense material during hypnosis, followed by suggestions for posthypnotic amnesia; on other trials, the same subjects learned comparable material in the normal waking state. On an initial test, the subjects recalled only about 3% of the critical material during amnesia, compared with 86% correct recall in the waking trials. However, when they were instructed to learn the material again, the amnesic group showed a savings of 48% in relearning—a considerable advan-

tage over never having learned the material previously, though still appreciably worse than the rate of relearning observed in the waking state (98% savings). Graham and Patton<sup>27</sup> employed a retroactive inhibition paradigm in another experiment. All subjects learned an original list of adjectives in the normal waking state. One group also learned the interpolated list in the waking state; a second group learned the second list in hypnosis, followed by suggestions for posthypnotic amnesia; a control group did not learn the second list at all. All subjects then relearned the original list. Despite their virtually complete inability to recall the items on the interpolated list, the amnesic subjects manifested the same amount of retroactive inhibition affecting the original list as did the waking group (55% and 46% savings, respectively, compared with 87% savings for the control group).

One can succinctly summarize a wealth of literature in this area as follows: the extent of amnesia appears to vary appreciably, depending on the type of memory test that is employed. While amnesic subjects have a great deal of difficulty in recalling the critical material, recognition memory<sup>4, 80</sup> and relearning of the critical material<sup>15, 72</sup> are considerably less impaired. Tasks involving retroactive inhibition,<sup>12, 27, 48</sup> word associations,<sup>71, 75, 76, 80</sup> and psychophysiological indices of memory<sup>6, 63</sup> all indicate that the memories covered by the amnesia suggestions remain active within the memory system. There are, of course, some exceptions to this generalization,<sup>50, 73</sup> chiefly the study by Stern *et al.*<sup>70</sup> But on the whole, only certain aspects of the processing and utilization of stored information are affected by posthypnotic amnesia.

Posthypnotic amnesia also exerts a selective impact on memory recall in which certain aspects of the critical material itself, but not other aspects, can be remembered. One of the most dramatic demonstrations of this property of amnesia is observed during the deeply hypnotized subject's response to posthypnotic suggestions. Here, the subject carries out some activity in response to a prearranged cue, but when questioned about the behavior, he or she does not remember having received the suggestion.<sup>7, 8, 16, 17</sup> Amnesia is by no means necessary for the production of posthypnotic behavior,<sup>24, 64</sup> but the two phenomena are frequently associated. In these instances, the person remembers *to do something*, but does not remember *why*.

The same kind of selectivity is observed in experiments in which the amnesic subject is required to capitalize on information acquired during the previous hypnotic state. In the experiment by Strickler,<sup>72</sup> for example, the amnesic subjects relearned the material rather quickly, as if they were already somewhat familiar with it. Williamsen *et al.*<sup>80</sup> found, by the same token, that their amnesic subjects remained sensitized to the critical material—enough so that they had a fair amount of success in decoding the critical words when they were presented in degraded form on the partial words task. Furthermore, while the amnesia prevented the subjects from recalling words that they had just learned, it did not prevent them from employing these same words in the free-association test. Similar results have been obtained by others.<sup>26, 45, 56</sup> One of the most striking observations in this regard has been of posthypnotic *source amnesia*.<sup>18, 22</sup> In this phenomenon, the hypnotized subject is incidentally taught some obscure information while hypnotized (e.g. the color that amethyst turns when it is exposed to heat), and subsequently receives suggestions for posthypnotic amnesia. When tested later, approximately one third of otherwise completely amnesic subjects nevertheless immediately and effortlessly remember the new information which had been taught to them. When the experimenter

presses further, the subjects are not able to recollect the circumstances in which they learned the facts, and may even confabulate the source of the knowledge. To paraphrase Evans:<sup>19</sup> the amnesic subject knows, but does not necessarily know how, why, or even what he knows.

The studies carried out under the rubric of the forgetting model of amnesia all underscore the general point that amnesia suggestions do not affect the memories themselves, but rather affect certain memory functions. The critical memory traces are not by any means dormant. Despite the failure of active recall, the amnesic subject may still gain access to the information by other means, such as recognition; and the critical material continues to interact with other ongoing acquisition, storage, and retrieval processes. When the material can be recalled, as in free-association or the source amnesia experiments, it is frequently devoid of "autobiographical" reference to the experiential context in which it was acquired. These findings, along with the reversibility of amnesia discussed earlier, point up the *paradox of posthypnotic amnesia*, which resides in the apparent contradiction between the subject's assertion that he or she cannot remember and the objective evidence of the availability and activity of the memories. This seeming paradox is an important touchstone for all contemporary theoretical and experimental work in posthypnotic amnesia.

#### AMNESIA AS THE KEEPING OF SECRETS

From a social-psychological perspective, the paradox of posthypnotic amnesia can be taken to mean that the subject only appears to be amnesic but in fact does not experience any difficulty in remembering at all. The hypnotic subject, from this point of view, attempts to comply with amnesia suggestions by actively suppressing his memory for the experience, exerting insufficient effort to complete the recall task or deliberately withholding information from the experimenter. Compliant subjects alter their verbal reports in accordance with immediate situational demands and their conceptions of the wider "hypnotic role," but indirect indices of memory that are difficult to modify intentionally show that they remember the material perfectly well. Thus, the use of recognition measures, retroactive inhibition procedures, or psychophysiological tests catch the subject in a lie, as it were, and show that the expressed amnesia is not "real." When the subject feels it is legitimate to do so, as when the prearranged reversibility cue is given at some later time, he provides a complete memory report to the experimenter, thus divulging his secret. This hypothesis has also been termed *amnesia by neglect*,<sup>44</sup> and has been articulated in various forms.<sup>2-5, 11, 60</sup> Barber,<sup>3</sup> (pp. 130-131) for example, provides the following personal account, which he contends applies to both hypnotized subjects and nonhypnotized subjects who have positive attitudes, motivations, and expectancies concerning the experimental situation:

Later the experimenter suggests that when the session is over I will not remember anything that occurred. Soon afterward he states that the experiment is over and asks me what I remember. Since I have no reason to resist the suggestion for amnesia, I say to myself that I do not remember what occurred, I keep my thoughts on the present, I do not think back to the preceding events, and I state that I do not remember. The experimenter subsequently states, "Now you can remember." I now let myself think back to the preceding events and I verbalize them.

On the face of it, the neglect hypothesis seems to arise from a misinterpretation of the results of studies that employed conventional memory-testing procedures to assess the extent of posthypnotic amnesia. Consider a simple experiment in normal memory, in which a subject studies a list of words and then takes recall and recognition tests of memory. It is commonly found that recognition is superior to recall under such circumstances,<sup>16</sup> but it does not follow that the subject is keeping a secret from the experimenter or has somehow fooled himself into believing that he cannot remember something. Rather, such an outcome is interpreted in terms of the strength of the memory trace (i.e., below the threshold for recall, but above that for recognition), or the disruption of search processes in retrieval, and so on. The same logic should apply to experiments on amnesia as well.

There is also more direct evidence regarding the "secrets" model of amnesia. One line of evidence has to do with unsusceptible subjects who have been instructed to simulate deep hypnosis.<sup>51</sup> Simulators remember their experiences perfectly well; however, they attempt to comply with the suggestion for amnesia by deliberately withholding memory reports from the experimenter and suppressing other evidence of the critical knowledge as best they can. Thus, it should be instructive to compare those simulating hypnosis with those who have not been given simulation instructions. TABLE 1, introduced earlier, provides such a comparison for the hypnotized and simulating subjects who were run in the experiment by Williamsen *et al.*<sup>50</sup> It is apparent that the two groups performed quite differently. On the initial test of recall during amnesia, the simulators showed a significantly greater memory deficit than those who were hypnotized; the former group did not remember any of the critical material at all. On the partial words task, the simulator group achieved significantly fewer solutions and took significantly longer to perform the task than did the hypnotic group; they also showed no recognition memory for the words whatsoever and responded significantly more quickly on this test than did the other group. Note also that the recall and recognition tasks yielded identical results for the simulators, whereas the hypnotized subjects performed better on recognition testing than on the recall task. These results were largely confirmed in a subsequent study by Barber and Calverley.<sup>1</sup>

Other studies have provided similar evidence. Bowers<sup>7</sup> gave hypnotized and simulating subjects suggestions to begin sentences with the words "he" or "they" on a later Taffel task, followed by suggestions for posthypnotic amnesia. As expected, there was no difference between hypnotized subjects and simulators in performance on the Taffel task. After the task, the subjects were led to believe that the experiment was over, and were interviewed by another experimenter. All of this was intended to make the subject drop the role of "good subject" and reflect honestly on his behavior. Although the amnesia suggestion had not yet been canceled, all of the simulating subjects showed full memory for their hypnotic and posthypnotic behavior in the previous phases of the experiment; less than half of the hypnotized subjects, however, showed full memory. Under the changed experimental demands, then, the simulators showed complete memory—they divulged their "secret"; the hypnotized subjects did not. Other studies have found that simulators do not show source amnesia, although source amnesia occurs with some frequency among hypnotized subjects;<sup>18</sup> and simulating subjects frequently show spontaneous amnesia, which is rare among hypnotic subjects.<sup>39</sup> The essential point here is that simulated amnesia, in which highly motivated, compliant subjects deliber-

ately suppress recall or withhold material from the experimenter, is quite different from the amnesia observed in hypnotized subjects. The different outcomes would seem to imply different underlying processes.

One can also assume that if social-psychological factors are of primary importance in this realm, subjects' expectations about hypnosis should be a major determinant of their actual behavior during an experimental session. Shor<sup>60</sup> assessed the impact of preexisting expectations on hypnotic behavior in the following manner. At the beginning of the session, the subjects received a questionnaire that listed the suggestions they would receive during hypnosis, including one for amnesia, and were asked to predict how they would respond to each item. Later a hypnotic procedure was administered, and the subjects' personal predictions, assessed prior to hypnosis, were compared to their objective scores on each item. The resulting *phi* coefficient measuring correlation with  $-.04$  for the amnesia item, indicating no relationship between expectancies and behavior. (Interestingly, advanced knowledge of the content of the hypnotic procedure did not seem to appreciably diminish the occurrence of posthypnotic amnesia.) In a somewhat related study, Young and Cooper<sup>62</sup> employed a procedure introduced by Orne<sup>52</sup> to experimentally manipulate subjects' expectancies regarding hypnosis. Slightly different versions of a lecture on hypnosis were delivered to sections of an introductory psychology class: half the students were told that amnesia always occurred after hypnosis while the other half was told that it never occurred; otherwise, the lectures were identical. In a subsequent session, a standardized hypnotic procedure was administered to the subjects, from which the usual amnesia suggestion was deleted. On a test of posthypnotic memory the "expect amnesia" group recalled significantly fewer items than the "not-expect amnesia" group, showing some effect of the instructional conditions and thus of expectancies. However, the difference observed was very small, with the treatment conditions accounting for less than 10% of the observed variance in posthypnotic amnesia.

Finally, a more recent study<sup>44</sup> attempted to manipulate experimental demands during posthypnotic amnesia itself. Groups of subjects were administered a slightly modified version of the Harvard Group Scale of Hypnotic Susceptibility, Form A, including a suggestion and test for posthypnotic amnesia. Before the amnesia suggestion was lifted, however, memory was tested again, with the difference that this second test was preceded by one of four kinds of special instructions. One group was simply administered a retest of memory, with no further instructions; a second was asked to recall the suggestions in the order in which they occurred during the hypnotic procedure; the third group was asked to exert an extra degree of effort in recalling the material; and the fourth group was instructed to be completely honest in reporting those things which they actually remembered. If the subjects were responding principally to the demands contained in the experimental situation, the special instructions should have abolished the amnesia, or at least produced a significant improvement in recall on the second test over that observed in the retest condition. FIGURE 1 shows the results for those hypnotizable subjects who met a criterion for virtually complete posthypnotic amnesia on the first recall test (each of the groups contained 15-24 subjects). It is apparent that the expected effects were not observed. In no condition did the interpolated test serve to abolish the amnesia that had been observed initially; there was still a significant further recovery of memory on the third test, after the amnesia had been lifted by the reversibility cue. Moreover, the special

instructions did not have differential effects on recall, either on the second test of amnesia or on the postamnesia test: the four lines are essentially parallel. In short, in this study posthypnotic amnesia was not breached despite considerable pressure placed on the subjects.

All of this research seems to converge on the conclusion that the subject who appears to be experiencing posthypnotic amnesia is not simply suppressing memory or failing to be completely candid with the experimenter. Nor does he or she appear to be simply complying with the perceived or expressed demands arising from within a particular experimental context, or behaving in accordance with some wider conceptualization of hypnosis. Rather, the amnesic subject's memory report seems to reflect a subjectively compelling internal state in which the person is trying to recall some material but finds

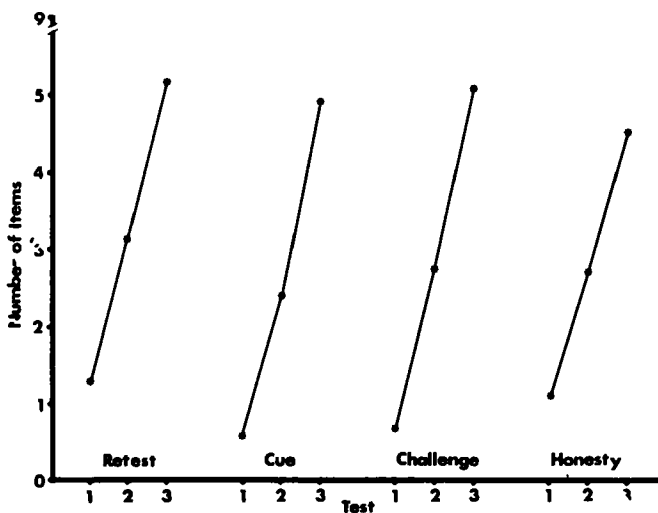


FIGURE 1. Mean number of items recalled on three tests of posthypnotic memory for hypnotizable subjects meeting a strict criterion for initial posthypnotic amnesia. Maximum recall=9 items. Tests 1 and 2 occurred during suggested amnesia, Test 2 preceded by special instructions (retest, cue, challenge, or honesty). Test 3 occurred after the reversibility cue was given to lift the amnesia. Based on FIGURE 1a of Kihlstrom *et al.*"

the process extremely difficult, inefficient, and unproductive. This means that the important sources of posthypnotic amnesia lie not so much in the subject's motivation during the recall task, nor in the particular demands placed on the subject, but rather involve other factors that interfere with the usual processes of information retrieval. These factors are described in the remaining two models that I wish to discuss.

#### AMNESIA AS REPRESSION

From a dynamic, intrapsychic point of view, posthypnotic amnesia may be seen as resulting from the repression of certain memories by the subject.



This hypothesis was formally proposed by Schilder and Kauders,<sup>62</sup> and was commented upon favorably by Rapaport<sup>58</sup> and Stengel,<sup>69</sup> among others. According to Schilder and Kauders, the motive for amnesia lies in the subject's transference relationship with the hypnotist (p. 60):

Obviously, the hypnotized is ashamed of his infantile-masochistic adjustment and denies the hypnosis in order to conceal the adjustment. Very frequently, therefore, we find hypnotized persons indignantly denying that they have been hypnotized.

According to Rapaport (p. 176), recovery of these memories occurs when the subject accepts his masochistic relationship, an affective change that is instigated by the hypnotist's further suggestions. In many respects these notions parallel Freud's<sup>23</sup> account of the forgetting of dream material.

The repression hypothesis has little trouble dealing with the paradoxes of posthypnotic amnesia—after all, repressed material may be expected to "leak" into consciousness in various ways or express itself in indirect ways—but it has problems in other respects. For example, the hypnotic subject is typically aware of his loss of memories, whereas repression is usually construed as an unconscious process. Moreover, the motive to repress does not always seem to be present in amnesic subjects. Patients hypnotized in clinical settings may well experience strong transference reactions or give expression to unacceptable thoughts or impulses during hypnosis,<sup>24, 53</sup> but the experience of hypnosis is quite different for normal subjects participating in laboratory research. Here the hypnotist is looked upon more as a coach or a guide than as a powerful authority figure.<sup>37</sup> Even without the powerful transference relationship as a primary motivating source, amnesia occurs in about one third of laboratory subjects.

If posthypnotic amnesia is like repression, then it might be reasonable to expect that those who experience amnesia after hypnosis are also likely to employ repression as a defense at other times as well.<sup>33</sup> The idea here is that certain subjects have an ability for repression that they can capitalize on during hypnosis. Hammer<sup>29</sup> tested this hypothesis by administering the Jung word-association test to subjects who had previously been assessed for response to hypnosis. On the first run through the stimulus words, they were asked to respond with the first word that came to mind; on the second trial, they were asked to repeat the association that they had given the first time through the list. A repression score was computed by counting the number of errors in repeating associations to those words (one-half the list) that were emotionally provocative. Subjects who had shown posthypnotic amnesia during the earlier hypnosis session proved to show no more repression than those who had been nonamnesic. Apparently, the occurrence of posthypnotic amnesia does not depend on a generalized "talent" for repression.

Perhaps the most direct test of the repression hypothesis currently available examines the content of what is remembered and forgotten during posthypnotic amnesia. If posthypnotic amnesia is like repression, then memories of hypnosis associated with a negative affective valence should be particularly subject to the impact of amnesia suggestions. Although special techniques can be devised to examine the selectivity of amnesia,<sup>10</sup> the most widely used procedures have employed the standardized scales of hypnotic susceptibility. Following Zeigernik,<sup>83</sup> one can assume that those suggestions on which the subject fails to pass the standardized criterion (i.e., "failure" experiences) will be negatively

toned, and that these items should be more strongly subject to the effects of amnesia than those which are passed—if, that is, amnesia involves repression. If the subject recalls fewer failed items than passed items, one would have evidence for a repression-like process involved in posthypnotic amnesia. Of course, some subjects cannot be considered in such an analysis, namely, those who pass or fail all the items as well as those who remember or forget all of the items. Fortunately for the method, such subjects are relatively few in number, and there is plenty of data left for analysis.

The repression hypothesis, then, predicts that during amnesia recall should favor passed (positively toned) over failed (negatively toned) items; more-

TABLE 2  
SELECTIVE RECALL OF PASSED AND FAILED ITEMS DURING AMNESIA  
FOR HYPNOTIZABLE AND INSUSCEPTIBLE SUBJECTS

Study	N	Index of Selective Recall *	
		Hypnotizable	Insusceptible
Hilgard & Hommel <sup>36</sup> †	124	.06	.15
O'Connell <sup>51</sup> †			
Sample A	100	.07	.12
Sample B	152	.11	.33
Sample C	54	.18	.40
Sample D	86	.02	.44
Sample E	94	.10	.05
Coe <i>et al.</i> <sup>32</sup> †			
Objective Pass/Fail	29	-.22	.08
Subjective Pass/Fail	29	-.08	.17
Pettinati & Evans <sup>57</sup> †			
Sample A	88	.09	.18
Pettinati & Evans <sup>57</sup> ‡			
Sample A	88	.07	.11
Sample B	108	.06	.11

\* A positive index means that recall favors passed over failed items. A negative index means that recall favors failed over passed items.

† Selective Recall Index, calculated from results reported by the authors.

‡ Recall Probability Index, from Pettinati & Evans.<sup>57</sup>

over, this selectivity in recall should be most prominent in those subjects who are highly hypnotizable, because, after all, they are the ones who are most likely to respond to suggestions for amnesia. TABLE 2 presents the results of the four available studies. A positive "Selective Recall Index" means that subjects reported more passed than failed items; a negative index means that the subjects favored failed items in recall. Hilgard and Hommel,<sup>36</sup> in their original study, did find that fewer failed than passed suggestions were recalled during amnesia; however, this differential suppression of items associated with failure was more prominent among those subjects who were relatively insusceptible to hypnosis. In a later study, O'Connell<sup>51</sup> replicated the Hilgard-Hommel

procedure in five separate samples totaling 486 subjects. Although there was some variation from sample to sample, in general he confirmed the earlier findings: relatively more recall of passed than failed items, particularly among the less hypnotizable subjects. Coe and his colleagues<sup>13</sup> performed a similar study and obtained somewhat different results. Using objective (behavioral) measures of success and failure, Coe *et al.* found that the selectivity of amnesia favored the recall of failed items among the hypnotizable subjects and of passed items among the insusceptible subjects. When they shifted from objective pass-fail ratings to the subjects' own impressions of whether or not an item had been successful (certainly a better approximation of the subjective feeling of failure), this tendency diminished appreciably. Finally, Pettinati and Evans<sup>57</sup> applied a new index of selective recall (the "Recall Probability Index") designed to eliminate the artifactual influence of the number of items remembered. In two samples totaling 196 subjects, hypnotizable and insusceptible subjects both favored the recall of passed items, regardless of the measure used, but with the improved index the difference between hypnotizable and insusceptible subjects was not significant.

Interpretation of the selective recall phenomenon is somewhat problematic because, as Hilgard and Hommel<sup>36</sup> pointed out, identical results could be produced by the repression of failed items and the enhancement of passed items. Whatever the source of the effect turns out to be, what is most important is that the findings of Pettinati and Evans<sup>57</sup> show that selective recall is not associated with depth of hypnosis. Thus the phenomenon probably does not stem from the suggestion for posthypnotic amnesia, but more likely reflects the vicissitudes of memory in general. In short, there is at present no evidence for a repression-like process operating specifically in posthypnotic amnesia.

#### AMNESIA AS MEMORY "ON THE TIP OF THE TONGUE"

The final mode of posthypnotic amnesia that I wish to discuss has its roots planted firmly in the information-processing theories of contemporary cognitive psychology. In this case, an analogy is drawn between posthypnotic amnesia and the experience of having memories "on the tip of the tongue" (Ref. 9 and pp. 719-721, Ref. 81), or the "feeling of knowing" something.<sup>30, 31</sup> Here, a person has difficulty remembering something (say, the location of the car keys or the name of a casual acquaintance), yet we know that the memory is available in storage because he will remember it eventually or recognize it when it is presented to him. Moreover, the person is able to determine with considerable accuracy that he knows the material and can correctly report some of its general characteristics. In much the same way, posthypnotic amnesia is reversible and can be breached by recognition testing; and amnesic subjects frequently offer comments such as the following: "I did some things, but I don't remember what they were—I think there was something about a mosquito, but I'm not sure."

Contemporary cognitive theorists (e.g. Anderson and Bower<sup>1</sup>) conceive of memory as a network of "locations" corresponding to events, concepts, and the like. Each location is associated with at least a few others and is also marked with certain "tags" that provide information about the spatiotemporal context in which the event occurred, the semantic and syntactic properties of

the concept, orthographic and acoustic properties of the word, strength of the memory trace, and so forth. Retrieval of an item from memory proceeds by following associative pathways from location to location, generating likely items whose tags are then examined to determine if the candidate item is actually part of what the person is trying to remember. The search process is aided by various sorts of organizational cues and strategies by which the person can work systematically through the array of associations. Moreover, Tulving<sup>77</sup> has argued that there are two general types of systems into which memories are organized: "episodic" memory, which deals with personal experiences and other material with an autobiographical reference; and "semantic" memory, which represents a kind of mental encyclopedia in which knowledge about one's world and language is stored. Many memories, of course, have both episodic and semantic components. When we learn a new word, concept, or fact, its location in memory will be tagged with both information about the spatiotemporal context in which the learning occurred (episodic memory) and information about the new item's relationship to other words, concepts, or facts that are already familiar (semantic memory).

Without a sufficiently rich associational structure and without sufficient retrieval cues and an adequate plan for searching through memory, the person will not be able to gain access to material that is available in memory.<sup>79</sup> In this instance, there will occur a complete failure of retrieval. Or, he may be able to gain access to certain items (or certain aspects of the to-be-remembered material) but not to others. Recognition is more successful than recall, according to this account, largely because it facilitates the search through memory for candidate items. The search mechanism can go directly to the location in memory that corresponds to the presented item and proceed to test the tags against the relevant criteria.

Some of the "paradoxical" aspects of posthypnotic amnesia begin to make sense when viewed from the perspective of this theoretical account of memory retrieval. We know from studies based on the "forgetting" model that recall memory is profoundly disrupted by posthypnotic amnesia. However, recognition memory and other mnemonic processes which do not necessarily involve retrieval (such as those which generate interlist interference) are left relatively intact during amnesia. This suggests that the locus of the memory deficit lies in the organized search-and-retrieval process by which a subject gains access to stored memories. Moreover, when word lists are learned during hypnosis, amnesia does not prevent the list items from being employed in word-association tasks, and facts learned during hypnosis may be remembered in the absence of recollection about the context in which they were learned. This suggests that episodic relationships among the critical memories, but not semantic ones, are disrupted by the suggestion. Thus, the paradox of posthypnotic amnesia is not a paradox at all. The apparent contradictions in the amnesic subject's behavior stem from a selective disruption of certain access routes to memory but not of others.

Following this sort of reasoning, Evans and Kihlstrom<sup>20</sup> argued that if organizational cues make recall as easy, efficient, and productive as it usually is, then when recall is difficult, inefficient, and unproductive—as it is during posthypnotic amnesia—the memory deficit reflects the disorganization of the process of retrieval. Now, the organization of recall draws on many sources, including visual, orthographic, acoustic, semantic, and syntactic cues; sensory modality, frequency, and saliency; and the spatiotemporal relationships among

the to-be-remembered items and their surrounding context. Formal analyses<sup>17</sup> indicated that temporal context cues are of overriding importance in the retrieval of episodic memories. Introspection, moreover, suggested that in retrieving the experiences of a previous hypnosis session, a prominent organizational strategy would involve the temporal sequence uniting the several events. Because amnesic subjects are trying unsuccessfully to remember a series of personal experiences, Evans and Kihlstrom proposed that posthypnotic amnesia resulted, at least in part, from a specific disruption in the temporal organization of recall.

In a first test of the disorganized retrieval hypothesis,<sup>20</sup> 112 subjects took part in an experiment involving three standardized hypnotic procedures, each of which contained a series of hypnotic suggestions followed by a final suggestion for posthypnotic amnesia. Those subjects who showed virtually complete amnesia in response to the suggestion were excluded from further consideration, since they recalled too few items to permit analysis of the organiza-

TABLE 3  
TEMPORAL ORGANIZATION IN RECALL DURING POSTHYPNOTIC AMNESIA \*

Study	N	Rho Index	
		Hypnotizable	Insusceptible
Evans & Kihlstrom <sup>20</sup>	112		
HGSHS:A		.67	.80
SHSS:B		.39	.58
SHSS:C		.08	.55
Unpublished Replication	107		
HGSHS:A		.61	.81
SHSS:C		.16	.68
Kihlstrom <i>et al.</i> <sup>14</sup>	488		
HGSHS:A		.68	.85

\* HGSHS:A=Harvard Group Scale of Hypnotic Susceptibility, Form A; SHSS:B and SHSS:C=Stanford Hypnotic Susceptibility Scale, Forms B and C.

tion of recall. For those subjects who recalled at least three of the events and experiences of hypnosis, despite the suggestion for complete amnesia, Spearman rank-order correlation coefficients (*rho*) were calculated between the order in which each subject recalled those suggestions that he or she could remember and the order in which those suggestions were actually administered as part of the hypnotic procedure. By this measure, hypnotizable subjects showed significantly less temporal organization during amnesia than did the insusceptible subjects. These findings were replicated in a subsequent unpublished study involving 107 subjects who received two different hypnotic procedures and one in which 488 subjects received a single standardized procedure,<sup>14</sup> as well as on other occasions. TABLE 3 portrays these results, which indicate that the temporal-disorganization effect in posthypnotic amnesia is highly stable.

More detailed analyses lend further support to the conclusion that the disorganization of temporal sequencing in recall is an aspect of posthypnotic

amnesia, along with reversibility and the vague and fragmentary nature of the subjects' memory reports. Despite the subject's ability to recall some of his or her experiences, these three properties may be cited in support of the conclusion that he or she is responding at least partially to the amnesia suggestion. Subsequent studies have shown that temporal sequencing in recall is unaffected when subjects are hypnotized but do not receive suggestions for amnesia, and that during amnesia hypnotizable subjects are relatively unable to arrange those items that they recall in correct temporal sequence when they are specifically instructed to do so. These findings indicate that temporal disorganization is functionally tied to the suggestion for amnesia, rather than to hypnosis alone, and does not merely reflect the subject's disinclination to organize recall in a particular way. A full account of this research is forthcoming.<sup>11</sup>

There are many issues that remain to be addressed. For example, we need to know what other access routes to memory are disrupted during amnesia as well as those which remain undisturbed. What techniques, aside from the administration of the reversibility cue, will serve to relieve posthypnotic amnesia? What is the function of the reversibility cue, and how does it work? What is it about hypnosis that allows posthypnotic amnesia to occur? With respect to the last question—that of mechanism—it is possible that the disruption of retrieval observed in posthypnotic amnesia reflects a dissociation of cognitive control systems,<sup>28, 31</sup> but final conclusions await further research on amnesia as well as further elaboration of the concept of dissociation.

The hypothesis that posthypnotic amnesia occurs through the inability of subjects to capitalize on organizational cues and strategies important to memory retrieval was originally suggested by the similarities between posthypnotic amnesia and instances of recall difficulty observed in waking life. In contrast to hypotheses generated by the "secrets" and "repression" models of amnesia, the available results are quite consistent with the notion of posthypnotic amnesia as disrupted retrieval. The initial success of the enterprise alone should be enough to justify further research efforts along these lines. Moreover, the notion that posthypnotic amnesia involves a disruption of retrieval processes gains strength from the fact that similar accounts have been sketched for a wide variety of memory failure, including ordinary forgetting,<sup>65, 78</sup> Korsakoff's syndrome,<sup>59, 71</sup> infantile amnesia in humans and in animals,<sup>61, 68</sup> amnesia induced by electroconvulsive shock,<sup>16, 67</sup> and state-dependent learning produced by alcohol, barbiturates, and other drugs.<sup>55</sup> Thus, the retrieval-failure approach advocated here is strongly tied to the ongoing attempt to develop a comprehensive view of both normal and abnormal memory processes within the context of contemporary cognitive psychology. It is to be hoped that the experimental study of posthypnotic amnesia will not only draw passively upon advances made in other areas, but will make its own unique contribution to the fuller understanding of the mind that we all seek.

#### ACKNOWLEDGMENTS

I thank Frederick J. Evans, Sharon Greene, A. Gordon Hammer, Helen M. Pettinati, Moshe Twersky, and especially Reid Hastie for their helpful comments during the preparation of this paper.

## REFERENCES

1. ANDERSON, J. R. & G. H. BOWER. 1972. Recognition and retrieval processes in free recall. *Psych. Rev.* **79**: 97-123.
2. BARBER, T. X. 1969. *Hypnosis: A Scientific Approach*. Van-Nostrand-Reinhold, New York, N.Y.
3. BARBER, T. X. 1972. Suggested ("hypnotic") behavior: The trance paradigm versus an alternative paradigm. *In Hypnosis: Research Developments and Perspectives*. E. Fromm & R. E. Shor, Eds. Aldine-Atherton, Chicago, Ill.
4. BARBER, T. X. & D. S. CALVERLEY. 1966. Toward a theory of "hypnotic" behavior: Experimental analyses of suggested amnesia. *J. Abnorm. Psychol.* **71**: 95-107.
5. BARBER, T. X., N. P. SPANOS & J. F. CHAVES. 1974. *Hypnotism, Imagination, and Human Potentialities*. Pergamon Press, New York, N.Y.
6. BITTERMAN, M. E. & F. L. MARCUSE. 1945. Autonomic response in posthypnotic amnesia. *J. Exp. Psychol.* **35**: 248-252.
7. BOWERS, K. S. 1966. Hypnotic behavior: The differentiation of trance and demand characteristic variables. *J. Abnorm. Psychol.* **71**: 42-51.
8. BOWERS, K. S. 1975. The psychology of subtle control: An attributional analysis of behavioral persistence. *Can. J. Behav. Sci.* **7**: 78-95.
9. BROWN, R. & D. MCNEIL. 1966. The "tip of the tongue" phenomenon. *J. Verb. Learn. Verb. Behav.* **5**: 325-337.
10. CLEMES, S. 1964. Repression and hypnotic amnesia. *J. Abnorm. Psychol.* **69**: 62-69.
11. COE, W. C. 1976. Posthypnotic amnesia and the psychology of secrets. Paper read at Soc. Clin. Exp. Hypn. Philadelphia, Pa.
12. COE, W. C., B. BASDEN, D. BASDEN & C. GRAHAM. 1976. Posthypnotic amnesia: Suggestions of an active process in dissociative phenomena. *J. Abnorm. Psychol.* **85**: 455-458.
13. COE, W. C., R. J. BAUGHER, W. R. KRIMM & J. A. SMITH. 1976. A further examination of selective recall following hypnosis. *Int. J. Clin. Exp. Hypn.* **42**: 13-21.
14. COOPER, L. M. 1972. Hypnotic amnesia. *In Hypnosis: Research Developments and Perspectives*. E. Fromm & R. E. Shor, Eds. Aldine-Atherton, Chicago, Ill.
15. COORS, D. 1928. A determination of the density of posthypnotic amnesia for the stylus maze. Unpublished bachelor's thesis. Univ. Wisconsin. Madison, Wis.
16. DAMASER, E. C. 1964. An experimental study of long-term posthypnotic suggestion. Unpublished doctoral thesis. Harvard University. Cambridge, Mass.
17. ERICKSON, M. H. & E. M. ERICKSON. 1941. Concerning the nature and character of posthypnotic behavior. *J. Gen. Psychol.* **24**: 95-133.
18. EVANS, F. J. 1971. Contextual forgetting: A study of source amnesia. Paper read at East. Psychol. Assoc. New York, N.Y.
19. EVANS, F. J. 1972. Posthypnotic amnesia and the temporary disruption of retrieval processes. Paper read at Amer. Psychol. Assoc. Honolulu, Hawaii.
20. EVANS, F. J. & J. F. KIHSTROM. 1973. Posthypnotic amnesia as disrupted retrieval. *J. Abnorm. Psychol.* **82**: 317-323.
21. EVANS, F. J., J. F. KIHSTROM & E. C. ORNE. 1973. Quantifying subjective reports during posthypnotic amnesia. *Proc. 81st Ann. Conv. Am. Psychol. Assoc.* **8**: 1077-1078.
22. EVANS, F. J. & W. A. F. THORN. 1966. Two types of posthypnotic amnesia: Recall amnesia and source amnesia. *Int. J. Clin. Exp. Hypn.* **14**: 333-343.
23. FREUD, S. 1900. The interpretation of dreams. *In The Standard Edition of the Complete Psychological Works of Sigmund Freud*. J. Strachey, Ed. Vols. 4-5. Hogarth Press. London, England. First published 1900; republished 1953.

24. GANDOLFO, R. L. 1971. Role of expectancy, amnesia, and hypnotic induction in the performance of posthypnotic behavior. *J. Abnorm. Psychol.* **77**: 324-328.
25. GILL, M. M. & M. BRENNAN. 1959. Hypnosis and Related States: Psychoanalytic Studies in Regression. International Universities Press. New York, N.Y.
26. GOLDSTEIN, M. S. & C. N. SIPPRELLE. 1970. Hypnotically induced amnesia versus ablation of memory. *Int. J. Clin. Exp. Hypn.* **18**: 211-216.
27. GRAHAM, K. R. & A. PATTON. 1968. Retroactive inhibition, hypnosis, and hypnotic amnesia. *Int. J. Clin. Exp. Hypn.* **16**: 68-74.
28. HAMMER, A. G. 1961. Reflections on the study of hypnosis. *Austral. J. Psychol.* **13**: 3-22.
29. HAMMER, A. G. 1970. Relationship of factors in hypnosis and in personality. Paper read at Am. Psychol. Assoc. Miami Beach, Fla.
30. HART, J. T. 1965. Memory and the feeling-of-knowing experience. *J. Educ. Psychol.* **56**: 208-216.
31. HART, J. T. 1967. Memory and the memory-monitoring process. *J. Verb. Learn. Verb. Behav.* **6**: 685-691.
32. HILGARD, E. R. 1965. Hypnotic Susceptibility. Harcourt, Brace & World. New York, N.Y.
33. HILGARD, E. R. 1966. Posthypnotic amnesia: Experiments and theory. *Int. J. Clin. Exp. Hypn.* **14**: 104-111.
34. HILGARD, E. R. 1976. Neodissociation theory of multiple cognitive control systems. *In* Consciousness and Self-Regulation. G. E. Schwartz & D. Shapiro, Eds. Vol. 1. Plenum Press. New York, N.Y.
35. HILGARD, E. R. & L. M. COOPER. 1965. Spontaneous and suggested posthypnotic amnesia. *Int. J. Clin. Exp. Hypn.* **13**: 261-273.
36. HILGARD, E. R. & L. S. HOMMEL. 1961. Selective amnesia for events within hypnosis in relation to repression. *J. Pers.* **29**: 205-216.
37. HILGARD, J. R. 1970. Personality and Hypnosis. Univ. Chicago Press. Chicago, Ill.
38. HULL, C. L. 1933. Hypnosis and Suggestibility: An Experimental Approach. Appleton-Century-Crofts. New York, N.Y.
39. JONHSON, R. F. Q., B. A. MAHER & T. X. BARBER. 1972. Artifact in the "essence of hypnosis": An evaluation of trance logic. *J. Abnorm. Psychol.* **79**: 212-220.
40. KIHLMSTROM, J. F. 1977. Generic recall during posthypnotic amnesia. Paper read at East. Psychol. Assoc. Boston, Mass.
41. KIHLMSTROM, J. F. & F. J. EVANS. 1976. Recovery of memory after posthypnotic amnesia. *J. Abnorm. Psychol.* **85**: 564-569.
42. KIHLMSTROM, J. F. & F. J. EVANS. 1977. The residual effect of suggestions for posthypnotic amnesia: A re-examination. *J. Abnorm. Psychol.* **86**: In press.
43. KIHLMSTROM, J. F. & F. J. EVANS. Memory retrieval processes in posthypnotic amnesia. In preparation.
44. KIHLMSTROM, J. F., F. J. EVANS, E. C. ORNE & M. T. ORNE. Attempting to breach posthypnotic amnesia. In preparation.
45. LIFE, C. 1929. The effects of practice in the trance upon learning in the normal waking state. Unpublished bachelor's thesis. Univ. Wisconsin. Madison, Wis.
46. McDUGALL, R. 1904. Recognition and recall. *J. Phil. Sci. Methods.* **1**: 229-233.
47. MILLER, R. R. & A. D. SPRINGER. 1973. Amnesia, consolidation, and retrieval. *Psychol. Rev.* **80**: 69-79.
48. MITCHELL, M. B. 1932. Retroactive inhibition and hypnosis. *J. Gen. Psychol.* **7**: 343-358.
49. NACE, E. P., M. T. ORNE & A. G. HAMMER. 1974. Posthypnotic amnesia as an active psychic process: The reversibility of amnesia. *Arch. Gen. Psychiat.* **31**: 257-260.
50. NAGGE, J. W. 1935. An experimental test of the theory of associative interference. *J. Exp. Psychol.* **18**: 663-682.



51. O'CONNELL, D. N. 1966. Selective recall of hypnotic susceptibility items: Evidence for repression or enhancement? *Int. J. Clin. Exp. Hypn.* **14**: 150-161.
52. ORNE, M. T. 1959. The nature of hypnosis: Artifact and essence. *J. Abnorm. Soc. Psychol.* **58**: 277-299.
53. ORNE, M. T. 1966. On the mechanisms of posthypnotic amnesia. *Int. J. Clin. Exp. Hypn.* **14**: 121-134.
54. ORNE, M. T. 1972. On the simulating subject as a quasi-control group in hypnosis research: What, why, and how. *In Hypnosis: Research Developments and Perspectives*. E. Fromm & R. E. Shor, Eds. Aldine-Atherton. Chicago, Ill.
55. OVERTON, D. A. 1968. Dissociated learning in drug states (state-dependent learning). *In Psychopharmacology: A Review of Progress 1957-1967*. D. H. Efron, J. O. Cole, J. Levine & D. H. Wittenborn, Eds. U.S. Public Health Service Publication no. 1836. Washington, D.C.
56. PATTEN, E. F. 1932. Does posthypnotic amnesia apply to practice effects? *J. Gen. Psychol.* **7**: 196-201.
57. PETTINATI, H. M. & F. J. EVANS. 1976. Repression or enhancement and the selective recall during posthypnotic amnesia of passed and failed experiences. Paper read at Soc. Clin. Exp. Hypn. Philadelphia, Pa.
58. RAPAPORT, D. 1942. Emotions and Memory. Williams & Wilkins. Baltimore, Md.
59. ROZIN, P. 1976. The psychobiological approach to human memory. *In Neural Mechanisms of Learning and Memory*. M. R. Rosenzweig & E. L. Bennett, Eds. MIT Press. Cambridge, Mass.
60. SARBIN, T. R. & W. C. COE. 1972. Hypnosis: A social-psychological analysis of influence communication. Holt, Rinehart & Winston. New York, N.Y.
61. SCHACHTEL, E. G. 1947. On memory and childhood amnesia. *Psychiat.* **10**: 1-26.
62. SCHILDER, P. & O. KAUDERS. 1927. Hypnosis. Nervous and Mental Disease Publications. New York, N.Y.
63. SCOTT, H. D. 1930. Hypnosis and the conditioned reflex. *J. Gen. Psychol.* **4**: 113-130.
64. SHEEHAN, P. W. & M. T. ORNE. 1968. Some comments on the nature of posthypnotic behavior. *J. Nerv. Ment. Dis.* **146**: 209-220.
65. SHIFFRIN, R. M. 1970. Forgetting: Trace erosion or retrieval failure? *Science* **168**: 1601-1603.
66. SHOR, R. E. 1971. Expectancies of being influenced and hypnotic performance. *Int. J. Clin. Exp. Hypn.* **19**: 154-166.
67. SPEAR, N. E. 1973. Retrieval of memory in animals. *Psych. Rev.* **80**: 163-194.
68. SPEAR, N. E. & P. PARSONS. 1976. Analysis of a reactivation treatment: Ontogeny and alleviated forgetting. *In Coding Processes in Animal Memory*. D. Medin, R. Davis & W. Roberts, Eds. Lawrence Erlbaum Associates. Hillsdale, N.J.
69. STENGEL, E. 1966. Psychogenic loss of memory. *In Amnesia*. C. W. M. Whitty & O. L. Zangwill, Eds. Butterworths. London, England.
70. STERN, J. A., W. E. EDMONSTON, G. A. ULETT & A. LEVITSKY. 1963. Electrodermal measures in experimental amnesia. *J. Abnorm. Soc. Psychol.* **67**: 397-401.
71. STEWART, C. G. & W. P. DUNLAP. 1976. Functional isolation of associations during suggested posthypnotic amnesia. *Int. J. Clin. Exp. Hypn.* **24**: 426-434.
72. STRICKLER, C. B. 1929. A quantitative study of posthypnotic amnesia. *J. Abnorm. Soc. Psychol.* **24**: 108-119.
73. TAKAHASHI, R. 1958. An experimental examination of the dissociation hypothesis in hypnosis. *J. Clin. Exp. Hypn.* **6**: 139-151.
74. TALLAND, G. A. 1965. *Deranged Memory: A Psychonomic Study of the Amnesic Syndrome*. Academic Press. New York, N.Y.

75. THORNE, D. E. 1969. Amnesia and hypnosis. *Int. J. Clin. Exp. Hypn.* **17**: 225-241.
76. THORNE, D. E. & M. V. HALL. 1974. Hypnotic amnesia revisited. *Int. J. Clin. Exp. Hypn.* **22**: 167-178.
77. TULVING, E. 1972. Episodic and semantic memory. *In Organization of Memory.* E. Tulving & W. Donaldson, Eds. Academic Press. New York, N.Y.
78. TULVING, E. 1974. Cue-dependent forgetting. *Am. Scientist* **62**: 74-82.
79. TULVING, E. & Z. PEARLSTONE. 1966. Availability and accessibility of information in memory for words. *J. Verb. Learn. Verb. Behav.* **5**: 381-391.
80. WILLIAMSEN, J. A., H. J. JOHNSON & C. W. ERIKSEN. 1965. Some characteristics of posthypnotic amnesia. *J. Abnorm. Psychol.* **70**: 123-131.
81. WOODWORTH, R. S. & S. SCHLOSSBERG. 1954. *Experimental Psychology.* Rev. Ed. Holt. New York.
82. YOUNG, J. & L. M. COOPER. 1972. Hypnotic recall amnesia as a function of manipulated expectancy. *Proc. 80th Ann. Conv. Am. Psychol. Assoc.* **7**: 857-858.
83. ZEIGARNIK, B. 1927. Das Behalten von erledigten und unerledigten Handlungen. *Psychol. Forsch.* **9**: 1-85.