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The influence of hypnosis on the recall of cognitively dissonant material

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THE INFLUENCE OF HYPNOSIS ON THE RECALL OF COGNITIVELY DISSONANT MATERIAL

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CHAPTER I

INTRODUCTION

Hypnotic phenomena have long fascinated and puzzled observers. The two most remarkable aspects of hypnotism have been the involuntary character of the hypnotized person's behavior, and the extraordinary manifestations of such behavior.

As for the first aspect, observers have been struck by the way the hypnotized person follows the instructions, or the suggestions, of the hypnotist. The response is not necessarily reflexive; it rather appears to be a reaction to an irresistible force. This is most noticeable in post-hypnotic compliance with suggestions given during the trance. The hypnotized person reports that he experiences the most insistent urge to perform a certain act which is frequently irrelevant to the waking circumstances. The somewhat awesome feature of the post-hypnotic behavior is that the hypnotized person is unaware of the origin of the urge, and he will often attempt to rationalize his act. This feature has given rise to an unresolved controversy

over the question whether a hypnotized person can be forced to commit anti-social acts without felonious intent. The hypnotized person's rationalizing of an implanted urge first alerted Freud to the importance of unconscious motivation.

As for the strange phenomena produced by the hypnotized person, it has been stated that a person in trance can exceed the usual limits of his performance. For example, he can keep his hand in a rigid position much longer than would be possible in his normal state; he can show remarkable insensitivity to pain, and he can recall recent and remote events which are not available to him when he is awake.

Perhaps the claim for better memory, or hypermnesia, has most contributed to the trend to use hypnosis in some cases of psychotherapy, mainly to facilitate the evocation of repressed events.

In recent years some doubt has been cast on the validity of both the involuntary nature of hypnotic phenomena and their extraordinary characteristics. Writers like White (1941) and Sarbin (1950) have stated that since subjects are motivated to comply with the wishes of the hypnotist, the behavior produced is not involuntary. Empirical studies, based on such a theoretical stand, for

example, Orne (1959) and Rosenberg (1960), have shown that with proper motivation subjects who are not susceptible to hypnosis are able to produce most of the hypnotic phenomena. However, a notable exception has been reported by Orne: the hypnotized persons show readiness to accept perceptual inconsistencies without an attempt to resolve them by any rationalization. The unsusceptible subjects, on the other hand, show marked uneasiness and report difficulty in handling such inconsistencies.

The present study aims to explore further the behavior of hypnotized persons exposed to inconsistencies. The investigation is concerned with the reaction of hypnotized subjects to cognitive rather than perceptual inconsistencies, and is centered on the recall activity of such subjects when they are presented with verbal material arranged in a manner which is inconsistent with their previous syntactical knowledge.

CHAPTER II

BACKGROUND OF THE PROBLEM

Three areas of study bear on the present research: (1) the hypnotic state, (2) cognitive dissonance, and (3) retention.

1. The Hypnotic State

A person is deemed to be in the hypnotic state when he can produce, in response to suggestions of the hypnotist at least some of several phenomena. The following are the most often quoted hypnotic phenomena: sensory desensitization--anesthesia and analgesia; motor rigidity, such as arm catalepsy and eyelid rigidity; positive hallucinations, such as hearing the buzz of an imaginary fly, and negative hallucinations, not seeing a present object; memory hyperfunctioning, the ability to regress to an earlier age, to recall remote events, and to follow post-hypnotic suggestions; and memory hypofunctioning, such as amnesia for events occurring in the hypnotic state.

Since it has been found that subjects who are unsusceptible to hypnosis have been able to produce most of the hypnotic phenomena, the authenticity of such behavior can no longer be assumed without further inquiry. Usually the subject's assertion that he has not simulated and that he really experienced his behavior as involuntary is taken as evidence that the phenomena produced are truly hypnotic. Sometimes the subject has been requested to sign a statement to the effect that he is not simulating (Pattie, 1935).

Besides the eliciting and the categorizing of hypnotic phenomena, various attempts have been made to account for the different aspects of these behaviors. One may group these explanatory attempts under two broad categories: (A) motivational explanations, and (B) cognitive explanations. Several writers have dealt with both explanatory concepts.

A. Motivational Explanations

Common to such positions is the postulation of a need to follow the instructions of the hypnotist.

White (1941) defines hypnotic behavior as "meaningful, goal-directed striving, its most general goal being to behave like a hypnotized person, as this is continuously

defined by the operator and understood by the subject." (p. 503).

The contribution of this view is that it suggests that the subject is not a passive tool in the hands of the operator, but a motivated participant. The shortcoming of such a conception seems to be that it does not fully indicate what makes the subject strive to behave like a hypnotized person. It is suggested that the subject's "regnant motive is submission to the operator's demands . . ." (p. 503), but the reasons for submission are not dealt with.

This problem is taken into prominent consideration in the psychoanalytic formulations about hypnosis.

Freud (1905) believed that "the essence of hypnosis lies in an unconscious fixation of the subject's libido to the figure of the hypnotist through the medium of the masochistic components of the sexual instinct." (p. 150).

Ferenczi (1909) perceived the hypnotic relationship as a reactivation of the Oedipus Complex. He made a distinction between "maternal" and "paternal" forms of hypnosis. "Maternal" hypnosis is an evocation of love ties, while "paternal" hypnosis is based on fear.

Freud (1922) compared hypnosis with being in love, but to the exclusion of sexual satisfaction. He noted

another aspect of hypnosis as the hypnotist awaking "the idea of a paramount and dangerous person, towards whom only a passive-masochistic attitude is possible and to whom one's will has to be surrendered." (p. 127).

Schilder and Kauders (1927) added an emphasis on the role of identification with the hypnotist. The subject "projects his desire on the hypnotist and subsequently, by identification, attains magic powers which he would not otherwise be permitted to ascribe to himself." (p. 94).

Kubie and Margolin (1944) tend to minimize in their conclusions the importance of transference in hypnosis. They state:

> In the hypnotic process, mechanisms are at work identical with those seen in the dream (such as transference, displacement, condensation, etc.) Much has been made of these in the literature, but they are not the essence either of the process or of the state itself. (p. 621).

However, they describe certain changes that occur in the subject that appear to have "transference" qualities. So they draw a parallel between the induction phase and the earliest phase of infancy, "during which the parents play in the psychology of the infant a role almost identical to the hypnotist in the mental life of the subject . . ." (p. 620). Further on they say:

> The final phase in the hypnotic process . . . parallels precisely that phase in the development of the infant's Ego in which its boundaries gradually expand . . . The incorporated image of the hypnotist plays the same role in the hypnotic subject as does the incorporated and unconscious image of the parental figure in the child or adult. (p. 621).

Gill and Brenman (1959) consider the inter-personal relationship to be of major importance in hypnosis. However, they make a distinction between transference underlying the hypnotic state and transference in therapy:

> We are suggesting that the ongoing and developing transference is fluid and shifting, specifically related to the interaction between patient and therapost, while the hypnotic state may be more like a fixed structure, without specificity to the therapist and the therapeutic situation. (p. 137).

They perceive the transference relationship in hypnosis as taking place between the hypnotist and a regressed part of the ego, a subsystem with specific qualities resulting from the regressive trend. This point will be elaborated below when the cognitive aspects of hypnosis are dealt with.

B. Cognitive Explanations

Most writers who focus on cognitive explanations propose that at least a partial suspension of some cognitive functions takes place in the hypnotic state.

The lethargic behavior of many hypnotized persons led early to the notion that hypnosis was a form of sleep. In 1784 the Marquis de Puységur (see Pattie, 1956) coined the term "somnambulistic sleep" to describe the hypnotic state. Braid's term "neurohypnotism" was derived from the same conception, although he changed his mind later (Bramwell, 1930). A neurological basis for such a conception was provided by Pavlov (1923). He extrapolated to the hypnotic state in man from the behavior of dogs subjected to repetitive presentation of conditioned stimuli. He proposed that part of the brain most directly affected by the conditioned stimulus became the center of an inhibitory process which radiated to other parts of the brain. The stages of inhibition prior to sleep were called hypnosis, which was conceived of as partial sleep. "Inhibition is partial sleep or sleep distributed in localized parts, forced into narrow limits . . ." (p. 607).

The controversy over the relation between hypnosis and sleep has not yet been settled (see, for example, Gill and Brenman, 1959). However, the idea of "sleep distributed in localized parts," divorced from neurological locus, points to the suspension of certain functions of the waking state, including cognition.

Hull (1933) proposed that in the hypnotic state the symbolic functions of the hypnotized person are withdrawn, or suspended, and the suggestions of the hypnotist replace such functions in the subject's ideomotor continuum. In other words, the ideas of the hypnotist activate the muscles of the subject as conditioned stimuli, instead of the subject's own ideas. Here, again, the core of the explanation is that cognitive functions of the hypnotized person are being suspended during the trance.

The dissociation theory, as expounded by Janet (1920) and McDougall (1926), appears to consist of two parts. One component is in psychological terms and the other is a neurological interpretation. The following quotation from McDougall may serve to illustrate the two components:

> The patient will fail to achieve a forbidden movement . . . because, when he tries to make a movement and succeeds in innervating the proper muscles, the antagonistic muscles come into play and prevent the movement. At this stage, then, there is manifested a certain splitting of the personality, a conflict of one part against the other: the muscles of one set obey the conscious willing subject; the antagonistic muscles obey some other part of the personality, which understands and is subservient to the comments and suggestions of the operator. (p. 87).

The neurological explanation has been criticized by White and Shevach (1942). Their major point is that while

there may be neurological sense in total suspension of one function, for example, hearing, there cannot be a neurological basis for selective dysfunctioning, for example, hearing only the hypnotist's words and being deaf to all other sounds.

The psychological component of the dissociation theory has not been dealt with by these critics. This component implies that there is some functional splitting of the personality, one part of which is the conscious subject, and the other, that which obeys the hypnotist. Such possible restructuring of the personality, although in different terms, will be encountered later in this section in connection with Gill and Brenman's approach to hypnotism. It may be pointed out here that an important part of such reorganization involves cognitive elements.

The three writers whose opinions are discussed next differ somewhat from those who preceded and those who will follow in that they focus more on the intensification of some cognitive functions rather than on the suspension of some other functions.

Sarbin (1950) views hypnosis as one form of role-taking. According to Sarbin, role-taking, whether in acting, in hypnosis, in hysterias or in states of ecstasy, involves an aptitude for losing oneself in the role and

becoming relatively unaware of the environment. It appears that the relative unawareness is not a result of the hypnotist's manipulations, but of concentrating on the self and on the role to be enacted.

Arnold (1946) proposes that the effects of hypnosis are due to imagination. The subject tries to imagine vividly the situation described by the hypnotist and to imagine himself in it.

Barber (1960) regards the "hypnotic aptitude" as one of the necessary conditions for hypnotic behavior. This aptitude, active not only in the hypnotic trance, is defined as the ability to become and remain selectively attentive and responsive to certain stimuli.

In a sense, the three writers state that the hypnotic behavior is task-oriented, and they postulate certain abilities: concentration, selective attention, and imagination, to account for the performance of good hypnotic subjects. They do not attempt to deal with other possible cognitive changes that may occur in the hypnotic state.

A more systematic effort in this direction is made by Gill and Brenman (1959) within the framework of psychoanalytic theory of hypnosis. Their discussion offers an overall view of changes that occur in hypnosis, but the

present exposition of their views will be focussed on the cognitive aspects.

The authors propose that in hypnosis there exists an "intra-ego" structure, a subsystem that selectively represents the total personality. This subsystem is the part which regresses during hypnosis, while the overall ego appears to remain intact. The regressive changes in the subsystem involve:

> (1) shift to more primitive defensive mechanisms; (2) greater preponderance of discharge by affect processes as against intellectual processes; (3) movement from action to less adaptive discharge patterns; (4) movement toward dedifferentiation. (p. 207).

In more general terms, the authors say that "the dynamics of a regressed mental state show a movement toward primary process functioning and away from secondary process functioning." (p. 206).

Gill and Brenman state:

> The dynamic relationship between the over-all ego and the intra-ego subsystem may be one of conflict or cooperation. If the conflict is of any severity, the over-all ego re-establishes its hegemony and the hypnosis is interrupted. If the relationship is one of cooperation, the hypnosis persists and the over-all ego may progressively "lend" its functions to the subsystem for automatized functioning under the aegis of the subsystem. (pp. 207-208). (Italics not in original).

It appears that during hypnosis there is a certain relinquishing of hegemony, or suspension of activity of the

over-all ego together with some readiness to take over in certain circumstances.

Gill and Brenman discuss the hypnotic state from the structural, the dynamic, the adaptive, the genetic and the economic points of view. Relevant here is the main thesis that in the hypnotic state there is a relative abeyance of reality-oriented functioning and an increase in more primitive modes of dealing with the environment.

A similar stand is taken by Shor (1959) who concentrates only on the cognitive aspects of the hypnotic state. He uses the term "generalized reality-orientation" which is defined as, "A structured frame of reference in the background of attention, which supports, interprets, and gives meaning to all experiences." (p. 585).

He proposes that in hypnosis two fundamental processes take place: "The first is the construction of a special temporary orientation to a small range of preoccupation and the second is the relative fading of the generalized reality-orientation into nonfunctional unawareness." (p. 594). When such fading occurs, "primary modes of thought may flow into the background of awareness to orient experiences." (p. 597). The "temporary orientation to a small range of preoccupation" may be compared to Gill and Brenman's "intra-ego structure," and the "relative fading

of the generalized reality-orientation" to the relinquishing of hegemony of the over-all ego.

For clarity of exposition in this review of the literature a distinction has been made between the conceptions that deal with the motivational aspects of hypnosis and those that deal with the cognitive aspects. Most writers have considered both, although usually with relative emphasis on one. As for the motivational aspects, it has in essence been stated that the hypnotized person participates actively in the hypnotic transaction because it fulfills certain of his needs. As for the cognitive aspects, the common core of the argument is that in the hypnotic state there is a relative suspension of the normal cognitive functioning with possible activation of other modes of thought.

Two studies that bear on the cognitive aspects of hypnosis are relevant here.

Ackman (1960) has hypothesized on the basis of Gill and Brenman's propositions that subjects under hypnosis will produce Rorschach percepts of a more primitive nature than when they are in their normal state. Using categories devised by Holt (1960) in the content analysis of the Rorschach protocols, Ackman has confirmed her hypothesis. Subjects produce significantly more

"level I" (more primary and archaic) percepts under hypnosis than they do when they are awake.

Orne (1959) has found that hypnotic subjects are not troubled by perceptual contradictions. They may simultaneously hallucinate a person in one part of a room and perceive him situated in another part of that room, without regarding this as an impossibility that needs justification. Orne considers such a reaction to be an instance of "trance-logic," where contradictions are accepted without an attempt to resolve them. He points out the similarity between this kind of logic and primary process thinking.

2. Cognitive Dissonance

Making sense of phenomena is a major attribute of thinking, whether of the commonsense variety or of the more refined logical and scientific kind. Making sense involves the ordering or categorizing of observations, and an important aspect of the categorizing process is its consistency. Ordering would be meaningless if its criteria were changed from item to item. When man is exposed to inconsistencies he attempts to deal with them in such a way that consistency will result.

The problem of cognitive inconsistency and its resolution has mainly interested investigators in social psychology, and more specifically, in the field of attitude change. They have used various terms to describe inconsistencies. Heider (1958) names the continuum "imbalance-balance," and Osgood (1960) calls it "incongruity-congruity."

The most methodical attempt to deal with the problem has been made by Festinger (1957) who prefers the term "cognitive dissonance" for inconsistency, and "cognitive consonance" for consistency. Cognitive dissonance is conceptualized by Festinger as a motivating state similar to the hunger drive, but without physiological origins. It may be defined as an awareness of dissonant relations between elements of cognition. An element of cognition may be a piece of knowledge, a belief, or an attitude about oneself or the environment. The author defines dissonant relations between two elements of cognition as obtaining when the obverse of one element will follow from the other. Or in symbols, x and y are dissonant if not-x follow from y. It should be stressed again that obverse relations are much more inclusive than contradiction, which is a particular instance of obverse relations. So, for example, "not-black" may be any color and not necessarily

"white." Festinger himself uses in his examples mostly the case of contradiction.

He formulates two hypotheses that he regards as basic to his theory:

> 1. The existence of dissonance, being psychologically uncomfortable, will motivate the person to try to reduce the dissonance and achieve consonance.
> 2. When dissonance is present, in addition to trying to reduce it, the person will actively avoid situations and informations which would likely increase the dissonance.

The empirical evidence by which Festinger and his followers support these hypotheses comes mainly from studies of attitude change, which are not relevant to the present research. However, a study by Rosenberg (1960 a) may serve to illustrate a corroboration of one of Festinger's hypotheses. Rosenberg (1960 b) summarizes the study as follows:

> Eleven experimental and eleven control subjects were tested on two separate occasions for their affective and cognitive responses toward various attitude objects. Between the two testing sessions the experimental subjects (all of whom were capable of achieving deep hypnosis) were placed in hypnosis and then given the suggestion that upon awaking their affective reactions toward two separate attitude objects would be changed (from positive to negative, or vice versa) and that they would have no memory of the suggestion's having been made until the presentation of an amnesia-removing signal. It was assumed that such posthypnotic suggestion would foster strong and "irreversible" affect change for as long as posthypnotic amnesia was maintained. In a control group which received no affect manipulation the cognitive responses toward attitude objects remained stable from the first to the second test

> administrations. In the experimental group significant change occurred not only in the subjects' affects toward the attitude objects but also in their beliefs about the relationships between each of those objects and various "values" deemed important by the subjects. (pp. 325-326).

The results of this study appear to confirm Festinger's first hypothesis about the reduction of dissonance and the achievement of consonance.

3. Retention

There are three main theories that attempt to account for the phenomena of forgetting:

1. The interference theory. This theory is based mainly on measured evidence of retroactive inhibition. It depends essentially on the idea that newer responses to stimuli compete successfully with other responses to the same stimuli, with resulting non-evocation of the older responses.

2. The trace theory. This theory is principally expounded by Gestalt theorists, such as Koffka (1935). They assert basically that perceptual experiences leave traces in the brain field. Since these traces are within a system of forces, they are affected by other traces and by the influx of new perceptual activity. The traces also undergo autonomous changes according to Gestalt laws

identical with those that operate in perception. These changes produce the loss of some of the material of the original experience. So, for example, a distorted circle will be recalled as a good circle because such is the final trace of the original percept. Sharpening and leveling are examples of the results of the operation of gestalt principles.

3. The psychoanalytic theory of repression explains forgetting in terms of ego forces or defenses that prevent the emergence into awareness of elements unacceptable to the ego.

Bartlett (1932) offers an explanation that in a sense combines organizing elements from Gestalt theory and affective components from psychoanalysis. The essence of his view is that the core of memory is an emotional attitude, which, at the time of reproduction, serves to organize that which is recalled. This emotional organizing attitude is termed a "schema." Memory is not a passive reproduction of perceptions, but an active reconstruction.

In that part of his experimental work which is relevant to the present research, Bartlett has shown that in reproducing meaningful connected verbal material, there is a strong tendency to make sense of unconnected or

unfamiliar elements by rationalizing them. The individual distorts them by the addition of explanatory ties or by changing the details to make them more consistent with his cultural background. Another process that takes place is the forgetting of the unfamiliar and ambiguous elements.

Levine and Murphy (1943) have shown that material which is inconsistent with the subject's view is learned with more difficulty. Subjects who had procommunist views learned more slowly than subjects with an anticommunist outlook a passage that was critical of the Soviet Union. The opposite occurred with a passage reflecting views favorable to the Russians. The rate of forgetting of the two passages was rather similar for the two groups, but in a way the slowness of learning already involves forgetting trends.

Allport and Postman (1948), in their study of serial verbal reproduction of scenes, discuss the effects of sharpening and leveling within the context of assimilation, which is quite similar to the idea of consistency with past experiences.

Besides mentioning the major theoretical attempts to account for forgetting in general, several studies have been cited in this section that show the vulnerability to forgetting of material which is at variance with the

attitudes and knowledge at the disposal of the subjects. The influence of hypnosis on the recall of such variant material will be discussed in the following chapters. The hypnotic impact on the recall of regular verbal material is considered in the next section.

Retention under Hypnosis

Bartlett's views on remembering serve as the theoretical basis for two studies that deal, in part, with the retention of meaningful, connected material under hypnosis. White, Fox, and Harris (1940) had their subjects learn some stanzas of a poem to a criterion of one perfect repetition. Recall, which took place twenty-four hours later, was 53.1 per cent better in hypnosis than under normal conditions. Rosenthal (1944) also found hypermnesia under hypnosis for recall of poetry learned in waking.

The authors of these two studies propose that hypnosis brings about relaxation, freedom from anxiety and lack of ego involvement, and therefore the creative reconstruction of memory, as suggested by Bartlett, proceeds more smoothly and less strenuously than in the usual waking state.

4. Summary of the Review of the Literature

Three areas of study that bear on the present research have been reviewed. In discussing the literature on the hypnotic state, consensus has been noted in considering the hypnotized person as a motivated participant in an intense inter-personal relationship. As for cognitive aspects of the hypnotic state, which are of major concern for the present study, most writers concur in the view that at least a partial suspension of rational cognitive functioning takes place under hypnosis.

The problem of cognitive dissonance has been reviewed next. It has been suggested that information which is contrary to expectation based on previous experience and which cannot be meaningfully integrated with such experience, is coped with either by being ignored or by being changed so as to fit present knowledge.

In reviewing the problem of retention, the major theoretical explanations have been mentioned, the recall fate of dissonant material has been discussed, and the studies on recall under hypnosis of verbal material have been summarized.

In the following theoretical discussion the three areas reviewed will be related to each other in accordance with the focus of this research.

CHAPTER III

THEORETICAL FORMULATIONS

It is not surprising that most theoretical approaches to the problem of thinking have in common the belief that cognitive processes operate according to certain rules, laws, or principles. So, the Associationists state the laws of similarity, contrast, and contiguity (see for example, Boring, 1929); the "thought psychologists" restate rules of formal logic in terms of "consciousness" (see, for example, the discussion and critique by Piaget, 1947); the Gestalt theorists offer laws of organization involving such rules as simplicity, regularity, proximity, symmetry, and pragnanz (see, for example, Koffka, 1935); Piaget (1947) discusses the "grouping operations" of intelligence and he states rules or conditions, for such operations, like combinativity, associativity, and especially, reversibility; Bartlett (1958) asserts that the possibility of a series of inter-connected steps between the beginning and the end of a thinking process "confer upon all thinking a character of necessity, or compulsion" (p. 75); Bruner (1957) proposes that

certain formal schemata are the rules for the "coding," or categorizing, operations of the cognitive processes.

It is easily noted that but for consensus about the existence of such rules governing cognitive processes, there is little agreement about the type of rules that regulate them. Similarly, there is little agreement among the theorists about the emergence of the rules of thought. So, the Associationists consider previous experience to be essential for the establishment of association laws; learning is suggested by Bruner as the origin of the formal schemata that underlie "coding," and to some extent this is Bartlett's belief too; the "thought psychologists" fall back on logical apriorism, i.e. non-psychological invariance; the Gestalt basic assertion of isomorphism of brain fields and the environment states invariance of a structural nature; Piaget views intellectual abstractive operations as evolving from earlier and more primitive forms, and the whole series is regarded as steps in biological adaptation; with less elaboration Bartlett offers a similar conception.

It is not necessary here to get involved in the controversy over the type of rules that govern thought or their origin. It may however be stated that evolutional explanations appear to offer greater flexibility to

cognitive principles than aprioristic or physiological standpoints of invariance.

Most theorists find it convenient to begin the discussion about cognitive processes from an arbitrary starting point which is the encounter with new information. Under optimal conditions of alertness, the cognitive processes of the adult (adulthood is chosen here to avoid genetic considerations) may fully operate according to the rules offered above. Thus the new item may be compared to other items in order to be associated to those that are similar to it (according to associationistic laws); it may be embedded within a certain configuration (in line with Gestalt rules); it may be consciously felt to be logically related (in "thought psychology" terms); or it may be serialized, classified "coded" or "grouped" in line with the suggestions of Bartlett, Bruner, and Piaget.

The nature of many new items of knowledge is such that their integration or assimilation within the context of existing experience is achieved with relatively minor cognitive effort. This is usually the case when the new information is consistent with previous experience, or rather with this segment of previous experience which is relevant to the new element. The appearance of a red signal with a car coming to a full stop in front of it is

consistent with previous knowledge of the relevant rule of the road.

However, not all new items of information are integrated according to one rule or another with existing cognitions. One obvious reason for the difficulty of integration may have to do with the state of the person. Fatigue, or lack of interest and motivation may interfere with the optimal operation of the cognitive processes. Another reason may be the circumstances under which the cognitive process operates. For example, if not enough time is allotted for the operation, the new item may not be assimilated.

However, the absence of integration may be due to the nature of the new cognitive element; it may be inconsistent with previous experience. The appearance of a green signal coupled with the abrupt stopping of several cars in front of it, without another relevant reason, may illustrate such inconsistency with previous knowledge. Such inconsistency arouses some kind of "conflict of forces" and the resolution of such conflict depends on the strength of the competing forces. If the illustration of inconsistency is extended and it is said that the person is exposed to it after several years of being out in the wilderness, he may decide that the relevant previous

knowledge is no longer valid. In another instance the person may be in a strange town and he may decide that the rules known to him are reversed for this particular town. The resolution here is achieved by relying on another segment of previous knowledge--"rules may have exceptions."

The invalidation of previous experience or the incorporation of an inconsistent item within a broader or a different context depend upon the importance of the item. Some parameters of "importance" may be the intensity of the stimulus (in such terms as frequency and duration), the degree of dissonance or divergence from what is usually expected or anticipated on the basis of previous experience, and the affective intensity of the new item.

When the new item is not intense enought to override existing knowledge, and on the other hand it is discrepant to the degree that it cannot be incorporated within any context of previous experience, it is handled in one of two ways. These ways may be described in propositions based on Festinger's hypotheses, with some revision and reversed order:

1. When a new item of information is dissonant (inconsistent) with present knowledge to the extent it cannot be assimilated to it, it may be ignored, or avoided.

2. The dissonant item may be changed, or distorted, so as to fit existing cognitions.

It appears that corresponding processes take place in memory phenomena: parallel to avoidance in the present there is forgetting of material presented in the past. Thus Bartlett (1932) has found that incongruous and unfamiliar material is forgotten more than congruous material. Similarly, distortion can take place, and the recall of inconsistent material is shown by Bartlett to be distorted more to fit expectations than is regular material. Forgetting and distortion of dissonant material has also been found by Paul (1959) using Bartlett's methods, and similar results have been obtained by Levine and Murphy (1943) and Allport and Postman (1948).

The discussion about the fate of dissonant items of cognition that are not integrated with existing knowledge can be recapitulated in the following way: If along a temporal continuum wherein cognitive processes operate two points are chosen, a point of exposure of material, and a point of recall, then a dissonant element may be avoided at the point of exposure, by not being "registered," or it may be avoided at a later point, at recall, by not being remembered. At both points this dissonant item may be distorted.

What can be predicted about the hypnotic influence on the fate of such dissonant elements?

It has been pointed out in the review of the literature about the cognitive aspects of hypnosis that most writers propose a partial suspension of rational, reality-oriented processes in the hypnotic state. Thus Gill and Brenman (1959) suggest on the basis of clinical observations that the over-all ego surrenders part of its hegemony to the regressed intra-ego structure, and Shor (1960) speaks about the non-functioning of the "generalized reality-orientation." Ackman (1960) has found experimentally that hypnotized subjects tend to produce more "primary" type of percepts, and Orne (1959) has observed that hypnotized persons view with equanimity perceptual inconsistencies.

On the basis of these statements and findings about partial suspension of everyday cognitive processes under hypnosis, it is proposed that hypnosis reduces the amount of avoiding, forgetting and distorting of dissonant material. The reduction occurs because the dissonant element is not "judged" by the partially suspended rational processes to be "dissonant." Now, in line with the recapitulation offered above, two possibilities are conceivable: (1) if partial suspension of the cognitive

processes occurs at the first point of the temporal continuum, i.e. at exposure point of the dissonant material, this material is going to be "registered," and so it will be available for recall at a later temporal point; (2) it is still likely that the process of avoiding and/or distorting is not immediately operating; therefore, partial suspension of the cognitive processes at the point of recall will still allow the dissonant material to be "registered" and reproduced. On the basis of the two conceivable possibilities, two specific predictions are made:

1. The recall of dissonant material is increased when the initial exposure is made under hypnosis.

2. The recall of dissonant material exposed in the normal state is increased if recalling is under hypnosis.

The purpose of this research is to test these two predictions.

CHAPTER IV

METHODS AND PROCEDURES

1. Subjects

The subjects were sixteen undergraduate students, nine females and seven males, in the age range from 22 to 27, with the median at 23. They were made available by the "Studies in Hypnosis Project" at the Massachusetts Mental Health Center, having previously been classified as very good hypnotic subjects. Each had undergone one group screening and two individual screenings, and had passed ten or more of the twelve items of the Stanford Hypnotizability Scale. Subjects were paid a dollar and one-half per hour.

2. The Variable of Control: Verbal Recall Ability

In the first part of the experiment, each subject was given a printed page of the Ghost Story as presented by Bartlett (1932). They were instructed to read the story twice at their regular speed so that they would be able later to recall the material as accurately as possible.

This test was given in the attempt to control for the ability to recall.

The story was divided into units in the manner suggested by Paul (1959) and scored according to the number of units recalled correctly. The subjects were ranked according to their scores (see Appendix B, Table II) and then divided into four groups in such a way that the first group consisted of the subjects ranked first through fourth, the second group consisted of those ranked fifth through eighth, and so on (see horizontal groups in Appendix B, Table III). This has been done in anticipation that each group of subjects will be relatively more homogeneous on the dependent variable in absence of treatment effects than subjects selected completely at random.

Three subtests of the Wechsler Adult Intelligence Scale, Information, Similarities, and Vocabulary, were also administered to the subjects in the first part of the experiment. This was done in order to obtain an estimate of their verbal intelligence, not as a variable of control, but as a possible correlate of the dependent variable (see estimated Verbal IQ, Appendix B, Table II).

3. The Stimulus Variable: Cognitive Dissonance versus Consonance

The stimulus variable was introduced by means of a list of forty sentences half of which were dissonant and half consonant. In a dissonant sentence, the second part did not follow logically from the first, or the stem. Consonant sentences consisted of two parts which were logically related.

The list was derived in the following manner: seventy-five dissonant sentences, composed by the author, were presented to four judges, staff psychologists at the Massachusetts Mental Health Center. They were asked to pick the twenty sentences which best fit the above definition of dissonance. The twenty sentences selected as dissonant by three or more judges served as grammatical models for twenty consonant sentences also composed by the author. These resembled the dissonant sentences not only in grammatical form but also in apparent difficulty of words and in length. In order to increase the difficulty of detecting the principle of dissonance the randomization was restricted so that not more than two sentences of one kind followed each other (see Appendix A, Table I).

4. Methods of Presentation and Recall

From pilot testing it was determined that one presentation with exposure time of seven seconds per sentence afforded two quick readings of each sentence without letting the subject exercise effectively mnemonic devices to facilitate his recall. The list was presented by means of a reading pacer. With a sheet attached to the bar to form a slot, only one sentence was uncovered at a time as the bar moved down the list at a set speed.

The recall period followed immediately after presentation. The subject was given a page on which the stems of the original sentences were printed in a new randomized order so as to prevent recall by spatial or temporal contiguity. The subjects were asked to complete in writing as many sentences as they could recall correctly. When they had finished, they were asked to guess on those sentences left uncompleted.

5. The Dependent Variable: The Number of Recalled Sentences

The dependent variable was the number of sentences recalled correctly. A separate score was computed for dissonant and consonant sentences. For scoring purposes,

a sentence was regarded as correct when the subject recalled the main idea, even if he made an error in a detail. However, if this error occurred in a connecting word embodying the idea of dissonance, like "however," "despite" and "but," the sentence was scored as wrong. The scoring was done by the author and another clinical psychologist after each sentence was discussed.

6. The Independent Variable: Hypnotic versus Normal State

The independent variable was the presence or absence of hypnosis during presentation of the test list or during the recall period. Four experimental conditions were chosen:

(1) Presentation of list under hypnosis and its recall under hypnosis. If H stands for "hypnosis" and N for "normal state," this condition is represented in symbols as H-H.

(2) Presentation under hypnosis and recall in the normal state (H-N).

(3) Presentation in the normal state and recall under hypnosis (N-H).

(4) Presentation and recall in the normal state (N-N).

Having already been divided into four groups according to their rank on the scoring of the Ghost Story, subjects were assigned to the four experimental conditions in such a way that members of each of the four groups were assigned by means of random tables to the four treatments. The vertical groupings in Appendix B, Table III, show the assignments by conditions.

Hypnosis was induced in the following manner: After it was established in the session that the subject had been hypnotized before so that he knew that no harm would befall him and that he would not be exposed to ridicule of any sort, the subject was told to relax all the muscles of his body, and it was suggested that all his limbs would become heavier and heavier. The suggestions were given in a monotonous voice with slight variations, as suggested by Weitzenhoffer and Hilgard (1959) in the Stanford Hypnotic Suggestibility Scale. When the subject closed his eyes, hand catalepsy was established and the subject was instructed to open his eyes and still remain in trance. Seeing his hand in the rigid position helps the subject to remain in trance with open eyes. After the suggestion to relax his hand, the subject was given the test. The hypnotic induction took about ten minutes.

After the presentation and recall of the test, each subject gave his view of the purpose of the experiment and was asked whether a hypnotized person would react differently to the test than a person in the normal state.

7. Summary of Procedure

Sixteen good hypnotic subjects were given a memory test to determine their ability to recall. On the basis of their scores, they were divided into four groups. They were also given three subtests of the Wechsler Adult Intelligence Scale to obtain an estimate of their verbal intelligence. In the experiment proper they were given a test list of twenty dissonant and twenty consonant sentences, each sentence presented for seven seconds by means of a reading pacer. Recall was tested immediately by asking the subjects to complete a re-randomized list of the stems of the original sentences. The presentation and the recall were done under one of four conditions to which the subjects within each group were assigned at random. These conditions were: (1) H-H, (2) H-N, (3) N-H, and (4) N-N. After the test, the subjects gave their opinions about the purpose of the experiment and about the possible difference in recall between hypnotized subjects and persons in the normal state.

CHAPTER V

RESULTS

A. The Experimental Hypotheses

The two statistical hypotheses that have been tested experimentally are stated as follows:

1. Test hypothesis: The mean number of correctly recalled dissonant sentences exposed under hypnosis is equal to the mean number of correctly recalled dissonant sentences exposed in the normal state.

Alternative hypothesis: The mean number of correctly recalled dissonant sentences exposed under hypnosis is significantly higher than the mean number of correctly recalled dissonant sentences exposed in the normal state.

2. Test hypothesis: The mean number of correctly recalled dissonant sentences exposed in the normal state and recalled under hypnosis is equal to the mean number of correctly recalled dissonant sentences exposed and recalled in the normal state.

Alternative hypothesis: The mean number of correctly recalled dissonent sentences exposed in the normal state and recalled under hypnosis is significantly higher than the mean number of correctly recalled dissonant sentences exposed and recalled in the normal state.

B. Experimental Results

Two analyses of variance were performed. For the first hypothesis, an analysis of variance for randomized blocks design, with replications, was carried out according to McNemar (1960). This involved the four experimental conditions grouped according to presence or absence of hypnosis during exposure, namely, H-H plus H-N versus N-H plus N-N. With two conditions of exposure, two replications per exposure, and four blocks, there were altogether 16 pieces of data. The raw data are presented in Appendix C, Table IV, the means for each of the four conditions in Table I, and the analysis of variance in Table II.

The mean for hypnotic exposure (H-H plus H-N) is 8.87, and the mean for normal exposure (N-H plus N-N is 5.12. A general statement can be made about the data. More cognitively dissonant sentences are correctly recalled when they are exposed under hypnosis, than when they are exposed in the normal state.

TABLE I

THE MEAN NUMBERS OF CORRECTLY RECALLED DISSONANT SENTENCES UNDER THE FOUR EXPERIMENTAL CONDITIONS

Condition	H-H	H-N	N-H	N-N
Mean	9	8.75	5.5	4.75

TABLE II

ANALYSIS OF VARIANCE FOR CORRECTLY RECALLED DISSONANT SENTENCES

Source	SS	d.f.	M.S.	F
Total	248	15		
Conditions (C)	56.25	1	56.25	11.8*
Blocks (B)	43.5	3	14.5	3.05
CxB	14.25	3	4.75	
Within	134	8	17.25	

*p = .05

Since the mean number of correctly recalled sentences exposed under hypnosis is significantly higher ($F = 11.8$, $p = .05$) than the mean number of correctly recalled dissonant sentences exposed in the normal state, the first hypothesis of no difference between such means is rejected.

For the second hypothesis, an analysis of variance for two randomized blocks design was done (Edwards, 1960). This involved conditions N-H and N-N, and with four blocks there were altogether 8 pieces of data. The raw data are presented in Appendix C, Table IV, under the appropriate two conditions, and the analysis of variance is shown in Table III.

The mean for condition N-H is 5.5 and the mean for condition N-N is 4.75. Since the mean number of correctly recalled dissonant sentences exposed in the normal state and recalled under hypnosis is not significantly higher ($F < 1$) than the mean number of correctly recalled dissonant sentences exposed and recalled in the normal state, the second test hypothesis of no difference between such means is retained.

It can be generally stated that if hypnosis is induced during recall period of cognitively dissonant sentences that were exposed in the normal state, it does

TABLE III

ANALYSIS OF VARIANCE FOR CORRECTLY RECALLED DISSONANT SENTENCES (CONDITIONS N-H AND N-N)

Source	SS	d.f.	M.S.	F
Total	68.9	7		
Conditions (C)	1.15	1	1.15	<1
Blocks (B)	30.4	3	10.1	<1
CxB	37.35	3	12.45	

not affect their recall.

C. Additional Analyses related to the First Hypothesis

In order to narrow down the number of alternative psychological interpretations that can be made with respect to the first hypothesis and its confirmation, additional analyses were performed.

It has been observed by White et al. (1940) and by Rosenthal (1944) that recall of meaningful connected material is improving under hypnosis. In these two studies the meaningful material was learned in the normal state and recalled under hypnosis. The authors interpreted the improvement in recall under hypnosis as due to the effects of relaxation and freedom from anxiety that facilitate the reconstructive process of remembering.

Two claims may be made on the basis of these findings and interpretations. One, based on the findings alone, is that it is conceivable that hypermnesia may occur in the hypnotic state regardless of the temporal point at which hypnosis interferes, i.e. at exposure or at recall. Another claim, based on the "relaxation" interpretation, may be that the relaxing effects of hypnosis induced during exposure are still in force during recall

which follows exposure immediately. The two claims lead to the identical conclusion that consonant material should be recalled better when exposed under hypnosis than when exposed in the normal state. This statement can be formulated as a hypothesis:

Test hypothesis: The mean number of consonant sentences exposed under hypnosis is equal to the mean number of correctly recalled consonant sentences exposed in the normal state.

Alternative hypothesis: The mean number of correctly recalled consonant sentences exposed under hypnosis is significantly higher than the mean number of consonant sentences exposed in the normal state.

An analysis of variance for randomized blocks design, with replications, was performed on the data of consonant sentences. The raw data appear in Appendix C, Table V, the mean numbers of correctly recalled consonant sentences under each of the four experimental conditions are shown in Table IV, and the analysis of variance is shown in Table V.

The mean number of correctly recalled consonant sentences for hypnotic exposure (H-H plus H-N) is 13.375, and the mean number of correctly recalled consonant sentences for normal exposure (N-H plus N-N) is 11.75. Since

TABLE IV

THE MEAN NUMBERS OF CORRECTLY RECALLED CONSONANT SENTENCES UNDER EACH OF THE FOUR EXPERIMENTAL CONDITIONS

Condition	H-H	H-N	N-H	N-N
Mean	14.75	12	11	12.5

TABLE V

ANALYSIS OF VARIANCE FOR CORRECTLY RECALLED CONSONANT SENTENCES

Source	SS	d.f.	M.S.	F
Total	226	15		
Conditions (C)	12.25	1	12.25	< 1
Blocks (B)	66.5	3	22.2	< 1
CxB	110.25	3	36.75	8.4*
Within	35	8	4.375	

*p = .01

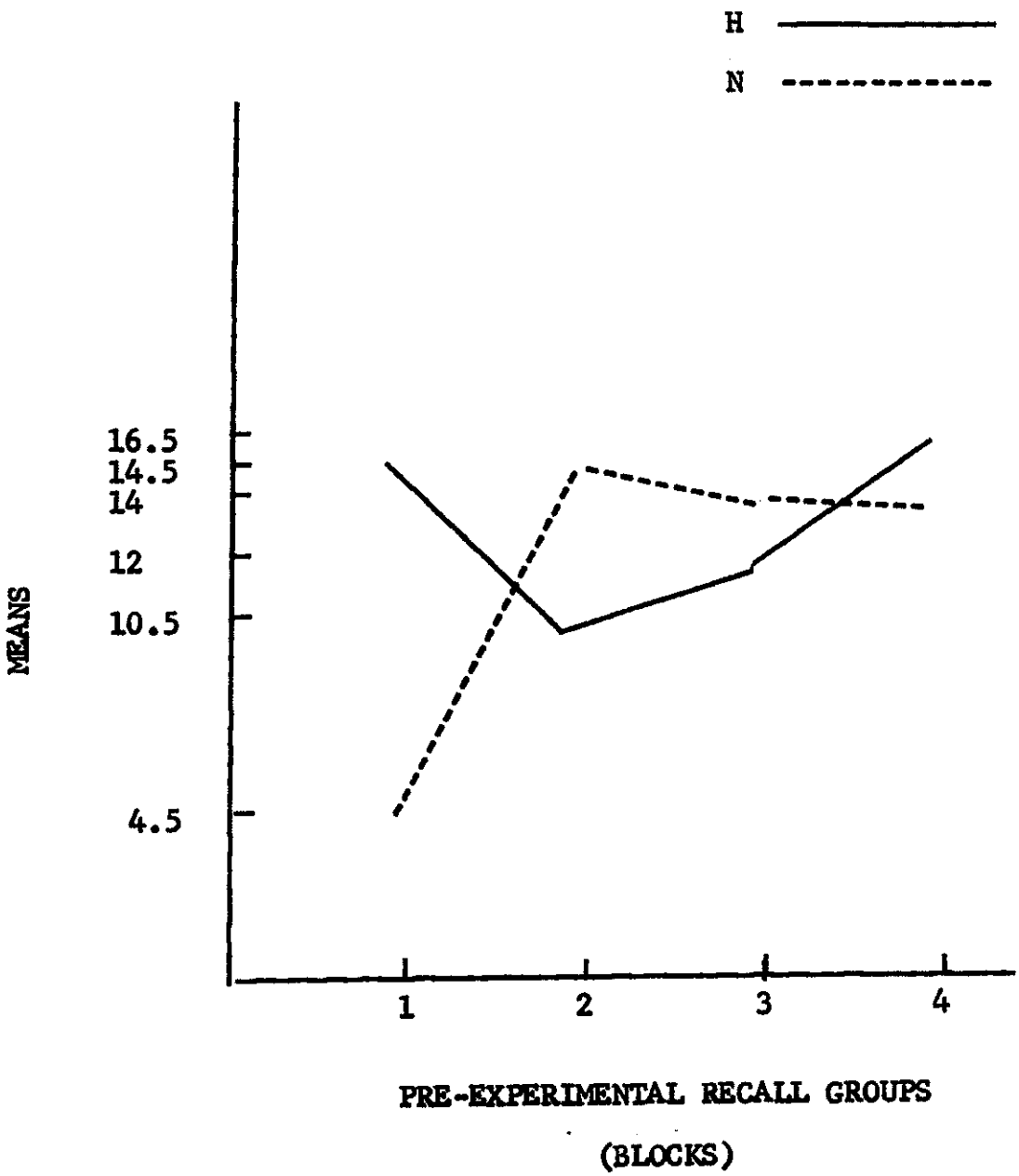
the mean number of correctly recalled consonant sentences exposed under hypnosis is not significantly different ($F < 1$) from the mean number of correctly recalled consonant sentences exposed in the normal state, the test hypothesis of no difference between such means cannot be rejected.

It can be generally stated that consonant sentences presented under hypnosis are not recalled better than consonant sentences presented in the normal state.

The analysis of variance shows a significant ($p = .01$) interaction effect between conditions and blocks. To make a visual presentation of the data, Figure I has been graphed; numerical form is presented in Appendix C, Table VI. Figure I indicates that subjects in block 1 (poorest recall ability) and block 4 (best recall ability) have better recall for material exposed under hypnosis than subjects in blocks 2 and 3. On the other hand, subjects in blocks 2, 3, and 4, recall better material presented in the normal state than subjects in block 1. In comparing the two conditions, it appears that subjects in block 1 recall material presented under hypnosis better than subjects to whom the material is presented in their normal state, while the reverse occurs in block 2. In block 3 this reversed effect seems much reduced, and in block 4 there appears

FIGURE I

THE MEANS OF CORRECTLY RECALLED CONSONANT SENTENCES EXPOSED UNDER HYPNOSIS OR IN THE NORMAL STATE FOR EACH OF THE PRE-EXPERIMENTAL RECALL GROUPS



again some gain in recall when the consonant material is presented under hypnosis.

It may be argued that intelligence is a factor in better recall of dissonant material, because more intelligent people may be expected to make sense of dissonant material more quickly by appropriate supplying of an intervening link. Correlations between scores on the dissonant material and estimated verbal intelligence are presented in Table VI. (IQ values for each subject are shown in Appendix B, Table II). The correlations are not significant except for one condition where the relationship is in the opposite direction, and the correlations are not significant for the combined conditions H-H plus H-N or N-H plus N-N. When conditions are ignored and overall correlation is made, rho = -.11, which is a statistically insignificant value. It may be said that for this group of subjects the data do not support the argument that verbal intelligence facilitates recall of dissonant material.

D. Further Analyses

It has been proposed in the theoretical section that dissonant material tends both to be forgotten and to

TABLE VI

SPEARMAN CORRELATIONS BETWEEN "DISSONANT" SCORES AND IQ VALUES

H-H	r_s	-.50	$p < .05$
H-N	r_s	-.96	$p = .05$
N-H	r_s	.50	$p < .05$
N-N	r_s	-.83	$p < .05$
H-H &H-N	r_s	-.20	$p < .05$
N-H &N-N	r_s	-.20	$p < .05$

be distorted more than consonant material. The number of correctly recalled consonant and dissonant sentences was therefore compared for each condition and for the total experimental group. The raw data appear in Appendix D, Table VII, and the t values and their probabilities are shown in Table VII. It appears that under all conditions significantly more consonant than dissonant sentences are recalled correctly. (p varies between .05 and $\geq$ .005).

A related question may be asked about the direction of distortion. There are four possible directions: a dissonant sentence can be distorted in the direction of consonance or in the direction of another dissonance; a consonant sentence can be distorted in the direction of another consonance or in the direction of dissonance. A distinction was made between faulty spontaneous recall and distorted guesses because the experimenter urged subjects to guess on the items for which they claimed no recall. The direction of distortion is presented in Appendix D, Table VIII, and the direction in terms of percentages is shown in Table VIII. It can be seen that about fifty per cent of the distortions, whether in recall or in guessing, are directed from dissonance to consonance, and the next most common distortion proceeds from consonance to another consonance. This is true regardless of experimental conditions.

TABLE VII

COMPARISON OF "DISSONANT" AND "CONSONANT" SCORES FOR EACH AND ALL CONDITIONS (t VALUES AND PROBABILITIES)

Condition	t value	p	
H-H	3.107	.05 >	<.025
H-N	2.475	.05 >	<.025
N-H	5.748		>.005
N-N	3.175	.05 >	<.025
All Conditions	4.215		>.005

TABLE VIII

DISTORTION IN TERMS OF PER CENT OF SENTENCES DISTORTED IN EACH DIRECTION AND EACH CONDITION

Condition	Direction of Distortion									
	C-D		C-C		D-C		D-D		SUM	
	r	g	r	g	r	g	r	g	r	g
H-H	7	14	30	10	50	66	14	10	101*	100
H-N	9	7	27	35	54	57	9	3	99	102
N-H	20	14	20	27	33	46	27	13	100	100
N-N	4	15	25	20	66	53	4	10	99	98
All Groups	10	15	25	23	50	55	14	9	99	102
All groups (Sum r&g)	12		23		53		10		98	

C -- Consonant
D -- Dissonant
r -- distorted recall
g -- distorted guess

*Rounding errors.

E. The Post-Experimental Interview

All subjects responded essentially in the same way to the inquiry about the purpose of the experiment. They observed that it had to do with memory, and noted that some sentences were logical and some not, but no distinction was made between the two types of sentences in relation to the purpose of the experiment. All but one believed that hypnotized persons should recall more sentences because of better concentration. One subject (S.A.) felt that hypnotized subjects should recall dissonant sentences better than consonant sentences. He could not explain why this should be the case. He, as the others, recalled more consonant than dissonant sentences.

F. Summary of the Findings

The findings may be summarized as follows:

1. Dissonant sentences are recalled better when exposed under hypnosis than in the normal state.

2. Dissonant sentences are not recalled better when recalled under hypnosis than in the normal state.

3. Consonant sentences are not recalled better when exposed under hypnosis than in the normal state.

4. No correlation was found between recall of dissonant material and verbal intelligence.

CHAPTER VI

DISCUSSION

This study has established that under certain circumstances hypnosis has an apparent facilitating effect on recall of cognitively dissonant material. Also, it has narrowed down the number of possible interpretations of the observed effect.

In order for the hypnotic intervention to be effective, it must be present at the time of exposure. When hypnosis takes place during recall period only, it has no noticeable facilitating effect on the recall of cognitively dissonant material.

A possible interpretation of the better recall of dissonant material exposed under hypnosis may be based indirectly on the explanation suggested by White et al. (1940) and by Rosenthal (1944) to account for their finding of hypermnesia under hypnosis for connected material. Their explanation is in terms of relaxation, freedom from anxiety, and lack of ego involvement. Because of this emotional tranquility, the reconstructive memory process,

as suggested by Bartlett (1932) is less hampered in hypnosis than in the normal state. The explanation in terms of lack of ego involvement is similar to the interpretation offered by Rosenzweig (1938) for the absence of the Zeigarnik effect in task-oriented subjects. It should be pointed out that White and his co-workers and Rosenthal found hypermnesia for material learned in the normal state and recalled under hypnosis. However, it may be claimed that in the case of immediate recall the effect of hypnosis during exposure still operates during recall.

The results with respect to consonant material in the test list show, however, that consonant sentences are not recalled better when exposed under hypnosis than when exposed in the normal state. This is the case when the effect on recall is averaged over the blocks representing different levels of retentive ability. Thus it would seem on the basis of the data that the relaxation hypothesis is not sufficient to account for the better recall of material presented under hypnosis.

It should be noted that when each block is examined separately, it appears that subjects with relatively poor ability as well as subjects with relatively good ability do recall consonant material exposed under hypnosis better than subjects with similar ability who were exposed to the

material in their normal state. On the other hand, subjects in the middle two groups do better when the consonant material is presented to them in their normal state. No explanation has been found to account for this differential effect.

One interpretation of the better recall of dissonant sentences exposed under hypnosis may be that the results have nothing to do with hypnosis, but with the intelligence of the subjects. It may be claimed that intelligent persons have available to them a wealth of associations from which to supply a link between the two dissonant elements so as to make a meaningful integration of the sentence, which will then be recalled more easily. The absence of significant correlations (except for one in a negative direction) between the subjects' estimated verbal IQ and their recall scores for dissonant material seems to speak against such interpretation. It should be stressed that in view of the small size of the groups that served as basis for the correlations, no generalization is made about the relationship between intelligence and the recall of dissonant material.

An interpretation which appears to take account of both the positive and negative results with respect to the two predictions is proposed in accordance with the

theoretical formulations stated above: In the normal state, when a piece of information is encountered, which cannot be fitted by the cognitive processes into existing knowledge, it is handled in one of two ways: it may be ignored, or it may be distorted so as to fit known experience.

If it is assumed that cognitive organizing principles function from the point of the encounter with the stimulus, the question may arise: at what point in the cognitive process does the elimination (avoiding) and/or the distortion take place? It may take place very shortly after exposure, or the deliberative and judging process may take longer before the dissonant material is declared, so to speak, to be "dissonant" and is handled accordingly. This may depend upon several factors, such as the degree of dissonance, the importance of such dissonance to the person in terms of his involvement with the issue, and the time allowed for exposure and reflection.

It has been proposed that in the hypnotic state a partial suspension of rational processes takes place. Because of this partial suspension, dissonant material is not cognized as "dissonant" to the same degree that it is when rational processes function without decrement, and it therefore is less likely to undergo elimination and/or

distortion.

Since it could not be determined beforehand how fast judgement is passed on the dissonance of the material, two points in time were chosen for the intervention of hypnosis--at exposure and at recall.

The results appear to show that if the partial suspension of the everyday cognitive processes takes place at exposure, the dissonant material is not yet cognized as "dissonant" and so it is "registered" as an experience. At least during the short interval until recall is requested (from six to ten minutes in this study) the experience seems to be available, since it is recalled. However, when the partial suspension takes place at the point of recall, it does not seem to have any effect on the dissonant material: the experience does not seem to be available to a greater degree than when the recall takes place in the normal state. The last statement should be qualified in view of the small size of the groups that have been compared. A related point should be mentioned here: in view of the lack of significant difference between the means of correctly recalled dissonant sentences exposed in the normal state but recalled under hypnosis versus those that were both exposed and recalled in the normal state, this finding may be interpreted as a disconfirming

evidence against hypermnesia under hypnosis. Besides the smallness of the size of the groups compared, there are several differences between the type of material and methods of presentation and recall in this study and in the studies by White and co-workers and Rosenthal. In their case the material was meaningful poetry; the material was learned to a criterion of perfect repetitions; the recall was twenty-four hours later. It is suggested therefore that the present results leading to rejection of the second prediction should not be regarded as bearing on the question of hypermnesia under recall of different materials and different procedures.

With respect to the first hypothesis, it may be concluded that in the normal state cognizing of dissonant material takes place at exposure or immediately after with the resulting operation of the eliminating and distorting processes. When the cognizing is arrested, in the hypnotic state, at the point of exposure, the experience of dissonance is "registered." Once registered, it is available, at least for a short period.

The conclusions should be strongly qualified: The suspension of the rational processes that may have taken place is very slight. Material exposed under hypnosis is indeed recalled significantly better than if it is exposed

in the normal state, but inspection of the data shows that on the whole many dissonant sentences were forgotten or distorted. Also, even under hypnosis the most frequent direction of distortion was toward consonance. It is also possible that short exposure time, and the large number of sentences in the test list, are factors in the fast "judgement" that takes place in the beginning of the continuum of exposure-recall.

Suggestions for Further Research

Further investigation is suggested along several dimensions.

The relatively better recall of dissonant material exposed under hypnosis has been obtained for material presented in light hypnosis. It may be expected that in deeper hypnosis there is greater suspension of rational processes and consequently more "registration" of dissonant material with resultant better recall for such material. However, the clinical observations and the theoretical considerations of Gill and Brenman (1959) and Shor (1959) suggest increasing intrusion of "primary" material and functioning. Such functioning may interfere with the recall of any material. It appears worthwhile to investigate the interaction between the processes that facilitate and

inhibit correct recall of material exposed in the various levels of hypnosis. The amount of correctly recalled dissonant sentences may be one index of such interaction. Ackman's (1960) measures of "primary" manifestations in Rorschach responses may be added to supply a more direct index of the intrusion of "primary" material.

Another line of investigation has to do with the forgetting of dissonant material along a temporal dimension. It may be argued that since material exposed under hypnosis is relatively better "registered," it is forgotten at a slower rate than material exposed in the normal state. It may however be argued that the functioning of normal cognitive processes, reinstated at termination of hypnosis, is speeded-up to eliminate the effects of "registration," so that the curve of forgetting of dissonant material exposed under hypnosis is steeper than that of forgetting material exposed in the normal state.

A somewhat related problem is the learning of the material. Learning to criterion involves memorization, and besides, it may be expected that partial suspension of the rational processes enhances learning since "registration" is better. It may then be expected that under hypnosis less trials are needed to reach a certain criterion than in the normal state. Using learning to

criterion instead of the short exposure time given in this study may enable the experimenter that investigates the former problem to select further temporal points of recall.

As for the units of measurement of recall of dissonant material, it is suggested that greater sensitivity may be gained if the amount of dissonance is taken as a unit instead of the number of sentences. The dissonant sentences may be given to judges to rate according to the magnitude of dissonance that exists between the two parts of each sentence.

In this study an attempt has been made in constructing the sentences to keep to a minimum the affective tone of the material in order to reduce confounding effects of repressive devices. Another approach to study the effects of hypnosis on some cognitive functions by means of material which is minimally charged with emotions may be taken. We refer to several of the tests used for example by Gardner et al. (1959), like the Schematizing Test and the Kinesthetic Time Error Test. The rationale for studying cognitive controls by means of such psychophysical measures is provided by these writers. It is also suggested that the whole range of cognitive controls may be usefully investigated under hypnosis to determine

whether there are changes along each dimension of control, and whether there are stylistic re-patternings of controls in the hypnotic state.

CHAPTER VII

SUMMARY

The purpose of the study has been to explore certain cognitive processes as they operate in the hypnotic state. More specifically, it was to investigate the influence of hypnosis on the recall of verbal material cognitively dissonant in nature. Cognitive dissonance occurs when one element of cognition does not follow from the other.

On the basis of the literature on hypnosis, especially from the writings of Gill and Brenman (1959) and Shor (1959), and the findings of Orne (1959) concerning the suspension of rational thinking in the hypnotic state, two predictions were made:

1. Cognitively dissonant material exposed under hypnosis is recalled better than cognitively dissonant material exposed in the normal state.

2. Cognitively dissonant material exposed in the normal state is recalled better under hypnosis than when it is both exposed and recalled in the normal state.

The subjects were sixteen undergraduate students, nine females and seven males, from 22 to 27 years of age, with the median at 23. In several screenings they had passed from ten to twelve of the Stanford hypnotizability tests and were classified as good hypnotic subjects. They were divided into four groups of four according to their scores on a pretest of verbal recall ability. Estimates of verbal intelligence were also obtained. Later, the subjects within each group were randomly assigned to one of four experimental conditions: (1) both exposure and recall under hypnosis; (2) exposure under hypnosis and recall in the normal state; (3) exposure in the normal state and recall under hypnosis; and (4) both exposure and recall in the normal state.

The material to be recalled was a randomized list of forty sentences, half of which were consonant, and the other half, dissonant. The material was presented by means of a reading pacer in such a way that each sentence was exposed separately for seven seconds. Recall was measured immediately afterward by means of a written completion test in which the first half of each of the forty sentences, in re-randomized order, was given. The subjects were told to guess on those sentences they could not recall.

Analyses of variance for randomized blocks design, with and without replications, and several correlations were performed on the data.

The results confirmed the first prediction that dissonant material is recalled better when exposed under hypnosis, than when exposed in the normal state. However, the results did not confirm the second prediction that dissonant material recalled under hypnosis, when exposed in the normal state, is remembered better than dissonant material exposed and recalled in the normal state.

Several additional findings were reported: significantly more consonant than dissonant sentences were recalled under all conditions; most instances of distortion were in the direction of consonance; no significant correlation was found between level of verbal intelligence and recall of dissonant material.

On the basis of the results and the theoretical formulations, the following conclusions have been reached:

1. When dissonant material is presented to a person in the normal state, and when this material cannot be integrated with previous experience, the rational processes function so as to eliminate the material or to distort it in such a way that it fits with existing knowledge.

2. When dissonant material is presented to a person in the hypnotic state, due to partial suspension of the rational processes, the material is not cognized as "dissonant" to the same degree as in the normal state, and therefore it "registers" and is available at time of recall.

3. It follows from these two conclusions that if the dissonant material is presented in the normal state it does not register during exposure and so is not available at recall, even in recall under hypnosis when there is a partial suspension of the rational processes.

A P P E N D I X E S

APPENDIX A

THE TEST LIST

TABLE I

THE TEST LIST

(D)*	He expressed his wish clearly, so that almost everyone could ignore him.
(C)*	Unable to disguise his dissatisfaction, he decided to leave the room.
(C)	It is not that we have another plan, but yours needs a complete revision.
(D)	I like this story very much, despite the fact that it appeals to me.
(D)	The actors were ready to start, long after the curtain went up.
(C)	Granted that the odds are against us, we still have a fighting chance.
(C)	After a leisurely walk in the garden, he returned for his usual drink.
(D)	Following a heated discussion, a long argument preceded.
(D)	Unable to stay longer at the party, he was standing near the table.
(C)	Supposing your view is correct, would you really act upon it?

*C--consonant; D--dissonant.

TABLE I--Continued

(C) As he will not hesitate to do it, you may certainly ask for his help.

(D) George did not care for the movies, so he arrived late for lunch.

(D) As no sound was heard, the picture was left on the chair.

(C) Following his footsteps quietly, she imitated his unusual gait.

(C) Since it sounds like a good idea, I really feel it deserves a try.

(D) He did not budge an inch; on the contrary, he refused to admit his mistake.

(C) Without coming to a quick decision, I tend to favor your position.

(D) Unless you make up your mind, you will decide what to do about the matter.

(C) Although we asked him to remain, he had to leave right away.

(C) The way to the village was muddy; in fact it was almost impassable.

(D) After an exhaustive drive, he appreciated the new paintings she got.

(C) My brother went out for a minute, because he wanted to buy cigarettes.

TABLE I--Continued

(C) The driver has neither dimmed his lights, nor has he reduced the speed of the car.

(D) This upset all our plans for the party; nevertheless we postponed it for several days.

(C) The little dog did not run away; on the contrary, it bravely approached the gate.

(D) All the children have already gone to bed, so that the buses ran on schedule.

(D) Although the boat was moving slowly, they settled down for a card-game.

(C) As no agreement was reached, they let the matter drop for a while.

(D) Instead of going to the store, at eight o'clock the concert has started.

(D) Without heeding your advice, I believe I can count upon it.

(C) She slammed the door, so all knew she was quite upset.

(C) The majority has already voted, so they were sure who would be elected.

(D) Supposing he is sick, will he be early for dinner?

(D) He was quite tired this day, so he went for his weekly hair-cut.

TABLE I--Continued

(C) As it was a warm afternoon, he took off his coat and felt better.

(D) Despite his liking for his present job, he also joined the club.

(C) The train left on schedule; nevertheless it took a long time before it left.

(D) Since he was in a rush, he paid as usual some attention to the street lights.

(D) I have nothing to say about the matter; so I'll tell you my own viewpoint.

(C) Jack liked the new show so much, that he stayed for a second performance.

APPENDIX B

RANKING AND ASSIGNMENT OF SUBJECTS

TABLE II

SUBJECTS RANKED ACCORDING TO SCORES ON GHOST STORY AND IQ VALUES BASED ON SCORES ON THREE WAIS SUBTESTS

Rank	Subjects	Ghost Story Scores	IQ	Rank	Subjects	Ghost Story Scores	IQ
1	R.T.	23	134	9	A.B.	49	142
2	J.R.	26	136	10	C.G.	51	132
3	J.M.	31	106	11	P.P.	52	124
4	S.D.	37	136	12	C.C.	53	142
5	P.G.	38	130	13	G.H.	55	140
6	S.A.	40	141	14	D.A.	58	146
7	J.L	46	128	15	L.C.	63	124
8	R.M.	47	134	16	N.B.	65	150

TABLE III

ASSIGNMENT OF SUBJECTS TO BLOCKS AND CONDITIONS

Blocks	Conditions			
	H-H	H-N	N-H	N-N
1	J.M.	S.D.	R.T.	J.R.
2	P.G.	S.A.	R.M.	J.L.
3	C.G.	P.P.	A.B.	C.C.
4	D.A.	L.C.	N.B.	G.H

APPENDIX C

RAW DATA

TABLE IV

CORRECTLY RECALLED DISSONANT SENTENCES

Blocks	Conditions			
	H-H	H-N	N-H	N-N
1	4	11	1	4
2	10	5	5	9
3	13	4	6	2
4	9	15	10	4
Sum	36	35	22	19
Mean	9	8.75	5.5	4.75

TABLE V

CORRECTLY RECALLED CONSONANT SENTENCES

Blocks	Conditions			
	H-H	H-N	N-H	N-N
1	16	13	4	5
2	13	8	12	17
3	13	11	13	15
4	17	16	15	13
Sum	59	48	44	50
Mean	14.75	12	11	12.5

TABLE VI

THE MEANS OF CORRECTLY RECALLED CONSONANT SENTENCES EXPOSED UNDER HYPNOSIS OR IN THE NORMAL STATE FOR EACH OF THE PRE-EXPERIMENTAL RECALL GROUPS

Condition at Exposure	Pre-Experimental Recall Groups			
	1	2	3	4
H	14.5	10.5	12	16.5
N	4.5	14.5	14	14

APPENDIX D

MEANS AND COMPARISONS

TABLE VII

COMPARISON OF "DISSONANT" AND "CONSONANT" SCORES FOR EACH AND ALL CONDITIONS

H-H			N-H		
Subjects	Consonant	Dissonant	Subjects	Consonant	Dissonant
1	16	4	9	4	1
2	13	10	10	12	5
3	13	13	11	13	6
4	17	9	12	15	10
H-N			N-N		
5	13	11	13	5	4
6	8	5	14	17	9
7	11	4	15	15	2
8	16	15	16	13	4

TABLE VIII

DIRECTION OF DISTORTION IN TERMS OF NUMBER OF SENTENCES DISTORTED IN EACH DIRECTION AND CONDITION

Condition	Direction of Distortion									
	C-D		C-C		D-C		D-D		SUM	
	r	g	r	g	r	g	r	g	r	g
H-H	1	6	4	4	7	28	2	4	14	42
H-N	3	3	9	15	18	25	3	1	33	44
N-H	6	8	6	15	10	26	8	7	30	56
H-N	1	10	6	14	16	36	1	7	24	67
All Groups	11	27	25	48	51	115	14	19	101	209
All Groups (Sum r&g)	38		73		166		33		310	

C--Consonant
D--Dissonant
r--distorted recall
g--distorted guess

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A B S T R A C T O F D I S S E R T A T I O N

ABSTRACT

The purpose of the study has been to explore certain cognitive processes as they operate in the hypnotic state. More specifically, it was to investigate the influence of hypnosis on the recall of verbal material cognitively dissonant in nature. Cognitive dissonance occurs when one element of cognition does not follow from the other.

On the basis of the literature on hypnosis, especially from the writings of Gill and Brenman (1959) and Shor (1959), and the findings of Orne (1959) concerning the suspension of rational thinking in the hypnotic state, two predictions were made:

1. Cognitively dissonant material exposed under hypnosis is recalled better than cognitively dissonant material exposed in the normal state.

2. Cognitively dissonant material exposed in the normal state is recalled better under hypnosis than when it is both exposed and recalled in the normal state.

The subjects were sixteen undergraduate students, nine females and seven males, from 22 to 27 years of age, with the median at 23. In several screenings they had

passed from ten to twelve of the Stanford hypnotizability tests and were classified as good hypnotic subjects. They were divided into four groups of four according to their scores on a pretest of verbal recall ability. They were also given three subtests of the Wechsler Adult Intelligence Scale: Information, Similarities, and Vocabulary. Later, the subjects within each group were randomly assigned to one of four experimental conditions: (1) both exposure and recall under hypnosis; (2) exposure under hypnosis and recall in the normal state; (3) exposure in the normal state and recall under hypnosis; and (4) both exposure and recall in the normal state.

The material to be recalled was a randomized list of forty sentences, half of which were regular, or consonant, and the other half, dissonant sentences. The material was presented by means of a reading pacer in such a way that each sentence was exposed separately for seven seconds. Recall was measured immediately afterwards by means of a written completion test in which the first half of each of the forty sentences, in re-randomized order, was given. The subjects were told to guess on those sentences they could not recall.

Analyses of variance for randomized blocks design, with and without replications and several correlations

were performed on the data.

The results confirmed the first prediction that dissonant material is recalled better when exposed under hypnosis, than when exposed in the normal state. However, the results did not confirm the second prediction that dissonant material recalled under hypnosis, when exposed in the normal state, is remembered better than dissonant material exposed and recalled in the normal state.

Several additional findings were reported: significantly more consonant than dissonant sentences were recalled under all conditions; most instances of distortion were in the direction of consonance; no significant correlation was found between level of verbal intelligence and recall of dissonant material.

On the basis of the results and the theoretical formulations, the following conclusions have been reached:

1. When dissonant material is presented to a person in the normal state, and when this material is not integrated with previous experience, the rational processes function so as to eliminate the material or to distort it in such a way that it fits with existing knowledge.

2. When dissonant material is presented to a person in the hypnotic state, due to partial suspension of the rational processes, the material is not cognized

as "dissonant" to the same degree as in the normal state, and therefore it "registers" and is available for recall.

3. It follows from these two conclusions that if the dissonant material is presented in the normal state, it does not register during exposure and so is not available at recall, even in recall under hypnosis when there is a partial suspension of the rational processes during recall.

A U T O B I O G R A P H Y

AUTOBIOGRAPHY

I was born on December 11, 1925, son of Yechiel and Batiah Anavi. I was graduated from Tichon Hadash (Israel) High School in 1938. I entered the Hebrew University in Jerusalem in 1942, and majoring in History, I received the degree of Master of Arts in 1950. I entered the Graduate School of Boston University in 1958. During the years 1958-1962 I was a clinical psychology trainee at Massachusetts Mental Health Center and at South Shore Guidance Clinic.

I married Mina Maydan in February, 1956.