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Posthypnotic Amnesia  
and the Distinction between Episodic and Semantic Memory<sup>1</sup>

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Posthypnotic amnesia is the subjectively compelling inability of the deeply hypnotized subject to remember the events and experiences that transpired while he or she was hypnotized. Even so, the usual form of the amnesia is rather selective in its effects. In particular, posthypnotic amnesia appears to selectively affect episodic but not semantic memories (Tulving, 1972). In studies by Patten and Life (Hull, 1933), for example, the amnesic subjects were able to capitalize on cognitive skills whose hypnotic acquisition they could not remember; in an experiment by Williamsen, Johnson, and Eriksen (1965), they could employ the constituent items of an unremembered wordlist as free

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associates; and in the demonstration of posthypnotic source amnesia by Evans and Thorn (1966), they could remember factual information but not the hypnotic circumstances under which it was learned. During posthypnotic amnesia, in brief, the subject can recollect information as knowledge, but not as history.

This year we have begun to explore the relationship between episodic and semantic memory during amnesia, using procedures similar to those employed by Williamsen et al. (1965) Hypnotized subjects drawn from the categories of low, medium, high, and very high hypnotizability ( $N=10$  per group) were taught a list of 15 familiar words followed by standard suggestions for posthypnotic amnesia. In addition to a series of free-recall tests of amnesia, an attempt was made to gain access to the critical material by means of a word-association procedure. Thus the episodic component of memory is represented by the learning experience, while the semantic component is represented by the word associations.

After learning the wordlist to a criterion of two perfect repetitions each subject received a suggestion of posthypnotic amnesia for the events of the hypnosis session, including the learning trials and the content of the memorized wordlist. After they were aroused from hypnosis the experimenter asked them to recall what they did while they were hypnotized, and in particular if they remembered anything about any words; this constituted the first test of posthypnotic amnesia. Figure 1 shows the number of items recalled on this test: it is clear

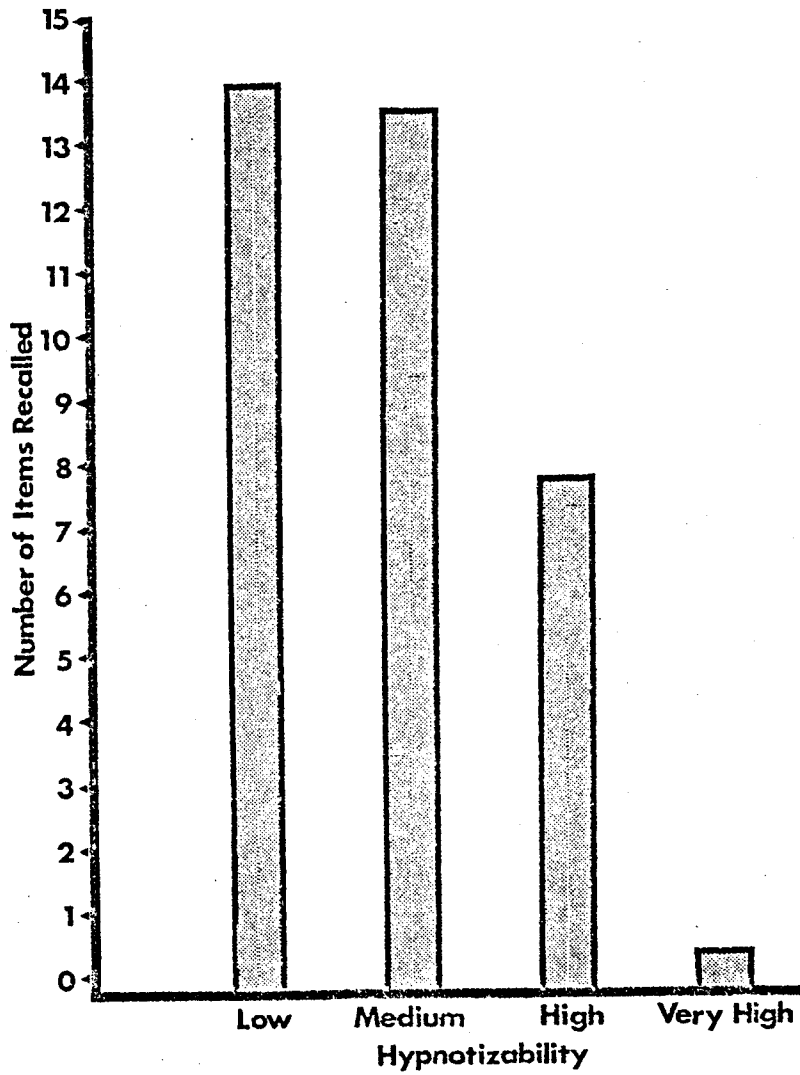


Figure 1

that the extent of initial posthypnotic amnesia was strongly associated with level of hypnotic susceptibility, with the most profound amnesia among those who were the most hypnotizable ( $F(3,36) = 33.96, p < .001$ ).

After this test the subjects took part in a word-association task. Half of the stimuli for this test had a high probability of eliciting the words which the subjects had previously learned; for the other half, the stimuli were chosen to have a high probability of eliciting some other word. The resulting two sets of 15 stimuli were closely matched in terms of the probability of eliciting their respective targets as first associates; in order to maximize the likelihood that the targets would be produced, the subjects gave three continued associates to each stimulus word. Figure 2 shows the average number of critical and neutral targets elicited in each of the four hypnotizability groups. Analysis of variance showed that critical targets were elicited much more frequently than neutral targets ( $F(1,36) = 16.73, p < .001$ ), but the outcome of the word-association procedure was not related to hypnotizability either as a main effect ( $F(3,36) = 1.14, n.s.$ ) or as an interaction ( $F(3,36) = .64$ ). In brief, learning a list of words beforehand seems to prime representations of the list items in semantic memory so that they are more readily elicited as associates to relevant stimuli; but posthypnotic amnesia does not seem to modulate this priming effect in any way.

Because the completely amnesic subjects in this experiment still

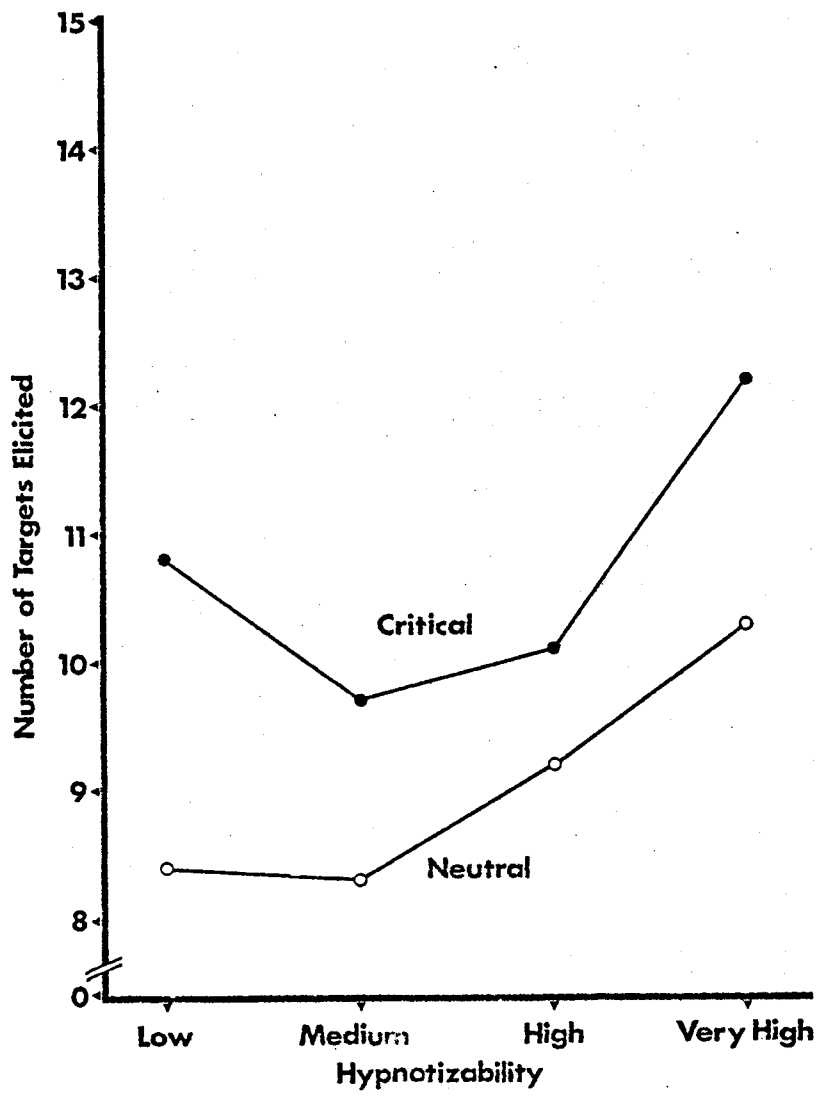


Figure 2

produced from 7 to 15 critical targets as free associates, we were interested in the effects of the word-association task on subsequent tests of posthypnotic amnesia. Figure 3 portrays the results of the initial test of posthypnotic amnesia (Test 1), as well as what happened on two subsequent recall tests: Test 2, also during amnesia but following the word-association procedure; and Test 3, following the administration of the pre-arranged reversibility cue. The main effects are significant for both hypnotizability ( $F(3,36) = 38.46, p < .001$ ) and test sequence ( $F(2,72) = 89.31, p < .001$ ), but the most important feature of the figure is a strong interaction between hypnotizability and tests ( $F(6,72) = 30.52, p < .001$ ). Comparing Test 1 and Test 2 during amnesia, it is apparent that successful retrieval of the target items on the word-association test did not remind the subjects in the very high hypnotizability group of those words that they had failed to recall ( $t(9) = 1.31, n.s.$ ), and it had only a relatively small impact on the amnesia of the subjects in hypnotizability group ( $t(9) = 1.91, p < .10$ , two-tailed). Production of critical target items during the word-association procedure sometimes produced a vague feeling that the word had a special quality to it, but as a rule the amnesia was relieved only after the amnesia suggestion had been formally cancelled -- as is seen in the comparison of Test 2, during amnesia, with Test 3 after it had been lifted (high:  $t(9) = 2.57, p < .05$ ; very high:  $t(9) = 32.39, p < .001$ ). The finding of a significant increment in memory on Test 3 means that whatever breach in amnesia

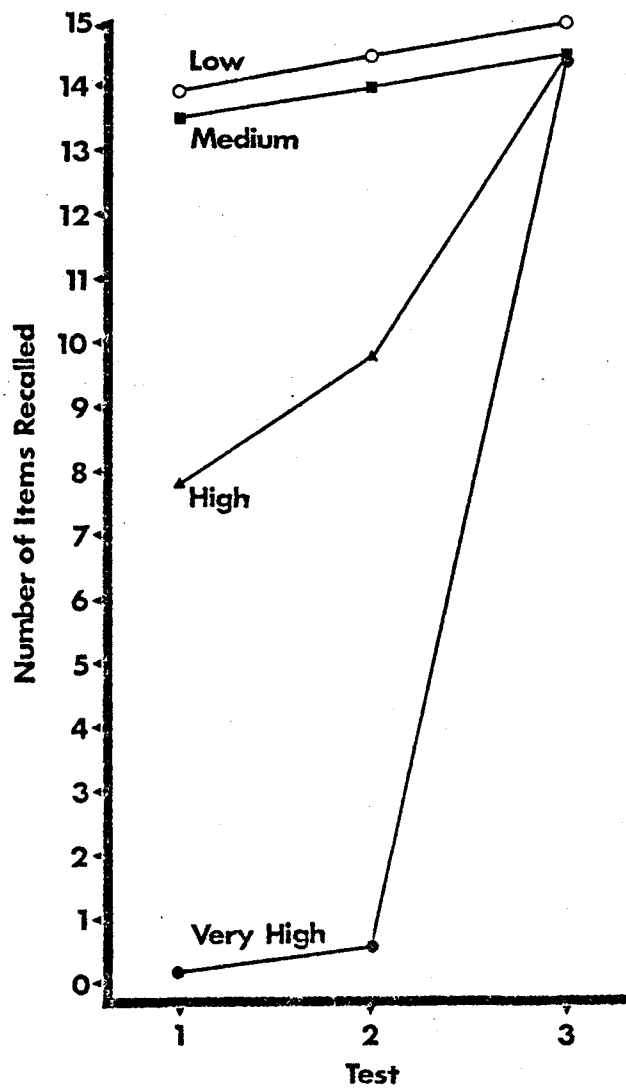


Figure 3

occurred on Test 2 was incomplete.

Similar findings have been obtained in a followup experiment, in which hypnotized subjects learned a list of items belonging to various categories, and then attempted to produce instances of the categories during suggested posthypnotic amnesia.

The procedures employed and the findings obtained in this experiment are, of course, similar in some respects to those found in the work of Tulving and his associates on encoding specificity in episodic memory. Contacting the target word in semantic memory by means of the free-association procedure did not necessarily lead the amnesic subject to recognize or reconstruct the critical learning episode. Note, however, that the effect is somewhat stronger than that typically observed by Tulving, and also that it does not appear to depend on any great discrepancy between the semantic context in which the items were encoded and that which was present at the point of recall. It is likely that the most common meanings of the individual items were represented in both cases, and that some other aspect of encoding context is of central importance in the phenomenon observed.

At present, the results appear to indicate that episodic memories can be dissociated from related representations in the "mental dictionary". When an amnesic subject forgets that s/he just learned the word "cat", s/he is not thereby prevented from giving that same word as a free associate when the experimenter probes with "dog".



Nor, if the person does so, is s/he necessarily reminded of the previous learning experience.

The observed asymmetry in the dissociation -- recognition failure of associable words, if you will -- appears to have several implications for our models of the organization of memory. First, the contextual features which are associated with an episodic memory range very far beyond the subtle shades of meaning studied by Tulving, and we should begin to explore them. Second, related schema in "semantic" memory are routinely activated during encoding of an "episodic" memory trace. The dissociation in memory which we have observed is very interesting, and we intend to explore it further with a special eye on its implications for a general theory of remembering and forgetting.

#### References

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