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Hypnosis and the Dissociation of Memory, with Special Reference to Posthypnotic Amnesia

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Abstract

The hypnotic effects on memory appear to involve both the monitoring and controlling functions of consciousness. Four such effects are briefly described: hypermnesia, age regression, agnosia, and amnesia. These are conceptualized in terms of the distinctions between declarative and procedural, and between episodic and semantic, knowledge. Recent research on posthypnotic amnesia is reviewed. The hypnotic effects on memory, viewed from Hilgard's neodissociation theory of divided consciousness, provide a somewhat different perspective on consciousness than that afforded by classical psychoanalysis or classical information-processing theory.

Hypnosis may be defined as a social interaction in which one person (designated the subject) responds to suggestions offered by another person (the hypnotist) for experiences which involve alterations in perception and memory. In the classic case, these experiences are accompanied by feelings of involuntariness bordering on compulsion, and subjective conviction bordering on delusion. Even the most highly responsive subjects, however, appear to retain some degree of veridical awareness and voluntary control, so that their behavior and experience represents a curious blending of illusion and reality -- what Orne (1959) has referred to as "trance logic". Like most active research topics in psychology, a wide variety of theoretical and empirical approaches have been applied to hypnosis (Hilgard, 1973; Sheehan & Perry, 1976; Spanos, 1970; Spanos & Barber, 1974; Tellegen, 1970), engendering considerable discussion concerning the meanings of concepts and empirical findings. A major controversy has ensued, for example, over whether hypnosis represents an "altered" or "special" state of consciousness (Hilgard, 1969; Ludwig, 1966).

Consciousness has to do with two things: monitoring ourselves and our environment, such that certain perceptual events and memories come to be accurately represented in phenomenal awareness; and controlling ourselves and our environment, such that we are able to voluntarily initiate and terminate behavioral and cognitive activities. When these conditions do not obtain -- when perception, memory, and thought are distorted, when some aspect of past or present experience cannot be brought into phenomenal

awareness, when we lose control over thought and action -- we may reasonably say that there has occurred some alteration in consciousness. Therefore, when hypnotized subjects see things that are not there, perceive themselves as unable to bend their outstretched arms, or fail to remember personal experiences that took place only a few moments before, to the extent that these overt behaviors are founded on subjectively convincing experience rather than behavioral compliance we may say that they are experiencing an altered state of consciousness. The task of this paper is to discuss some alterations in consciousness, observed during hypnosis, which appear to involve memory as opposed to perception, attention, or action. The framework for the discussion is provided by Hilgard's (1977) neodissociation theory of divided consciousness.

Hypnotic Effects on Memory

From the perspective of contemporary cognitive psychology, perception, attention, and memory are inextricably bound together into a unified system. For the sake of limiting the scope of this paper, we may restrict the domain of memory to that part of the cognitive system which deals with stored representations of knowledge (schemata). Furthermore, it is important to understand two distinctions commonly made within the memory system (Anderson, 1980; Hastie & Carlston, 1980; Tulving, 1972; Winograd, 1975). First is the distinction between two types of knowledge represented in the memory system: declarative knowledge, consisting of facts; and procedural knowledge, consisting of processes for manipulating (i.e., acquiring, storing, transforming, and retrieving) declarative knowledge. Within declarative knowledge, there is a further distinction: between episodic knowledge, concerning particular experiences located within a context of personal space and time; and semantic knowledge, where the facts lack this contextual coding. The hypnotic effects on memory seem to involve all three types of knowledge.

Hypnotic Hypermnesia

It is often claimed that subjects can remember experiences while hypnotized that they cannot remember in the normal waking state. This phenomenon -- which incidentally is being employed on a widespread basis by forensic investigators in the almost complete absence of evidence concerning the reliability of the memories so obtained -- appears to involve the recovery of previously inaccessible knowledge of the declarative sort. Occasional reports of individual cases leave little doubt that hypermnesia suggestions can yield an improvement in recall (Dorcus, 1960; Hull, 1933; Kroger & Douce, 1979; Milos, 1975; Raginsky, 1969), but they do not shed much light on the generality with which the technique may be applied to the population at large or on the mechanisms underlying its effectiveness. Some of the clinical reports are very dramatic, but their significance is typically weakened by the investigator's failure to attempt to verify the memories thus obtained, or inquire into the parameters of the phenomenon.

Laboratory studies of hypermnesia have a history extending back to the beginnings of the modern period of hypnosis research (Young, 1925, 1926; Hull, 1933), often finding no advantage of hypnosis over a waking test. Despite the rigor apparent in the design of these studies, they possess certain methodological drawbacks, particularly concerning the artificiality of the memory tasks used. Lists of nonsense syllables and the like do not correspond very well to the linguistic material and sequences of natural events that make up the bulk of what we must remember in the course of everyday living. In fact, several studies employing meaningful material have shown some hypermnesia effects (Dhanens & Lundy, 1975; Rosenthal, 1944; Stalnaker & Riddle, 1932; White, Fox, & Harris, 1940).

On the basis of the available evidence, then, it can be said that laboratory studies weakly support the conclusions drawn from clinical case reports and other uncontrolled studies if they employ critical material analogous to the kinds of memories sought, and found, in clinical situations. Even so, these memories may be seriously contaminated by inference, suggestive probing, and other errors of reconstructive memory (Orne, 1979; Putnam, 1979; Stalnaker & Riddle, 1932). For that reason, they should be used in forensic situations only with extreme caution (Orne, 1979). The fact that memories can sometimes be recovered through hypnosis that were not accessible otherwise provides prima facie evidence for a division in consciousness affecting the retrieval and reconstruction of episodic memories. In this case, the dissociation is one that is bridged by hypnotic procedures, although instances of the recovery of previously inaccessible memories may also be observed in the normal waking state (Ballard, 1913; Buxton, 1943; Erdelyi & Kleinbard, 1978).

Hypnotic Age Regression

In the phenomenon of hypnotic age regression a hypnotizable adult takes on a childlike demeanor and appears to relive an experience associated with some period in his or her past life. It has been suggested that such a subject forgets skills and knowledge that s/he possesses as an adult, and revives skills and knowledge available only during childhood. Here, perhaps, some procedural and declarative knowledge is lost, while other such knowledge is regained. A recent overview (Brenneman, 1978), indicates that the naive concept of hypnotic age-regression involves three characteristic features: ablation, the functional loss of all the person's knowledge, abilities, and memories acquired after the suggested age; reinstatement, a return to earlier and more childlike modes of cognitive and emotional functioning; and revivification, in which the person gains access to memories from childhood that cannot be recalled in the normal waking state. Research has been conducted which bears on all three of these elements.

It has been repeatedly demonstrated, for example, that the adult subject does not lose his or her knowledge and abilities during age regression (Orne, 1959; Perry & Walsh, 1978). Such evidence argues strongly against the occurrence of ablation of adult procedural knowledge and semantic memory during age-regression. Whether age-regression entails an amnesia for adult episodic knowledge is at this time an open question.

With respect to the reinstatement component, most of the literature has involved investigations of perceptual and cognitive functioning, in an attempt to confirm the subjects' experiential reports by determining whether their performance in some experimental situation is appropriately childlike (e.g., Parrish, Lundy, & Liebowitz, 1969; but see Perry & Chisolm, 1973). In the most extensive study in the literature, Reiff and Scheerer (1959) attempted to demonstrate a return to preoperational modes of thought in subjects regressed to age four. However, O'Connell, Shor, and Orne (1970) obtained similar patterns of performance in insusceptible subjects who were instructed to simulate hypnosis and age regression. Most recently, Nash, Johnson, and Tipton (1979) found that age-regressed subjects placed in a moderately frightening situation behaved in a manner appropriate to the suggested age, whereas simulating subjects did not. These are the only existing positive results from a comparative study of real and simulating subjects on a developmental task. Whether the regression performance is best construed as a reinstatement of childhood modes of functioning (i.e., procedural knowledge about how to respond when frightened) or a revivification of childhood memories (i.e., episodic knowledge of how one used to respond), or a fantasy constructed on the basis of the subject's implicit theory of developmental psychology (i.e., semantic knowledge of how frightened children tend to act), is a theoretical issue that can only be resolved by further research.

The revivification component of age regression is conceptually similar to the enhancement of memory seen in hypnotic hypermnesia. It seems likely that age regression is fantasy constructed on two bases: fragmentary memories of specific past experiences, and inferences drawn from more generalized knowledge structures -- that is, from both semantic and episodic memories. This account differs from reconstructive accounts of memory in general (e.g., Bartlett, 1932; Jenkins, 1974; Neisser, 1967, 1976) only in that the high levels of imaginative involvement characteristic of hypnosis (Hilgard, 1979; Sarbin & Coe, 1972) may lead imagination to dominate over fact, and the hypnotized adult to think of him- or herself as a child. Nevertheless, following notions of cue-dependent remembering and forgetting (e.g., Tulving, 1974), the reconstructed past, if vividly imagined, may provide additional contextual cues that permit access to other memories which are not ordinarily recallable (for analogous phenomena observed in the normal waking state, see Anderson & Pichert, 1978; Black & Bower, 1979; Black, Turner, & Bower, 1979; Bower, Black, & Turner, 1979; Owens, Bower, & Black, 1979; Pichert & Anderson, 1977).

Young (1926) was able to elicit a substantial number of early recollections in one of two hypnotizable subjects, whose accuracy was independently verified. Reiff and Scheerer (1959) obtained similar results, also verifying the memories, but O'Connell et al. (1970) found no difference in this respect between hypnotized and simulating subjects. Most recently, Hofling, Heyl, and Wright (1971) tested subjects' recall of personal experiences occurring on the day three weeks prior to the experimental session, and compared the resulting account with diary entries actually made on the day in question. Ratings made by a team of psycholinguists, blind to the condition of testing, indicated superior recall in hypnosis compared to the waking state. Unfortunately, these investigators failed to include a simulating control group.

The situation with hypnotic age-regression, then, is just as ambiguous as the one with hypnotic hypermnesia. Aside from the Nash et al. (1979) report, there is no evidence for the reinstatement of childhood modes of functioning (procedural knowledge). There are, however, tantalizing reports of the revivification of childhood memories (declarative knowledge). From a theoretical point of view, age-regression -- with its potential for providing extra contextual cues -- may prove the more successful of the two techniques for recovering otherwise inaccessible memories, although again the investigator, whether in the laboratory or the field, must constantly guard against suggestive probing and take care to obtain independent verification of the memories. If successful this would be another instance of the hypnotic bridging of a dissociative barrier affecting the memory system.

Hypnotic Agnosia

Changes in accessibility of declarative knowledge of the semantic kind have also been observed, at least informally. On one of the standardized procedures developed for laboratory use, suggestions of nominal aphasia for a familiar word like house or scissors frequently result in the subject's inability to understand the word or to use it in the naming of objects. Occasionally, such subjects are further unable to understand the meaning of a word like home, or to demonstrate the proper use of a pair of scissors (Hilgard, 1965, 1977). What is intended by the hypnotist to be a form of aphasia, then, often turns into a difficulty in accessing categorical knowledge about particular objects and events.

Evans (1972) has studied hypnotic agnosia in the form of a suggestion that the number "6" has disappeared from the subject's number system. When hypnotized subjects are subsequently confronted with arithmetic problems which contain the number "6" in the problem, solution, or intermediate step, their computation errors indicate that they have treated the digit as if it were not present or not meaningful; simulators, by contrast, make computation errors reflecting their attempt to operate on the digit in the most logical, mathematically acceptable way. The difference in performance of hypnotized and simulating subjects seems to reflect the operation of "trance logic" in hypnosis (Orne, 1959; Sheehan, 1977).

Posthypnotic Amnesia

Finally, in posthypnotic amnesia, people seem to be unable to remember the events and experiences which transpired while they were hypnotized (for reviews see Coe, 1978; Cooper, 1979; Hilgard, 1965, 1966, 1977; Kihlstrom, 1977, 1978b; Kihlstrom & Evans, 1979). Amnesic subjects have no difficulty in identifying objects involved in such experiences, and -- as with all the other phenomena described here -- the amnesia can be reversed by a prearranged cue, so that the phenomenon appears to be a fairly pure instance of temporarily inaccessible episodic memories.

Like the other three phenomena, amnesia appears to involve an alteration in consciousness, in the sense that the executive functions which monitor and control memory functions are disrupted. In all these

cases, the alteration in consciousness may be described as a dissociation (Hilgard, 1977). They all seem to involve the creation or bridging of some cognitive barrier, and corresponding changes in the accessibility of available procedural or declarative knowledge. In saying this, however, it should be clear that "dissociation", like "state", is a categorical label which has descriptive, not explanatory, value (Hilgard, 1969). The explanatory problem requires experimental work to clarify the nature of the dissociation, and to conceptualize it within a plausible model of the human cognitive system. Of the four phenomena described, only posthypnotic amnesia has been systematically investigated with paradigms familiar to memory researchers, and only amnesia has been conceptualized in terms of a general theory of human memory.

Dissociative Processes in Posthypnotic Amnesia

There is substantial agreement about the surface features of posthypnotic amnesia. Following the termination of hypnosis, many subjects find that they cannot remember the events and experiences which transpired while they were hypnotized. Later, after the hypnotist has administered a prearranged cue, these memories seem to flood back into awareness, and the subjects who showed such difficulty in remembering just a few moments before now remember the events of hypnosis vividly and clearly. A number of studies employing standardized hypnotic procedures have further documented the various features of posthypnotic amnesia. For example, amnesia does not occur unless it has been explicitly or implicitly suggested to the subject (Hilgard & Cooper, 1965). The extent of initial amnesia (Hilgard, 1965) and subsequent reversibility (Kihlstrom & Evans, 1976) are both greatest in those subjects of highest hypnotizability. While the affected memories are recoverable (Kihlstrom & Evans, 1976; Nace, Orne, & Hammer, 1974), some measure of residual amnesia may persist for a time in these subjects (Kihlstrom & Evans, 1977). Among subjects of more moderate hypnotizability, the partial effects of the amnesia suggestion may be observed in a relative deficit in initial recall accompanied by vague and fragmentary accounts of those experiences which are successfully remembered (Evans, Kihlstrom, & Orne, 1973; Kihlstrom & Evans, 1978), plus a further recovery of memory, and some residual amnesia, after the reversibility cue has been given (Kihlstrom & Evans, 1976, 1977). Those subjects who are experiencing a partial posthypnotic amnesia show a diminished tendency to favor the recall of successfully experienced suggestions, compared to their nonamnesic counterparts (Hilgard & Hommel, 1961; Pettinati & Evans, 1978).

In the normal waking state, posthypnotic amnesia has its parallel in the phenomenon of directed forgetting (Bjork, 1972; Epstein, 1972). In both cases a subject encodes some set of new information, and then receives an instruction to forget part or all of it. However, there are some important methodological differences between the phenomena. In directed forgetting the items are presented only once and retention is tested immediately, while in hypnotic amnesia the items are typically studied until they are well learned and retention may be tested after a considerable interval. Investigations of both hypnotic amnesia and

directed forgetting have been concerned with two types of effects: the retention of items covered by the cue to forget, and the influence of the ostensibly forgotten items on other items which are to be remembered. Subjects in both types of experiments appear to show a retention deficit; however, the available literature indicates that directed forgetting reduces retroactive inhibition effects while hypnotic amnesia does not. The methodological differences just outlined (see Kihlstrom, 1978a, for details) preclude systematic comparison of the outcomes of the two procedures. An important topic for future research is the direct comparison of hypnotic and waking instructions to forget, within the bounds of a common experimental paradigm.

There is substantial disagreement concerning how posthypnotic amnesia is to be explained. According to Coe (1978; Sarbin & Coe, 1972, 1979), many ostensibly amnesic subjects remember the critical material perfectly well, and simply keep it a secret, witholding their verbal reports in accordance with their perceptions of the experimenter's demands for self-disclosure; some of these may even deceive themselves into thinking that they are amnesic. Another, somewhat related formulation is that of Spanos and Radtke-Bodorik (1980), who hold that subjects respond positively to amnesia suggestions by distracting themselves from the target material, thus actively deploying their attention in such a way as to impair retrieval processes that would ordinarily be effective. Common sense suggests that subjects of both kinds may be found in hypnosis experiments, and indeed there is some experimental evidence supporting this view (e.g., Howard & Coe, 1980; Kihlstrom, Evans, Orne, & Orne, 1980; Schuyler & Coe, 1981; Spanos & D'Eon, 1980; Spanos, Stam, D'Eon, Pawlak, & Radtke-Bodorik, 1980). At the same time, however, these same experiments indicate that this is not all that is going on: self-distraction and other memory-impairing strategies are not always associated with amnesia, and changing contextual demands do not invariably alter the subject's performance on memory tests (Kihlstrom, 1978b; Kihlstrom et al., 1980). Those subjects who are not simply witholding memory reports or suppressing memories suggest that the amnesia response may also reflect an underlying dissociation of memory.

Awareness and Control

The dissociation which sometimes occurs during posthypnotic amnesia seems to involve both the monitoring and controlling aspects of consciousness. In the first place, there is a frank failure of memory, as indexed by the subject's inability to recall, or even to recognize, events which occurred or items which were learned while he or she was hypnotized (Kihlstrom, 1980; Kihlstrom & Shor, 1978; Williamsen, Johnson, & Eriksen, 1965). In the most dramatic display of this failure yet, McConkey, Sheehan and Cross (1980; see also McConkey & Sheehan, in press) have found that the amnesia may remain robust even when subjects are shown videotapes of themselves taken during the hypnotic session; subjects who are simulating hypnosis and amnesia behaved rather differently.

Even when amnesic subjects are able to successfully remember some of the critical material, a loss of control over the processes of retrieval and reconstruction is manifested in their failure to strategically organize

recall around normally salient structural features of the material (Evans & Kihlstrom, 1973; Kihlstrom & Evans, 1979; Spanos & Bodorik, 1977; Spanos & Radtke-Bodorik, 1980). In one set of studies, for example, partially amnesic subjects often failed to list those items which they could recall in their proper chronological sequence, even when they were specifically instructed to do so (Kihlstrom & Evans, 1979). Moreover, subjects who have successfully recalled a fragment of an experience may not be able to flesh it out, by adding other relevant features, into a full and complete representation of the event (Kihlstrom & Evans, 1978).

Interference and Utilization

Despite these difficulties with awareness and control, there is abundant evidence that these memories remain available and active within the cognitive system (for reviews see Kihlstrom, 1977, 1978a&b; Kihlstrom & Evans, 1979). For example, relearning of a skill whose acquisition is covered by posthypnotic amnesia takes place more rapidly than if that skill had never been acquired at all (Hull, 1933); retroactive inhibition is not eliminated by a suggestion for amnesia covering the interpolated list in the ABA paradigm (Graham & Patton, 1968); and subjects whose learning of a list of familiar words has been covered by amnesia employ those words as free associates more readily than carefully matched control words which had not been learned (Kihlstrom, 1980; Williamsen et al., 1965).

A good example of the paradox of posthypnotic amnesia -- that the amnesic subject knows but does not know, remembers but does not remember -- comes from a recent study (Kihlstrom, 1980). In Experiment 2, hypnotizable and insusceptible subjects received an induction of hypnosis, and then were required to master a list of 16 words -- four words from each of four taxonomic categories -- to a criterion of two perfect repetitions. Following this, they were given a suggestion to forget that they had learned the words, and hypnosis was terminated. On an initial test of response to the suggestion, the insusceptible subjects, as expected, had no difficulty recalling the words, while the hypnotizable subjects showed a dense posthypnotic amnesia.

In the next phase of the experiment, the subjects were asked to generate instances of eight taxonomic categories -- the four represented on the previously memorized wordlist, and four controls. For each category represented in the critical list learned by the subject, there was a control category of equivalent size and item-accessibility, and for each target item selected from the critical category, there was a target item from the control category with the same relative response frequency. The critical targets had been learned by all subjects during hypnosis. The insusceptible and hypnotizable subjects gave the same number of target items to critical category probes, and with the same response latency, so that the amnesia covering the memorized list, an episodic memory, did not affect the vocabulary, or semantic memory, of the hypnotizable subjects. As would be expected, the insusceptible subjects produced more critical targets, and with faster response latencies, compared to control targets. This difference reflects the priming which mental representations of target items, and their associations, received by virtue of their inclusion in the prior list-learning task. Interestingly, the amnesic subjects showed the

same sort of priming effect, so that critical targets were easier to produce despite the fact that the hypnotizable subjects could not remember what they had learned. The success of the category-instances task in eliciting the critical targets provided the amnesic subjects with an opportunity to be reminded of those words which they had learned while hypnotized, but could not now remember. However, there was virtually no recognition of the relevance of the critical category instances, as indicated by the failure of the hypnotizable subjects to show any improvement in recall until the amnesia suggestion was cancelled by the prearranged cue.

Evidence that the material covered by the amnesia suggestion continues to influence ongoing thought and action -- like other instances where a task ostensibly being performed outside of awareness interacts with the performance of a simultaneous task -- has long been taken as discrediting the concept of dissociation (White & Shevach, 1942). The argument is that since the ostensibly dissociated tasks or memories continue to interact with other cognitive and behavioral processes, there is no sense in which they have been split off, isolated from the rest of the system. Hilgard (1977) has persuasively argued, however, that non-interaction is a later importation and not an essential property of the original concept of dissociation. Only lack of awareness is essential; the matter of interference is an empirical question. Moreover, the insistence of both early and late theorists on non-interference between dissociated mental activities seems to stem from a misunderstanding of James' (1890) metaphor of the stream of consciousness. Following the metaphor, it is held that two streams of water, running parallel but separated by tall banks, should not affect each other. However, if the two streams orignate from the same source, each will certainly draw some of the flow from the other. Given a model of attention such as Kahneman's (1973), in which a single source of attentional capacity may be deployed in multiple directions, James' metaphor would certainly lead one to predict some degree of mutual interference between simultaneous, though dissociated, tasks.

In the experiment just described (Kihlstrom, 1980), there is some provisional evidence for such a lack of awareness despite the interference represented by the priming effect. Recall that the subjects had no trouble producing critical targets -- those that appeared on their memorized lists -- when presented with appropriate category labels as cues. In general the insusceptible-nonamnesic and hypnotizable-amnesic subjects were alike in their performance on this part of the experiment, but there was one striking difference between the groups. After the nonamnesic subjects produced their first critical target from a critical category, the others followed in rapid succession; the amnesic subjects, by contrast, did not cluster critical targets together in their output. It seems as if the nonamnesic subjects recognized the connection between the category instances and the list they had learned, and strategically employed their memory of the wordlist to help them generate responses; the amnesic subjects, simply, did not do this. To say that they could not do so will require further studies of the extent to which amnesic subjects can deliberately utilize memories covered by the amnesia suggestion.

Alas, it is too early to begin to incorporate these findings into a model of dissociated memory which makes any very specific theoretical commitments. However, the phenomena of dissociated memory -- whether it is posthypnotic amnesia, fugue, the mutual amnesias of multiple personality, or anomalies of everyday memory such as deja vu or cryptomnesia all seem to involve fairly central questions concerning constructs such as metamemory, working memory, and the nature of the contextual features that differentiate episodic from semantic knowledge. For the most part, most of us would prefer to view amnesia and other hypnotic phenomena through the familiar lenses of contemporary cognitive theory -- in some sense representing a sort of exercise in applying theory to problems in the real world. There is at least one important theoretical contribution that the study of dissociative phenomena in hypnosis and elsewhere can provide, however, by giving us a somewhat different perspective on the nature and function of consciousness.

The concept of consciousness has had a checkered past in the history of psychology. It was almost the whole of the field for James, and only slightly less important for Freud, and declined to virtual nonentity status with the onslaught of the behaviorist movement. Interest in the topic persisted in the hands of the psychoanalysts, and was revived within mainstream psychology with the cognitive revolution and its emphasis on the problem of attention. Both these traditions have made important contributions to the study of consciousness, but neither explicitly makes a place for what we see in hypnosis and other dissociations: that declarative knowledge, available to subjects and perhaps even utilized by them, cannot be deliberately brought into phenomenal awareness.

The phenomena of dissociation give a rather different picture of the unconscious than that provided by either classical psychoanalysis or classical information-processing theory. Psychoanalysis views the unconscious as consisting of primitive sexual and aggressive impulses, and associated ideas and memories; these are repressed, pushed out of consciousness, as a defense against anxiety. Neodissociation theory, by contrast, holds that the unconscious can be rational and even creative; it is not that unconscious contents are suppressed, but rather that they cannot be brought into awareness except under special conditions; and this division in consciousness need not be motivated by the desire to avoid conflict. Classical information-processing theory, for its part, often equates consciousness with attention (we are aware of what we pay attention to, and unconscious of the rest), so that the unconscious boils down to a repository for unattended inputs or the incidental byproducts of simple, automatic operations occurring quite early in the information-processing sequence. Alternatively, some theorists assert that it is procedural knowledge, not declarative knowledge, that is unconscious (Nisbett & Wilson, 1977). But the phenomena of dissociation suggest that we can attend to mental contents without bringing them into phenomenal awareness; and that quite complex mental processes can proceed outside of awareness; and that declarative as well as procedural knowledge can be isolated from awareness.

References

Anderson, J.R. (1980) Cognitive psychology and its implications. San Francisco: W.H. Freeman.

Anderson, R.C. & Pichert, J.W. (1978) Recall of previously unrecallable information following a shift in perspective. Journal of Verbal Learning and Verbal Behavior, 17, 1-12.

Ballard, P.B. (1913) Oblivescence and reminiscence. British Journal of Psychology Monograph Supplements, 1, Whole No. 2.

Bartlett, F.C. (1932) Remembering: A study in experimental and social psychology. Cambridge: Cambridge University Press.

Bjork, R.A. (1972) Theoretical implications of directed forgetting. In A.W. Melton & E. Martin (Eds.), Coding processes in human memory. Washington, D.C.: V.H. Winston.

Black, J.B. & Bower, G.H. (1979) Episodes as chunks in narrative memory. Journal of Verbal Learning and Verbal Behavior, 18, 309-318.

Black, J.B., Turner, T.J., & Bower, G.H. (1979) Point of view in narrative comprehension, memory, and production. Journal of Verbal Learning and Verbal Behavior, 18, 187-198.

Bower, G.H., Black, J.B. & Turner, T.J. (1979) Scripts in memory for text. Cognitive Psychology, 11, 177-220.

Brenneman, H.A. (1978) Peer descriptions during hypnotic age regression. Paper presented at the 30th annual meeting of the Society for Clinical and Experimental Hypnosis, Ashville, North Carolina.

Buxton, C.E. (1943) The status of research in reminiscence. Psychological Bulletin, 40, 313-340.

Coe, W.C. (1978) The credibility of posthypnotic amnesia: A contextualist's view. International Journal of Clinical and Experimental Hypnosis, 26, 218-245.

Cooper, L.M. (1979) Hypnotic amnesia. In E. Fromm & R.E. Shor (Eds.), Hypnosis: Developments in research and new perspectives. New York: Aldine.

Dhanens, T.P., & Lundy, R.M. (1975) Hypnotic and waking suggestions and recall. International Journal of Clinical and Experimental Hypnosis, 23, 68-79.

Dorcus, R.M. (1960) Recall under hypnosis of amnestic events. International Journal of Clinical and Experimental Hypnosis, 8, 57-61.

Epstein, W. (1972) Mechanisms of directed forgetting. In G.H. Bower (Ed.), The psychology of learning and motivation. Vol. 6. New York: Academic Press.

Erdelyi, M.H., & Kleinbard, J. (1978) Has Ebbinghaus decayed with time?: The growth of recall (hypermnesia) over days. Journal of Experimantal Psychology: Human Learning and Memory, 4, 275-289.

Evans, F.J. (1972) Posthypnotic amnesia and the temporary disruption of retrieval processes. Paper presented at the 80th annual meeting of the American Psychological Association, Honolulu.

Evans, F.J., & Kihlstrom, J.F. (1973) Posthypnotic amnesia as disrupted retrieval. Journal of Abnormal Psychology, 82, 317-323.

Evans, F.J., Kihlstrom, J.F., & Orne, E.C. (1973) Quantifying subjective reports during posthypnotic amnesia. Proceedings of the 81st Annual Convention of the American Psychological Association, 8, 1077-1078.

Graham, K.R. & Patton, A. (1968) Retroactive inhibition, hypnosis, and hypnotic amnesia. International Journal of Clinical and Experimental Hypnosis, 16, 68-74.

Hastie, R., & Carlston, D. (1980) Theoretical issues in person memory. In R. Hastie, T.M. Ostrom, E.B. Ebbesen, R.S. Wyer, D.L. Hamilton, & D. E. Carlston (Eds.), Person memory: The cognitive basis of social perception. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Hilgard, E.R. (1965) Hypnotic susceptibility. New York: Harcourt, Brace, & World.

Hilgard, E.R. (1966) Posthypnotic amnesia: Experiments and theory. International Journal of Clinical and Experimental Hypnosis, 14, 104-111.

Hilgard, E.R. (1969) Altered states of awareness. Journal of Nervous and Mental Disease, 149, 68-79.

Hilgard, E.R. (1973) The domain of hypnosis: With some comments on alternative paradigms. American Psychologist, 28, 972-982.

Hilgard, E.R. (1977) Divided consciousness: Multiple controls in human thought and action. New York: Wiley-Interscience.

Hilgard, E.R., & Cooper, L.M. (1965) Spontaneous and suggested posthypnotic amnesia. International Journal of Clinical and Experimental Hypnosis, 13, 261-273.

Hilgard, E.R., & Hommel, L.S. (1961) Selective amnesia for events within hypnosis in relation to repression. Journal of Personality, 29, 205-216.

Hilgard, J.R. (1979) Personality and hypnosis: A study in imaginative involvement. 2nd Ed. Chicago: University of Chicago Press.

Hofling, C.K., Heyl, B., & Wright, D. (1971) The ratio of total recoverable memories to conscious memories in normal subjects. Comprehensive Psychiatry, 12, 371-379.

Howard, M.L., & Coe, W.C. (1980) The effect of contextual factors on posthypnotic amnesia. Journal of Personality, 48, 342-359.

Hull, C.L. (1933) Hypnosis and suggestibility: An experimental approach. New York: Appleton-Century-Crofts.

James, W. (1890) Principles of psychology. New York: Holt.

Jenkins, J.J. (1974) Remember that old theory of memory? Well, forget it! American Psychologist, 29, 785-795.

Kahneman, D. (1973) Attention and effort. Englewood Cliffs, N.J.: Prentice-Hall.

Kihlstrom, J.F. (1977) Models of posthypnotic amnesia. In W.E. Edmonston (Ed.), Conceptual and investigative approaches to hypnosis and hypnotic phenomena. Annals of the New York Academy of Sciences, 296, 284-301.

Kihlstrom, J.F. Instructed forgetting: Hypnotic and nonhypnotic. Paper presented at the 86th annual meeting of the American Psychological Association, Toronto.

Kihlstrom, J.F. (1978b) Context and cognition in posthypnotic amnesia. International Journal of Clinical and Experimental Hypnosis, 26, 246-257.

Kihlstrom, J.F. (1980) Posthypnotic amnesia for recently learned material: Interactions with "episodic" and "semantic" memory. Cognitive Psychology, 12, 227-251.

Kihlstrom, J.F., & Evans, F.J. (1976) Recovery of memory after posthypnotic amnesia. Journal of Abnormal Psychology, 85, 564-569.

Kihlstrom, J.F., & Evans, F.J. (1977) Residual effect of suggestions for posthypnotic amnesia: A reexamination. Journal of Abnormal Psychology, 86, 327-333.

Kihlstrom, J.F., & Evans, F.J. (1978) Generic recall during posthypnotic amnesia. Bulletin of the Psychonomic Society, 12, 57-60.

Kihlstrom, J.F., & Evans, F.J. (1979) Memory retrieval processes in posthypnotic amnesia. In J.F. Kihlstrom & F.J. Evans (Eds.), Functional disorders of memory. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Kihlstrom, J.F., Evans, F.J., Orne, E.C., & Orne, M.T. (1980) Attempting to breach posthypnotic amnesia. Journal of Abnormal Psychology, 89, 603-616.

Kihlstrom, J.F., & Shor, R.E. (1978) Recall and recognition during posthypnotic amnesia. International Journal of Clinical and Experimental Hypnosis, 26, 330-349.

Kroger, W.S. & Douce, R.G. (1979) Hypnosis in criminal investigation. International Journal of Clinical and Experimental Hypnosis, 27, 358-374.

Ludwig, A.M. (1966) Altered states of awareness. Archives of General Psychiatry, 15, 225-234.

McConkey, K.M., & Sheehan, P.W. (In Press) The impact of videotape playback of hypnotic events on posthypnotic amnesia. Journal of Abnormal Psychology.

McConkey, K.M., Sheehan, P.W., & Cross, D.G. (1980) Posthypnotic amnesia: Seeing is not remembering. British Journal of Social and Clinical Psychology, 19, 99-107.

Milos, R. (1975) Hypnotic exploration of amnesia after cerebral injuries. International Journal of Clinical and Experimental Hypnosis, 23, 103-110.

Nace, E.P., Orne, M.T., & Hammer, A.G. (1974) Posthypnotic amnesia as an active psychic process: The reversibility of amnesia. Archives of General Psychiatry, 31, 257-260.

Nash, W.R., Johnson, L.S., & Tipton, R.D. (1979) Hypnotic age regression and the occurrence of transitional object relations. Journal of Abnormal Psychology, 88, 574-555.

Neisser, U. Cognitive psychology. New York: Appleton-Century-Crofts.

Neisser, U. (1976) Cognition and reality: Principles and implications of cognitive psychology. San Francisco: W.H. Freeman.

Nisbett, R.E., & Wilson, T.D. (1977) Telling more than we know: Verbal reports on mental processes. Psychological Review, 84, 231-259.

O'Connell, D.N., Shor, R.E., & Orne, M.T. (1970) Hypnotic age regression: An experimental study. Journal of Abnormal Psychology Monograph, 76, 1-32.

Orne, M.T. The mechanisms of hypnotic age regression: An experimental study. Journal of Abnormal and Social Psychology, 46, 213-225.

Orne, M.T. (1959) The nature of hypnosis: Artifact and essence. Journal of Abnormal and Social Psychology, 58, 277-299.

Orne, M.T. (1979) The use and misuse of hypnosis in court. International Journal of Clinical and Experimental Hypnosis, 27, 311-341.

Owens, J., Bower, G.H., & Black, J. (1979) The "soap opera" effect in story recall. Memory and Cognition, 7, 185-191.

Parrish, M., Lundy, R.M., & Liebowitz, H.W. (1969) Effect of hypnotic age regression on the magnitude of the Ponzo and Poggendorff illusions. Journal of Abnormal Psychology, 74, 693-698.

Perry, C., & Chisolm, W. (1973) Hypnotic age regression and the Ponzo and Poggendorff illusions. International Journal of Clinical and Experimental Hypnosis, 21, 192-204.

Perry, C. & Walsh, B. (1978) Inconsistencies and anomalies of response as a defining characteristic of hypnosis. Journal of Abnormal Psychology, 87, 574-577.

Pettinati, H.M., & Evans, F.J. (1978) Posthypnotic amnesia: Evaluation of selective recall of successful experiences. International Journal of Clinical and Experimental Hypnosis, 26, 317-329.

Pichert, J.W., & Anderson, R.C. (1977) Taking different perspectives on a story. Journal of Educational Psychology, 69, 309-315.

Putnam, W.H. (1979) Hypnosis and distortions in eyewitness memory. International Journal of Clinical and Experimental Hypnosis, 27, 437-448.

Raginsky, B.B. (1969) Hypnotic recall of aircrash cause. International Journal of Clinical and Experimental Hypnosis, 17, 1-19.

Reiff, R., & Scheerer, M. (1959) Memory and hypnotic age regression: Developmental aspects of cognitive functioning explored through hypnosis. New York: International Universities Press.

Rosenthal, B.G. (1944) Hypnotic recall of material learned under anxiety- and non-anxiety-producing conditions. Journal of Experimental Psychology, 34, 369-389.

Sarbin, T.R. & Coe, W.C. (1972) Hypnosis: A social psychological analysis of influence communication. New York: Holt, Rinehart, & Winston.

Sarbin, T.R., & Coe, W.C. (1979) Hypnosis and psychopathology: Replacing old myths with fresh metaphors. Journal of Abnormal Psychology, 88, 506-526.

Schuyler, B.A. & Coe, W.C. (1981) A physiological investigation of volitional and nonvolitional experiences during posthypnotic amnesia. Journal of Personality and Social Psychology, 40, 1160-1169.

Sheehan, P.W. (1977) Incongruity in trance behavior: A defining property of hypnosis? In W.E. Edmonston (Ed.), Conceptual and investigative approaches to hypnosis and hypnotic phenomena. Annals of the New York Academy of Sciences, 296, 194-207.

Sheehan, P.W., & Perry, C.W. (1976) Methodologies of hypnosis: A critical appraisal of contemporary paradigms of hypnosis. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Spanos, N.P. (1970) Barber's reconceptualization of hypnosis: An evaluation of criticisms. Journal of Experimental Research in Personality, 4, 241-258.

Spanos, N.P., & Barber, T.X. (1974) Toward a convergence in hypnosis research. American Psychologist, 29, 500-511.

Spanos, N.P., & Bodorik, H.L. (1977) Suggested amnesia and disorganized recall in hypnotic and task-motivated subjects. Journal of Abnormal Psychology, 86, 295-305.

Spanos, N.P., & D'Eon, J.L. (1980) Hypnotic amnesia, disorganized recall, and inattention. Journal of Abnormal Psychology, 89, 744-750.

Spanos, N.P., & Radtke-Bodorik, H.L. (1980) Integrating hypnotic phenomena with cognitive psychology: An illustration using suggested amnesia. Bulletin of the British Society for Experimental and Clinical Hypnosis, 1(3), 4-7.

Spanos, N.P., Stam, H.J., D'Eon, J.L., Pawlak, A.E., & Radtke-Bodorik, H.L. (1980) Effects of social-psychological variables on hypnotic amnesia. Journal of Personality and Social Psychology, 39, 737-750.

Stalnaker, J.M., & Riddle, E.E. (1932) The effect of hypnosis on long-delayed recall. Journal of General Psychology, 6, 429-440.

Tellegen, A. (1970) Some comments on Barber's "reconceptualization" of hypnosis. Journal of Experimental Research in Personality, 4, 259-267.

Tulving, E. (1972) Episodic and semantic memory. In E. Tulving & W. Donaldson (Eds.), Organization of memory. New York: Academic Press.

Tulving, E. (1974) Cue-dependent forgetting. American Scientist, 62, 74-82.

White, R.W., Fox, G.F., & Harris, W.W. (1940) Hypnotic hypermnesia for recently learned material. Journal of Abnormal and Social Psychology, 35, 89-103.

White, R.W., & Shevach, B.J. (1942) Hypnosis and the concept of dissociation. Journal of Abnormal and Social Psychology, 37, 309-328.

Williamsen, J.A., Johnson, H.J., & Eriksen, C.W. (1965) Some characteristics of posthypnotic amnesia. Journal of Abnormal Psychology, 70, 123-131.

Winograd, T. (1975) Frame representations and the procedural-declarative controversy. In D. Bobrow & D. Collins (Eds.), Representation and understanding: Studies in cognitive science. New York: Academic Press.

Young, P.C. (1925) An experimental study of mental and physical functions in the normal and hypnotic states. American Journal of Psychology, 36, 214-232.

Young, P.C. (1926) An experimental study of mental and physical functions in the normal and hypnotic states: Additional results. American Journal of Psychology, 37, 345-356.

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