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# Recall and recognition memory under varying conditions of hypnotically suggested amnesia

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Posthypnotic amnesia has been systematically investigated in the past and subsequently alluded to as either role enacted behavior or evidence for an altered state of consciousness. Recall and recognition have been tested during posthypnotic amnesia and as in normal memory functioning, recognition performance has been found to be usually superior to recall performance. In order to gain further understanding of the circumstances which facilitate amnesic behavior, an experiment was carried out which was designed to vary the usual manner in which recall and recognition memory are observed during posthypnotic amnesia.

The suggestion for posthypnotic amnesia was varied from previous research in that some subjects received the suggestion before presentation of the to-be-remembered stimuli rather than after stimulus presentation. In place of the usual general suggestion for overall memory impairment, specific suggestions for recall amnesia and for recognition amnesia were used. Nonverbal stimulus material supplanted the usual verbal material also.

A group of 44 undergraduate subjects was divided into four treatment conditions and all were administered the Stanford Scale of Hypnotic Susceptibility, Form A. Three groups remained hypnotized while the Bender Gestalt test was administered and a fourth group was aroused before their Bender administration. One hypnotic group was given prestimulus suggestions for amnesia for recall and amnesia for recognition. Another was given poststimulus suggestions for recall and recognition amnesia. The third hypnotic group was given no suggestion for amnesia. The dependent measure was the number of recalled and recognized Bender figures.

A repeated measures analysis of variance revealed significant effects for type of memory test (recall vs. recognition) and for the hypnosis/suggestion condition. Further analysis determined that all hypnotic groups significantly differed from the waking control group in terms of mean memory scores, but there were no significant

differences among hypnotic group memory scores. These results indicated that: recall performance was significantly more affected by hypnosis than was recognition performance; specific suggestions for recognition amnesia did not have any significant effect on recognition performance; hypnosis with suggested amnesia did not result in a significantly greater amount of amnesia than did hypnosis without any amnesia suggestion; and hypnosis with or without suggested amnesia resulted in poorer recall than shown in a waking condition but this difference did not hold for a recognition test. These results do not support the role enactment theory due to the lack of amnesic role adherence in the situation involving direct role demand for recognition amnesia.

The results of the present experiment are discussed in terms of theories of memory, theories of hypnosis, and previous germane research. The need for replication of these results prior to drawing conclusions based on them is also suggested.

# RECALL AND RECOGNITION MEMORY UNDER VARYING CONDITIONS OF HYPNOTICALLY SUGGESTED AMNESIA

by

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# CHAPTER I

## INTRODUCTION AND REVIEW OF THE LITERATURE

One of the most curious effects of the hypnotic state is the amnesia shown by a subject who has been told that he or she will not remember the events or information that occurred during the trance state. The popular view of this phenomenon is that a person cannot remember and was probably not conscious of what transpired in the temporal span between the commands, "You are deep asleep" and "You are fully awake and alert." Another notable characteristic of suggested amnesia is that it is often reversible; after emerging from a hypnotic experience a person will not report memory of some event or bit of information he/she was exposed to until told of his/her ability to do so, then the memory will come forth.

The nature of this temporary memory impairment remains unknown and has been the subject of much controversy within and outside the field of hypnosis research. Theories of posthypnotic amnesia include those of Sarbin and Coe (1972) and Barber and Calverley (1966) who suggest that it is an artifact of role enacted behavior or expected compliance. Opposed to this view are the more cognitive theories of Bowers (1976) and Kihlstrom and Shor (1978)

who profess an "altered state of consciousness" explanation for amnesic behavior.

A number of different experiments have provided data that have been interpreted to support one or the other of these positions at various times. To complicate the matter further, the experimental literature on normal (waking) memory and forgetting reveals various accounts of the cognitive mechanisms responsible for those functions.

Given this state of affairs it is here suggested that further knowledge of the psychological characteristics and mechanisms operating in posthypnotic amnesia as well as hypnosis in general is going to be gained only in a piecemeal fashion. Many experiments designed to test many separate, though related, hypotheses are necessary before drawing all the data together for a definitive answer to such questions as: What accounts for posthypnotic amnesia in some people and perfect memory in others? Is amnesic behavior role enactment or disorganized retrieval? Why does recognition memory nearly breach an amnesia suggestion? This thesis is proposed to contribute to the task of isolating the apposite variables involved in the phenomenon of posthypnotic amnesia by further investigation of the observed differences between recall memory and recognition memory during posthypnotic amnesia.

## Recognition and Recall Under Hypnosis

As is the case in normal memory research, recognition has been observed to be significantly more successful than recall memory in studies of posthypnotic amnesia. In other words, after being given a suggestion during hypnosis to be amnesic for certain stimulus material, subjects can recognize the stimuli quite successfully but recalling it is much more difficult. Williamsen, Johnson, and Ericksen (1965) were among the first to observe this phenomenon. In their first experiment, hypnotized subjects learned a list of six common words and then received an amnesia suggestion. On an initial recall test there was little ability on the part of the subjects to recall the stimulus words. After performing another related learning task, the subjects were presented with a list containing the six stimulus words and six unrelated new words. There was a significant improvement by all subjects on this recognition memory task although the performance of the highly hypnotizable and amnesic subjects was still below the recognition performance of a waking control group. In a second experiment however, these authors omitted the task that separated the recall and the recognition tests and under these circumstances there was no significant difference between the two memory performances. This implies that the previous difference could have been a function of the intervening activity and/or time between the recall and recognition tasks.

Barber and Calverley (1966) did a virtual replication of the first Williamsen et al. experiment using 144 student nurses as subjects, and they obtained comparable results. The hypnotic subjects recalled significantly fewer critical words than they recognized either partially (some letters omitted) or wholly. These two studies further found that subjects that were rated highly susceptible on a standardized scale were more amnesic than subjects low in susceptibility.

Kihlstrom and Shor (1978) carried out the most recent investigation of these memory differences with two separate experiments. In the first one, 453 college students were given a standardized susceptibility scale (Harvard Group Scale of Hypnotic Susceptibility) followed by either a written recall test or a recognition test involving the items (suggestions) on the susceptibility scale. A group of 196 subjects was asked to recall on paper the events during hypnosis after being given a suggestion for post-hypnotic amnesia regarding the previously presented items on the scale. The other group of 257 subjects received the same scale and suggestion but was given a list containing nine critical suggestions and eleven additional suggestions that did not occur during the hypnotic procedure. In this situation recognition performance was significantly better than recall. These authors did further comparison of hypnotic susceptibility and amnesia in each group. They

derived point biserial correlations of .32 ($p<.05$) for initial amnesia and susceptibility scores in the recall condition, but only .04 between initial amnesia and susceptibility scores in the recognition condition. This finding implies that recall performance during posthypnotic amnesia is related somewhat to susceptibility but recognition performance during the same condition is not.

The second experiment by these authors involved 50 subjects experienced with hypnosis and classified as low to moderate in hypnotizability or high in hypnotizability on the basis of scores on the Stanford Hypnotic Susceptibility Scale, Form C. Each subject was given the scale including an amnesia suggestion for the previous items and was asked to recall the events until an impasse occurred at which time a list of eleven critical items and twenty-two plausible nonoccurring items was presented for a recognition test of the critical events. A final recall test followed the completion of the recognition list and a reversibility cue ("Now you can remember everything"). Once again, recall performance was significantly poorer than recognition during posthypnotic amnesia for both low-medium and high hypnotizable subjects. This finding not only adds to the evidence that recognition memory is superior to recall during posthypnotic amnesia, it also contradicts the observation of the Williamsen et al. experiment II that the time and intervening activity

between the recall and recognition tests is responsible for the difference between the two tests of memory. There was little time and no activity during the period between the oral recall test and the written recognition test in Kihlstrom and Shor's second experiment.

## Theories of Recognition and Recall

Before considering other findings on posthypnotic amnesia, it may be useful to take a brief look at theories of normal (waking) memory performance in light of the results described above. There are a number of theoretical views regarding the observed superiority of recognition to recall memory.

A prominent example is the two-stage theory of Anderson and Bower (1972, 1974) which proposes that new information is encoded into an established pattern of associations and memories. The coding is done according to characteristics and properties of the new stimuli that match existing associational structures. Memory involves a search using appropriate cues that lead to an accurate decision. Recall involves search and decision while recognition only involves decision because the cues inherent in a recognition task involve perfect matches to a criterion which obviate the need for searching.

Tulving and Thomson (1973) suggest that memory is a matter of "encoding specificity" which involves contextual

features of the perceived event or information. This theory holds that a match is necessary for successful retrieval, between a memory probe and the encoded features of the stored information.

Craik and Lockhart (1972) profess a levels-of-processing theory which accounts for memory as being contingent on factors such as the number of cognitive operations going on at the time of perception, the context of the memory trace, the level of processing or extent to which the new information is processed according to existing memory stores, and the quality of match between the trace and the memory probe.

This sampling of theories implies a degree of agreement about the mechanism of memory probe information matching the memory trace information. Viewed this way, recall and recognition are not considered qualitatively different operations. The difference between the two operations is largely attributable to the recognition cues containing much more matching information about the critical memory than the recall situation provides.

## Theories of Hypnotically Induced Amnesia

Given the evidence that recognition memory is more apt to breach a suggestion for amnesia than is recall, the two usual interpretations of hypnotic amnesia present themselves. It could be suggested that because recognition

memory is superior to recall memory in both the hypnotic state and the normal alert state, there is no difference between the two conditions in terms of memory function. This assumption seems to support the role demand enactment view of hypnotic phenomenon. However, a good role enactment should include amnesic performances by good subjects in both recognition as well as recall situations. In both the Williamsen et al. (1965) experiments and Barber and Calverley's (1966) study, a hypnotic group instructed to simulate amnesia performed equally poorly on both recall and recognition tasks and remembered significantly fewer items than the genuine hypnotic group or the control group. Further evidence against the role enactment theory comes from an experiment by Bowers (1966) in which he also used a simulator group and a hypnotic group to compare responses in a situation free of obvious experimental role demand. Subjects had been given the suggestion to start sentences with "I" or "We" and to be amnesic for the suggestion. Both groups used "I" and "We" as expected during the experiment. Then the experimenter ceased the action, took off his lab coat, gave a bogus explanation of the experiment and asked the subjects if they would agree to an interview by a graduate student about their experimental experiences. The graduate student was a confidant and was checking to see whether or not the amnesia was real. All the simulators acknowledged their use of "I" and "We" while 57% of

the hypnotic group still failed to recall their use of the pronouns. From this it was suggested that "pretending" to forget can not account for the phenomenon of amnesia since it is still found in a majority of subjects in situations free of hypnotic role demands.

The alternative explanation involves the characteristics of recall memory and recognition memory. As previously noted, the cues available in a recognition test are usually perfect matches to the memory trace, and in a recall task the cues must be self-generated by the subject. In this case a suggestion for amnesia interferes with organized cue retrieval only in recall. The implication is that there is cognitive involvement in some aspect of hypnosis and in the amnesia suggestion. The possibility that this involvement entails a blocking of consciousness during the hypnotic experience does not survive investigation.

Bowers (1976) did another study in which susceptible subjects were given a posthypnotic suggestion to choose one of a pair of paintings associated with a four digit index number containing the numeral seven. The subjects that evinced no memory for the role of a seven in their choice were asked to circle any number from one to nine. Over half circled seven while one-sixth of a control group chose that number. This was taken as evidence that the amnesic subjects, at some level, found a special significance in the number seven, and their evident amnesia for remembering why

was not equivalent to never having known that seven had special significance in their choice.

Most proponents of the cognitive "altered state" view of hypnosis agree with Hull's (1933, in Evans and Kihlstrom 1973, p. 318) original proposition that "the processes underlying posthypnotic amnesia take place at the level of memory retrieval rather than . . . information storage." This is based on the phenomenon of reversibility of the suggested amnesia. What cannot be remembered at one point during posthypnotic amnesia will come forth from susceptible subjects after the amnesia is "lifted" by a prearranged cue (Nace, Orne, and Hammer 1974). This certainly implies that the information during hypnosis is acquired and stored in some form if it can be remembered following a certain cue.

Evans and Kihlstrom (1973) compared the order of retrieved items on a recall test by susceptible and insusceptible hypnotic subjects during posthypnotic amnesia. They found that the sequence of remembered items was quite different from the sequence of item presentation for the susceptible group, and the insusceptible group recalled significantly more items and in significantly more accurate sequential order (according to presentation) than the susceptible subjects. The authors interpreted these results as supporting the assumption that disorganized retrieval accounts for posthypnotic amnesia, at least under recall testing circumstances.

In light of the evidence available, Kihlstrom and Shor (1978) attribute recall amnesia to a dissociation of particular memories from conscious control. This is a variation on the disorganized retrieval theme which seems to explain amnesia for recall satisfactorily but accounts for the superior recognition performance nearly breaching the amnesia suggestion by the perfect match of a cue to the memory trace.

Other evidence which covers the recall-dissociation-disorganized retrieval proposition comes from Hilgard (1966) and Osborn (1965, in Hilgard 1966). Hilgard (1966) has found that some subjects manifest spontaneous posthypnotic amnesia, although with much less prevalence than suggested amnesia. Osborn (1965, in Hilgard 1966) used a drug (thiopentol) to induce a drowsy, hypnotic-like state and, under this condition, partial amnesia was observed. These authors suggest that these instances support a notion of an inherent disorganized and/or dissociated state during hypnosis that can lead to the observed amnesic behavior. Orne (1966) also postulates this phenomenon as accounting for posthypnotic amnesia and compares it to the waking dissociation of inaccessible memory that cannot be recalled without the proper cue (normal forgetting).

These cognitive theories are not free of detractors and it may be useful to include some counter arguments for

the purpose of broadening this overview of posthypnotic amnesia.

## Alternative Views of Posthypnotic Amnesia

Coe (1978) takes what is known as a contextual view of posthypnotic amnesia and perceives the phenomenon as flowing from everchanging situational cues which direct a subject's overt behavior, in this case a subjective report of amnesia. Challenges to the credibility of self-reported amnesia come from a study by Bitterman and Marcuse (1945) in which galvanic skin response (GSR) was monitored during a test for posthypnotic amnesia. Subjects were given a suggestion not to remember certain key words that had been presented during hypnosis. During a recognition test the key words were presented with neutral words and susceptible subjects recognized significantly fewer key words than a control group until they were told they could recognize them (reversibility cue). However, their GSR's in reaction to key words were different from those in reaction to the neutral words.

Another experiment by Coe, Basden, Basden, and Graham (1976) involved giving subjects two lists of words to remember, one before hypnosis and one during hypnosis. The second list presentation was designed to create retroactive inhibition for the first list--so, learning the second made it more difficult to recall the first. Some

subjects were given a posthypnotic suggestion for amnesia regarding the second list learned during hypnosis, and other subjects were not. It was suggested by the authors that if posthypnotic amnesia made the second list unavailable, then subjects that were amnesic for it should have recalled the first list at a higher rate than the non-amnesic subjects. The results were such that subjects who did not recall the second list (amnesic group) did not recall the first list significantly better than the group that was not amnesic for the second list. There was retroactive inhibition of the first list by the second for the amnesic subjects as well as for the nonamnesic subjects.

The controversy between those advocating the cognitive-altered state theory and those agreeing with the role enactment theory maintains a rather consistent split between cognitive theorists and behavioral theorists. The former, such as Bowers and Kihlstrom, interpret their data to imply that genuine memory impairment takes place during hypnosis which disorganizes recall ability but seldom impairs recognition with its superior cues. The behaviorists, including Barber and Coe, possibly by theoretical bent, do not give credence to subjective self-reports of amnesia and consider any evidence of direct cognitive activity of any kind scant or lacking.

While this theoretical disagreement continues there are numerous questions yet to be addressed that could help

resolve the questions regarding the mechanisms operating in hypnosis generally and posthypnotic amnesia specifically.

## New Questions on Hypnotic Amnesia

There are certain aspects of the research discussed above that raise new points to consider in investigating amnesic behavior in hypnosis. One of the most significant independent variables in the Barber and Calverley (1966) study was type of suggestion. They obtained different results for groups given various suggestions, e.g., authoritative amnesia ("You will forget"), permissive amnesia ("Try not to hear"), simulation of amnesia, and no amnesia. This implicates the characteristics of the suggestion itself as being quite important in the observance of the suggested behavior. As obvious a statement as that may seem there has been little effort to focus on some particular variations in the amnesia suggestions which may lead to results that differ from the usually observed pattern between recall and recognition memory performance.

Williamsen et al. (1965) obtained no significant difference between recall and recognition performance in their second experiment and the cause was suggested as the shortening of the time interval between recall and recognition testing. This was later disproved by Kihlstrom and Shor (1978) who repeated that procedure. The earlier Bitterman and Marcuse (1945) study obtained no reported

difference between recall and recognition performance while subjects were still under suggested amnesia, but no causes were discussed as this was not a pertinent matter in that particular experiment. These studies suggest that under some circumstances recognition memory is not superior to recall memory during posthypnotic amnesia. It is quite plausible that those circumstances somehow involve the characteristics of the amnesia suggestion as well as the manner in which the amnesia (or memory) is assessed.

Beginning from Barber and Calverley's (1966) observation that type of suggestion was a pertinent variable, the present investigation proposes looking into some variations in the suggestion variable and the stimulus material used to assess posthypnotic memory.

The amnesia suggestion on most standardized susceptibility scales involves general memory for the previous sensations and motor tasks called for by the scale items. Other studies have involved paired associate or word list learning of some kind.

Another consistency in previous research on posthypnotic amnesia involves the timing of the amnesia suggestion, which is usually given after the presentation of the to-be-remembered (or forgotten) material. In terms of this last point, recall that according to the current theories of normal memory function (e.g., Craik and Lockhart 1972; Tulving and Thomson 1973) the context of the memory

trace and the amount of perceptual activity occurring at the time of retention influence the success of subsequent memory. This implies that a variation in the timing (context) of the amnesia suggestion would result in different effects for both initial and reversible amnesia. To suggest inability to remember the stimulus material before it is presented would alter the context and degree of perceptual activity during which the critical material was being presented. This prestimulus suggestion would be more apt to attenuate the subsequent effort devoted to retention and may result in poorer recall and recognition in comparison to performance under a poststimulus suggestion for amnesia as it is usually given.

Of equal interest would be the effect of more specific amnesia suggestions delineating recall and recognition. In past research the amnesia suggestion has been of a general form such as "You will not remember" or "Try to forget" regardless of what kind of memory test was being used. Looking again at theory, the cognitive model for posthypnotic amnesia involves disorganization of retrieval due to a dissociation from conscious memory. This view can account for the relative success of recognition in spite of suggested amnesia by the perfect matches between memory probe and trace inherent in a recognition task. There are also the facts that some studies do not get significant differences between posthypnotic recall and recognition, and in

cases in which the difference is significant, recognition has not completely breached amnesia.

If a separate suggestion to be amnesic for recall and a separate suggestion to be amnesic for recognition were given to susceptible subjects the results would be most interesting in light of the controversy over the mechanisms responsible for posthypnotic amnesia. Focusing on recognition performance, a significant amount of amnesia on the recognition task followed by successful recognition of the critical material after a cue to lift (reverse) the amnesia would tend to support the role enactment view of amnesic behavior. The direct suggestion not to recognize would stifle a report of memory until the reversal cue allows it. Accurate recognition following the reversed amnesia cue would imply that the stimulus was perceived, retained, and processed in memory. If, however, recognition performance is significantly better than recall as is usually the case, it would detract from the role enactment theory because subjects would be failing to comply with the direct suggestion not to recognize. Another possibility, that of initially poor recognition and equally poor recognition following the reversal of the amnesia suggestion would imply that something other than the suggestion was operating during the hypnotic experience to interfere with successful memory performance.

A further potentially interesting point of departure from usual methodology is also addressed in this thesis. It has been noted that most of the research on posthypnotic memory has used verbal material in one form or another as the critical stimuli to be remembered. This presupposes that memory mechanisms of interest are semantic and episodic in nature and are largely left hemispherical functions. Hilgard and Hilgard (1975) point out that hypnosis involves right hemisphere activity more than left as measured by electrical activity in the brain during hypnosis. It seems logical that spatial forms of memory (e.g., that for shapes, designs, patterns, etc.) would be more involved in hypnotic experiences as spatial perception is the domain of the nondominant (usually right) hemisphere (Luria 1973). Considering this situation, the use of nonverbal stimulus materials rather than words or events may be of interest for this field of investigation.

Any remarkable differences in total memory performance using nonverbal stimuli during hypnosis from memory for semantic and/or episodic material during hypnosis as per the previously cited body of evidence could illuminate some further characteristics of hypnosis-memory interaction.

In consideration of the foregoing information, this thesis is proposed to test the following hypotheses:

Hypothesis 1. That suggesting the inability to recall or recognize stimulus material before it is

presented will make recall and recognition significantly more difficult than they are when the same suggestions are given after the stimulus presentation.

Hypothesis 2. That specialized instructions inducing the inability to recognize stimulus material will result in a significant amount of amnesia on a recognition task.

In addition, the informal hypothesis is posed that using nonverbal stimulus material will contribute to a difference in the usually observed trend in which recognition is proof against posthypnotic amnesia more than is recall memory.

# CHAPTER II

## METHOD

### Subjects

A total of 44 people (32 females and 12 males) were selected as subjects from volunteers from four different undergraduate psychology classes at Portland State University. Announcements were made in each class regarding the opportunity to participate in a hypnosis experiment which involved the administration of a standardized susceptibility scale. No remuneration (other than extra class credit where applicable) was offered to any subject. From a group of 65 hypnotic subjects, 44 proved susceptible enough to complete the experiment. The age range of the subjects was 18 to 47 years with a mean age of 22.9 years and a mode of 19 years.

### Procedure

The first phase of the experiment involved a brief interview with each potential subject at which time the experimenter discussed the characteristics of the susceptibility scale and hypnotic experience. In conjunction with this was the administration of a health status questionnaire which was designed to screen out any individuals with neurological, physical, or emotional infirmities that could

render hypnosis a potential danger to her/him. The questionnaire is presented in Appendix A.

The setting for all phases of this experiment consisted of a small consulting room used by the Portland State University Psychology Clinic. The subject sat in a reasonably comfortable chair at a desk with a wall directly across from him/her. The experimenter sat 90 degrees to the right of the subject with the subject's right profile facing him. An eye fixation induction target consisting of three overlapping silver thumbtacks was placed at eye level on the wall across the desk from (and directly in front of) the subject. Lighting was limited to a small, low wattage, desk lamp.

Subjects were all tested separately. After establishing that a given subject was suitable to continue without undue risk, the administration of the Stanford Hypnotic Susceptibility Scale, Form A of Weitzenhoffer and Hilgard (1959) immediately followed the interview segment. The scale consists of a standardized eye fixation induction of hypnosis and a series of representative hypnotic experiences (suggestions) that are scored on a pass or fail basis. The criterion used for scoring consists of the observable following of each suggested experience by the subject. The individuals who obtained a score of seven or above (out of a possible ten) continued on to the next phase of the experiment. Those subjects attaining a lower score than

seven were aroused from hypnosis (using the appropriate section of the scale) and when fully alerted and comfortable they were thanked and dismissed from further participation.

Following the successful completion of the susceptibility scale, the subject was assigned randomly to one of four experimental treatment groups. This was done by the experimenter who drew a card from a randomly shuffled deck of cards, each marked A, B, $C_2$, or C for each treatment condition. There was a total of 44 cards split into two decision decks, one for each sex. The ratio of male to female (cards and subjects) was determined from that ratio found on the total list of volunteers, which was roughly three females to one male. The aim was to have equal proportions of each sex represented in each group as well as equal n's while maintaining random assignment. While the subject remained hypnotized, the experimenter drew a card from the top of the deck for the appropriate sex; the card was then destroyed.

Those subjects for which the experimenter randomly drew an "A" card were immediately administered the nine figures of the Bender Gestalt Test (Bender 1946) with instructions to copy each one as it was presented to them one at a time for 15 seconds. Instructions were also given to remain hypnotized and relaxed while still being able to open the eyes and draw the figures with pencil and paper

which were placed before them. Following completion of the nine drawings, the A subjects closed their eyes again and were given a suggestion to be amnesic for recall and a suggestion to be amnesic for recognition of the figures until a signal was given, at which time they could remember everything. The text of these suggestions is contained in Appendix B. Following the card drawing, the subjects who "received" a B card were first given the suggestions for inability to recognize or recall the Bender figures and then the drawing task (stimulus presentation) followed. Those subjects who had a $C_2$ card drawn for them were given the Bender figures and accompanying instructions but received no suggestions for amnesia. These subjects were also still hypnotized while doing the drawing task and like their counterparts in groups A and B, they were told to close their eyes again and relax after completing the drawing task. The C card called for those subjects assigned to that group to be aroused from hypnosis after the card was drawn and before any further activity. After being aroused from the hypnotic state they were then presented with the Bender figures to copy in the same manner as were other subjects but without hypnosis or any amnesia suggestion. This was the main control condition which provided an estimate of normal (waking) memory performance, while the $C_2$ condition controlled for the amnesia suggestion but permitted a measure of memory performance as affected by hypnosis minus suggested amnesia.

The final portion of the experiment consisted of the memory testing phase. Following completion of the drawing task, subjects in groups A, B, and $C_2$ were told to close their eyes again and relax. Then the final segment of the Stanford Scale was utilized to rouse them from the hypnotic state; this included the experimenter counting aloud backwards from twenty to one. To control for the time and activity factor, the C subjects were asked to also count aloud from twenty to one after they had completed copying the Bender figures. After the hypnotic subjects were alert, and the C subjects (who were awakened earlier) had done their counting task, a recall memory test was administered which consisted of placing a second blank sheet of paper on the desk before the subject and asking her/him to recopy the figures that she/he could recall from memory. When an impasse was reached, that sheet was taken away and a recognition list of twenty randomly arranged figures including the nine Bender figures was presented and the subject was asked to circle all the figures that were originally presented and copied. A copy of the recognition list is presented in Appendix C. After completion of that recognition task, all subjects were given the prearranged cue to "lift" the suggested amnesia. This consisted of a suggestion that the subject could now remember everything. Then both the recall (copying from memory) task and the recognition list were presented again just as they were the first

time. For the control conditions the presented cue of "Now you can remember everything" had nothing to do with the absent amnesia suggestion. However, to ensure uniformity in testing conditions, the reversal cue and the second memory test trial were carried out just as they were for groups A and B.

Before analyzing the data it was necessary to devise a scoring criterion for the recalled figures and test the reliability of that criterion. This was done by comparing scoring judgments of four different raters. A three point rating scale was selected for scoring the accuracy of the redrawn (recalled) Bender figures with a maximum score of three being a distortion free, accurate copy based on the original drawing directly copied from the stimulus card. A zero was scored for each missing figure. The experimenter, a fellow graduate student, and two psychologists familiar with the Bender each scored recall test results from a randomly selected subsample of ten subjects. Each treatment condition was represented, but rater/scorers were blind as to which group each sample subject was representing. Instructions for raters and details of the scoring criteria are contained in Appendix D.

Intercorrelations among the four raters' summed rating scores for both recall trials of each subsample subject were computed. The average Pearson r obtained as a reliability coefficient of ratings was .98. The remainder

of the recall data was scored by one of the four raters using the same criteria. Recognition scores, in order to be compared with recall results, consisted of three points for each correctly recognized figure from the recognition list. Both recall and recognition scores were summed. This yielded one total recognition performance score and one total recall score for each trial. Complete recall or complete recognition corresponded to a score of 27 points (three for each of the nine figures).

# CHAPTER III

## RESULTS

The mean susceptibility score for the total sample based on ten items of the SHSS:A was 8.16. The range was from 8.0 to 8.54 across the four treatment groups. Table I shows the mean recall and recognition scores on the first trial for all four treatment conditions.

TABLE I

MEAN SCORES ON MEMORY TESTS FOR EACH EXPERIMENTAL TREATMENT GROUP

| Treatment Group | N | Mean Scores | |
|---|---|---|---|
| | | Recall | Recognition |
| A-hypnosis with a post-stimulus suggestion for amnesia | 11 | 10.72 | 21.0 |
| B-hypnosis with a pre-stimulus suggestion for amnesia | 11 | 11.72 | 20.73 |
| $C_2$-hypnosis with no amnesia suggestion | 11 | 12.54 | 22.09 |
| C-waking control; no hypnosis, no suggestion for amnesia | 11 | 19.45 | 25.63 |

A repeated measures analysis of variance (Kirk 1968) resulted in significant effects for both type of memory test (recall

vs. recognition) and hypnotic/suggestion condition. These results are shown in Table II.

TABLE II

ANALYSIS OF VARIANCE: TYPE OF MEMORY PROBE TEST X HYPNOTIC/SUGGESTION CONDITION

| Source | df | SS | MS | F | p |
|---|---|---|---|---|---|
| Within | 80 | 2491.454 | 31.143 | | |
| Between | (10) | | | | |
| Factor 1 type of test | 1 | 1684.376 | 1684.376 | 54.085 | <.01 |
| Factor 2 hypnotic condition | 3 | 634.307 | 211.436 | 6.726 | <.01 |
| 1 x 2 | 3 | 52.853 | 17.618 | .565 | >.05 |

Figure 1 graphically represents the mean scores on initial (first trial) recall and recognition tests for each of the four experimental treatment groups.

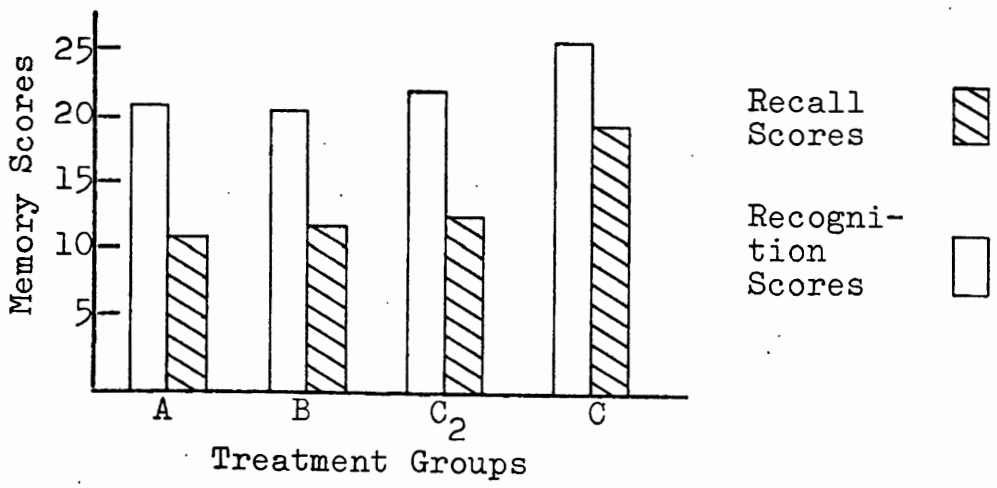


Figure 1. Mean memory scores during posthypnotic amnesia (trial 1).

The results of the ANOVA indicate that recognition memory performance is significantly better than recall performance for the whole sample. The other significant effect, from the hypnotic and amnesia suggestion conditions, is inconclusive without further analysis of the four groups involved. A visual scan of Table I suggests considerable differences among the mean scores for recall of each treatment group and only slight differences among the recognition scores. A multiple comparison test using Tukey's HSD method (Tukey 1953, in Kirk 1968) was carried out. This allowed a determination of which comparisons among the four treatment conditions were responsible for the overall significance found in the analysis of variance. Table III lists the differences among the four treatment group means with first trial recall and recognition scores pooled for each group.

TABLE III

DIFFERENCES AMONG COMBINED FIRST TRIAL RECALL AND RECOGNITION MEANS FOR FOUR TREATMENT GROUPS

| Group | Mean | A | B | $C_2$ | C |
|---|---|---|---|---|---|
| A | 15.86 | - | .367 | 1.45 | 7.68* |
| B | 16.227 | | - | 1.09 | 7.313* |
| $C_2$ | 17.318 | | | - | 6.222* |
| C | 22.54 | | | | - |

*$p<.05$

tabled value = 4.43

Table IV contains mean score differences among first trial recall scores and first trial recognition scores separately for each treatment group comparison. From the multiple comparison tables it is apparent that when initial recall and recognition results are pooled, each hypnotic treatment group (A, B, and $C_2$) is significantly different from the waking control group (C). All three hypnotic conditions had significantly poorer overall memory performance than the nonhypnotic group. However, the three hypnotic treatment groups did not significantly vary among each other. The suggestion for amnesia had no appreciable effect of memory performance.

TABLE IV

DIFFERENCES AMONG MEANS FOR RECALL AND RECOGNITION ON FIRST TRIAL PERFORMANCE BY FOUR TREATMENT GROUPS

| | Group | Mean | Recall Groups | | | | Recognition Groups | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | A | B | $C_2$ | C | A | B | $C_2$ | C |
| Recall | A | 10.72 | - | 1.0 | 1.82 | 8.73* | 10.28* | N/A[a] | N/A | N/A |
| | B | 11.72 | | - | .82 | 7.73* | N/A | 9.007* | N/A | N/A |
| | $C_2$ | 12.54 | | | - | 6.91 | N/A | N/A | 9.55* | N/A |
| | C | 19.45 | | | | - | N/A | N/A | N/A | 6.18 |
| Recog-nition | A | 21.0 | | | | | - | .273 | 1.09 | 4.63 |
| | B | 20.73 | | | | | | - | 1.36 | 4.90 |
| | $C_2$ | 22.09 | | | | | | | - | 3.54 |
| | C | 25.63 | | | | | | | | - |

*$p<.05$; tabled figures = 7.44

[a]N/A: not applicable

When recall and recognition means for each of the four groups were compared separately (Table IV), the difference between recall means for the waking control group (C) and the hypnotic group given no amnesia suggestion ($C_2$) is not significant. Recall mean scores for the three hypnotic groups all differ significantly from their respective recognition mean scores. This difference is not significant for the waking control condition however.

The results of the analysis of variance together with those of the subsequent multiple comparisons indicate that: recall performance was significantly more affected by hypnosis than was recognition; specific suggestions for recognition amnesia did not appear to have any significant effect on recognition performance; the timing of the amnesia suggestion did not result in any significant effects on memory performance; hypnosis in conjunction with any suggestion for amnesia did not result in a significantly greater amount of amnesia than did hypnosis without any amnesia suggestion; and hypnosis with or without suggested amnesia resulted in poorer recall than shown in a waking condition but this difference did not hold for a recognition test.

Table V shows mean scores for both first and second trial recall and recognition scores for each of the four experimental groups. Results of t-tests on the differences are also shown.

TABLE V

t-TEST RESULTS FOR COMPARISONS OF FIRST AND SECOND RECALL AND RECOGNITION TRIALS

| Group | 1st recall $\bar{X}$ | 2nd recall $\bar{X}$ | t | p |
|---|---|---|---|---|
| A | 10.72 | 15.72 | 2.45 | <.05 |
| B | 11.72 | 17.36 | 3.84 | <.01 |
| $C_2$ | 12.54 | 18.73 | 9.01 | <.01 |
| C | 19.45 | 22.64 | 2.99 | <.05 |
| | 1st recog. $\bar{X}$ | 2nd recog. $\bar{X}$ | t | p |
| A | 21.0 | 22.64 | 1.75 | >.05 |
| B | 20.72 | 22.91 | 2.04 | >.05 |
| $C_2$ | 22.09 | 22.36 | .215 | >.10 |
| C | 25.64 | 26.18 | 1.47 | >.10 |

Figures 2 and 3 depict the first and second trial means for each of the four groups on the recall tests and recognition tests respectively.

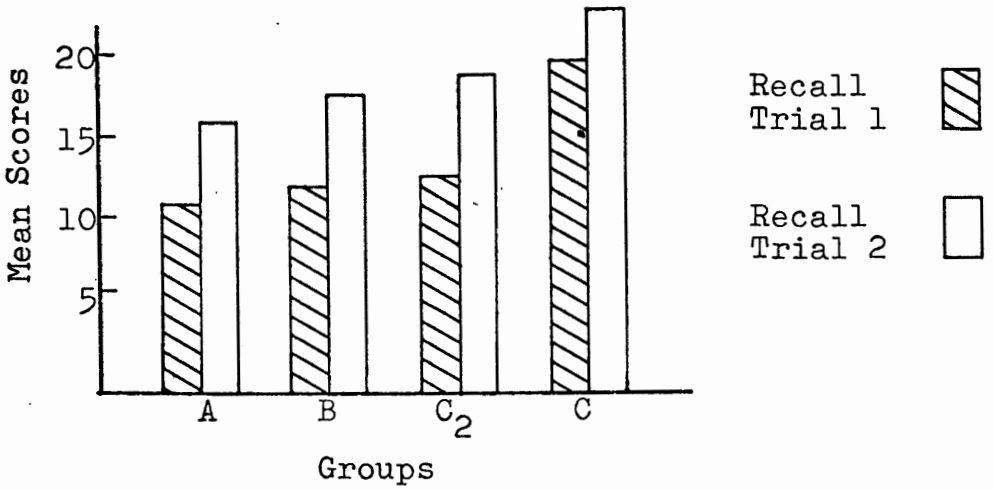


Figure 2. Mean recall scores at trial 1 and trial 2 for all groups.

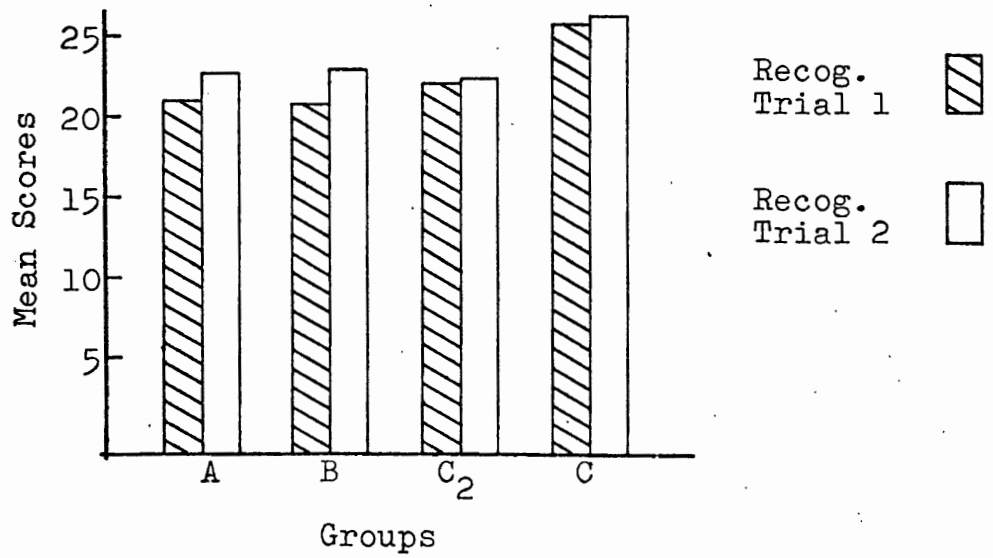


Figure 3. Mean recognition scores at trial 1 and trial 2 for all groups.

The t-test results indicate that in all treatment conditions there was a significant difference between first trial recall mean scores and second trial recall mean scores. There was no significant difference for any treatment group between the first and second trial recognition mean scores, however.

From the graphic representations of the data it is apparent that there is a uniform though not significant trend involved in the group comparisons. There is the highest amount of posthypnotic amnesia for the group given the stimulus presentation under hypnosis and a poststimulus suggestion for amnesia (A). Slightly less amnesia is shown by group B, which was also under hypnosis during stimulus presentation and given a prestimulus amnesia suggestion. The group of subjects given no suggestion but presented with the stimulus while under hypnosis ($C_2$) manifested a still slightly smaller degree of amnesia. The waking control group (C) which was not under hypnosis nor given any suggestion for amnesia showed the least amount of amnesia of all the groups.

# CHAPTER IV

## DISCUSSION

This experiment was an investigation of posthypnotic memory under conditions which varied from those of previous research in this area. Specifically, recall and recognition tests were compared during and after posthypnotic amnesia. Rather than the usual poststimulus suggestion for amnesia regarding the stimulus material, a prestimulus amnesia suggestion was given some subjects. In addition to a waking control group, there was also a second "control" group consisting of hypnotized subjects given no amnesia suggestion. Specific suggestions for recall amnesia and recognition amnesia were given rather than a general suggestion for overall memory impairment. And nonverbal stimuli were used instead of verbal material.

The first experimental hypothesis stated that a prestimulus suggestion for amnesia would lead to greater memory impairment than a poststimulus suggestion for amnesia. This was based on the levels-of-processing theory of Craik and Lockhart (1972). Memory, according to this view, is partially dependent on the context of the memory trace and the quality and quantity of perceptual activity at the time of retention. It was hypothesized that the

timing of the amnesia suggestion constituted a powerful enough contextual variable to have an effect on subsequent posthypnotic memory performance. The hypothesized direction of the effect consisted of greater amnesia for those subjects given a poststimulus suggestion. The prestimulus suggestion was considered capable of altering the context of the memory task in such a way as to compel subjects to attend to, retain, and retrieve fewer critical stimulus items than subjects receiving poststimulus amnesia suggestions.

This hypothesis was not supported by the results. The group receiving the prestimulus suggestion for posthypnotic amnesia showed no significant difference in posthypnotic memory from the group given a poststimulus amnesia suggestion, or the group given no suggestion for posthypnotic amnesia at all. Not only does this finding imply that the timing of the suggestion had no effect on memory performance, it also shows that the suggestion for posthypnotic amnesia itself had no significant effect on posthypnotic memory performance. The group that was hypnotized during stimulus presentation but was given no suggestion for amnesia manifested a degree of amnesia statistically equivalent to that found in the hypnotic groups that were given some suggestion for amnesia.

The timing context of the suggestion for amnesia was not a pertinent variable in this experiment. Various other

contextual aspects of a memory trace may prove to have an effect on memory performance as suggested by Craik and Lockhart (1972). However, in a hypnotic memory testing situation, the context of the temporal point at which post-hypnotic amnesia was suggested did not significantly affect subsequent memory performance. Within the entire context of hypnosis, a suggestion to be amnesic did not affect subsequent memory performance as much as did the hypnotic state itself. The contextual variables characteristic of the hypnotic state that are responsible for memory impairment remain unidentified by this study.

The second hypothesis suggested in this thesis dealt with an attempt to induce a high degree of recognition amnesia by giving some hypnotic subjects specific suggestions for recognition amnesia. This hypothesis was devised to further specify the relevant factors involved in the observed difference between recall and recognition performance during posthypnotic amnesia. The role enactment theory suggests that posthypnotic amnesia involves motivated cooperation with a suggestion to manifest the appropriate response, in this case memory loss. The altered state view of amnesic behavior holds that hypnosis interferes with memory by disorganizing retrieval processes. Retrieval is more involved with recall than recognition because recognition involves provided retrieval cues.

Therefore more amnesia is observed on recall tests than on recognition tests.

The results of this experiment do not support the role enactment theory of posthypnotic amnesia. In spite of the direct suggestion to be amnesic for recognition, a significant majority of subjects recognized stimuli much more successfully than they recalled them. Enactment of amnesia from following the suggestion for recognition amnesia was not evident. As previously stated, there were no significant differences among the memory scores of hypnotic groups given an amnesia suggestion and the hypnotic group given no suggestion for amnesia. To enact amnesia, subjects must be given the role demand via a suggestion for amnesia. In the present experiment the suggestion for amnesia used in any context had no significant effect on posthypnotic memory. Some factors inherent in the hypnotic state itself were responsible for a significant degree of recall amnesia. Recognition, with the retrieval cues involved in a recognition task, was not affected significantly by these unspecified factors.

Using nonverbal stimulus material in the form of figure drawing did not appear to result in any significant differences in observed memory performances when compared to memory for verbal material. The present study produced mean memory score percentages of 39% on recall and 77% on recognition for the first trial of the condition involving

hypnosis and a poststimulus amnesia suggestion. Kihlstrom and Shor (1978) used a comparable condition but with verbal stimulus material consisting of the items on a susceptibility scale. Their mean score percentages were 38% on recall and 76% on recognition. The results of the present study cannot be compared directly with the results of Kihlstrom and Shor's but it is striking that the performances on recall and recognition are so nearly the same in the two experiments. It implies that hypnosis has a similar effect on memory for shapes and memory for semantic stimuli. In spite of the observed increase in electrical activity of the nondominant cerebral hemisphere during hypnosis (Hilgard and Hilgard 1975), memory for structures that are dealt with primarily by the nondominant hemisphere does not appear to be superior to memory for material usually dealt with by the dominant (hypnotically attenuated) hemisphere. This suggests that memory is not simply a cognitive operation that is localized hemispherically according to stimuli. It also implies that a hypnotically induced increase in right hemisphere activity does not have any effect on posthypnotic memory functioning. These conclusions are certainly tentative, especially in light of the fact that subjects were not given verbal and nonverbal stimuli in the present experiment nor were they being monitored for brain activity during hypnosis.

In spite of the variations in method which were outlined above, the results of this experiment are consistent with those of most others who have previously investigated recall and recognition memory during posthypnotic amnesia (Williamsen et al. 1965; Barber and Calverley 1966; Kihlstrom and Shor 1978). Recognition performance was significantly more successful than recall performance. There were, however, two notable differences. The present investigation found no significant effect of the suggestion for amnesia on posthypnotic memory. This does not agree with the findings of Barber and Calverley's (1966) study that the type of suggestion was a pertinent variable. It also differs from Hilgard's (1966) finding that the amount of suggested amnesia observed was significantly greater than the amount of spontaneous amnesia observed. Replication of the current experiment's results is mandatory before stating whether or not a suggestion for posthypnotic amnesia is necessary to observe posthypnotic amnesia in hypnotizable subjects. Previous research has implied that the suggestion is necessary to obtain a significant amount of amnesia (Barber and Calverley 1966; Hilgard 1966). The present study suggests that other characteristics of the hypnotic state itself are more involved in inducing posthypnotic amnesia. Continuing research will hopefully lead to the discovery of the neural mechanisms involved in

the disorganized retrieval or dissociation of conscious control which are responsible for posthypnotic amnesia.

The results of this thesis should be considered with due regard to the limitations of the methods employed. (1) Various circumstances prevented the use of a larger sample which would have added to the validity of the results. (2) A more rigorous test of hypnotic susceptibility would have ensured a more reliably hypnotizable sample. (3) In comparing first and second trial memory test scores, there is some uncertainty in determining whether an observed difference is due to the amnesia suggestion being precluded by the reversal cue or if it is simply an artifact of practice.

The results of this study add to the scientific investigation of hypnosis and its effects on memory. It is hoped that consideration of these results and the problems involved in the methods employed will provide the impetus to deal further with questions remaining from this thesis and those that remain about the various phenomena involved in hypnosis in general.

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# APPENDIX A

## SAMPLE QUESTIONNAIRE

1. Have you ever had any of the following medical problems?

__Epilepsy __Hear disease __Rheumatic fever __Asthma

__Fainting spells __Frequent headaches __Seizures

__Others (specify)_____

2. Have you ever suffered a severe head injury resulting in loss of consciousness, skull fracture, concussion, or brain damage?
_____

3. Have you ever had a disturbed reaction to hallucinogenic drugs?
_____

4. Are you currently taking any medications?_____
If yes, please specify.

5. Have you ever been treated for emotional problems?_____

6. Have you ever been hypnotized?_____

7. Please rate your attitude toward hypnosis along the following dimensions:

Circle the number most appropriate for you.

| | | | | | |
|---|---|---|---|---|---|
| A. | Useless | Fake | Unusual | Interesting | Beneficial |
| | 1 | 2 | 3 | 4 | 5 |
| B. | Dangerous | Scary | Relaxing | Pleasant | Safe |
| | 1 | 2 | 3 | 4 | 5 |
| C. | Unconscious | Asleep | Aware | Relaxed | Vigilant |
| | 1 | 2 | 3 | 4 | 5 |

# APPENDIX B

## TEXT OF SPECIFIC INSTRUCTIONS AND SUGGESTIONS FOR HYPNOTIC GROUPS A, B, AND $C_2$ AFTER STANFORD SCALE ADMINISTRATION

Group A: I'm going to show you some figures and you will be able to copy them one by one while you're still deeply relaxed and hypnotized. You will be able to open your eyes and look at the figures but you will not notice anything else. You will still feel relaxed and detached, just like waking in the middle of sleep for a phone; you're just not quite sure what it is and you'd rather drift back to sleep. So, here is a pencil and some paper. Open your eyes to copy the figures and think of anything you want to. You're still comfortably hypnotized even while you draw. (After drawing completed) Good, now close your eyes again and sit back and relax. In a moment I'll count backwards from twenty to one. You'll gradually become alert while I count . . . . When you are fully alert and awake you will feel relaxed and will not be clear about what you experienced. Trying to remember will be too difficult to do well. In fact, you will not recall any of the things you copied some time ago. Furthermore, you won't even be able to recognize the figures if you see them anyway. Only if I say, "This time you can remember everything" will you be able to identify the figures. Now here comes the count,

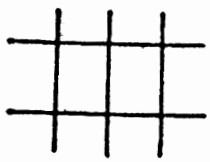
20-19-18-etc.

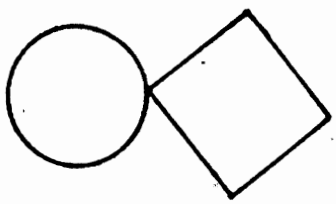
Group B: Same as for group A through "you're still comfortably hypnotized even while you draw." After you've copied the figures you will relax. Then later when you awaken fully, you will still feel relaxed, comfortable, and unclear about what you have experienced. It will be so difficult to remember that it is easier to refrain from trying. In fact, you will not recall any of the things you haven't copied yet. Furthermore, you will not be able to recognize the figures any time you see some. Only if I say "This time you can remember everything" will you be able to see the figures. Until then, you won't be able to recall or recognize any of the figures. So here is a pencil and some paper. Open your eyes to copy the figures and think of anything you want to. You are still comfortably hypnotized even while you draw. (Following drawing task) Now, close your eyes, just sit back and relax. In a moment I will count backwards from twenty to one and you will gradually awaken. When you are alert and fully awake you will still feel relaxed and will not have any unpleasant side-effects. So just listen for the count . . . . 20-19-18-etc.

Group $C_2$: Same script as for group A before drawing task. Same script as group B after drawing task is completed. (No suggestion for amnesia is given.)

# APPENDIX C

## RECOGNITION LIST

1. 

2. 

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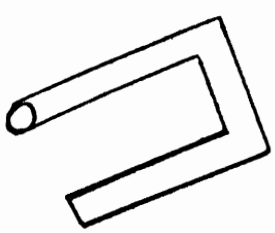
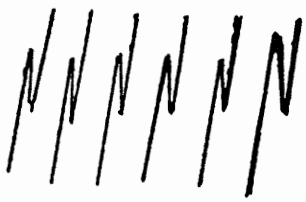
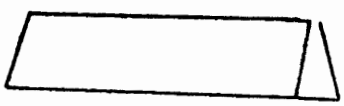
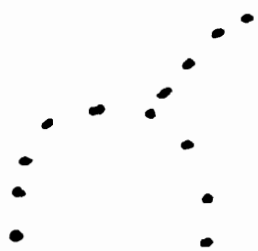
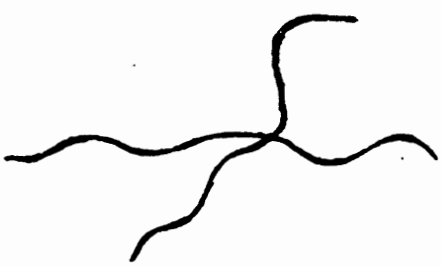
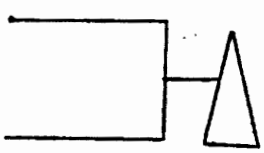
5. 

6. 

7. 

8. 

9. 

10. 

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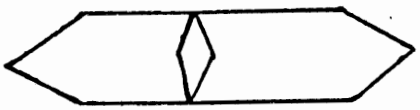
12. 

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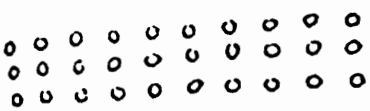
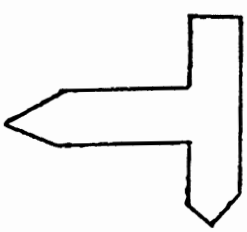
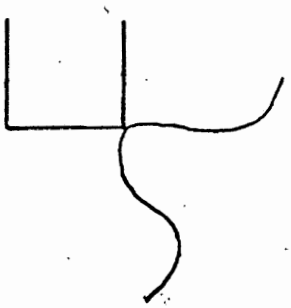
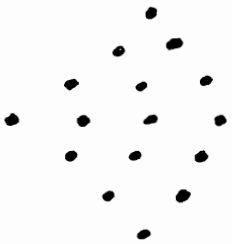
14. 

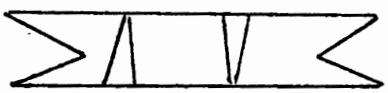
15. 

16. 

17. 

18. 

19. 

20. 

# APPENDIX D

## INSTRUCTIONS FOR RATING RECALL FIGURES

The task is to compare the accuracy of the recalled copies of the Bender figures against the original drawings from the stimulus cards. The figures that are recopied in some form will be rated on a three point scale according to the accuracy of the memory trace.

The criterion for recall accuracy will be the original drawing performance for each figure by individual subjects. To obtain a maximum memory score the recalled and redrawn figure must be equal in quality to the original drawing or superior (closer to the actual Bender figure). The scoring scale breakdown is as follows:

0 = given for each missing figure; stimulus item not recalled (recopied) at all;

1 = given to a very distorted or incomplete figure based on a comparison of the recall example and the first reproduction from the Bender card;

2 = given to a slightly distorted form of the originally copied figure;

3 = given to very accurate, to exact copies of the originally drawn figure or the Bender stimulus card.

It should be noted that if the initial figure drawn by direct copy from the Bender card is distorted, an equally

distorted recall copy will get full credit even if it deviated from the Bender card. In addition, if the recall form is less distorted than the original performance and is closer in form to the Bender card, it too would call for a maximum score (three points).

Each rater will fill out one score sheet for each subject. Score sheets will consist of two sets of nine lines numbered A through eight corresponding to the numbers of the Bender figures. Each potentially recalled figure will get a rating score, 0-3. Both first and second recall trials on each subject will be rated. Scores will be summed for each set of nine possible recalled lines.

# APPENDIX E

## INFORMED CONSENT SHEET

I, _____ hereby agree to serve as a subject in the experiment involving the administration of a standardized hypnotic susceptibility scale and drawing task, conducted by _____.

I have been informed of the possible risks to some people in hypnosis research and I have, to the best of my knowledge, answered the health status questionnaire accurately.

I understand I am giving two hours of time to this experiment for the purpose of expanding the scientific knowledge of hypnotic phenomena.

I have been offered no remunerations for my part in this investigation but am free to ask questions at the conclusion of my session.

In the event of any residual uneasiness from participation, I understand that _____ will discuss this with me at the soonest mutual opportunity.

I understand that I am free to withdraw from participation at any time without jeopardizing my relationship with any facet of Portland State University or my grade in any class.

I have read and understand the foregoing information.

| | |
|---|---|
| _____ | _____ |
| experimenter | subject |
| | _____ |
| | date |