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SUGGESTIBILITY ON COGNITIVE PER­
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EFFECTS OF HYPNOTIC INDUCTION, MOTIVATING INSTRUCTIONS, AND SUGGESTIBILITY ON COGNITIVE PERFORMANCE

by

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Chairman:

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Dean of the College of Arts and Sciences

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CHAPTER I

INTRODUCTION

Hypnosis has always been a fascinating subject of study. The use of hypnosis in medicine, dentistry, psychiatry, and entertainment has been well documented. The use of hypnosis and post-hypnotic suggestion to enhance learning and cognitive performance is more recent vintage, and more than worthy of such investigation. Comparatively speaking, little empirical study has been devoted to questions involving hypnosis and cognitive performance although lay opinion generally attributes a variety of advantages to learning under the influence of hypnotic induction.

I. BACKGROUND

Investigations of the effect of hypnotic induction procedures or "hypnosis" on cognitive performance tasks have produced equivocal results. Findings run the full spectrum of enhancement to impairment with most studies demonstrating the enhancement of the performance on

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such tasks. Some of the studies indicate no significant effect. One reports an impairment of learning performance. In the light of recent research, many of these investigations do not consider areas which may or may not be responsible for such equivocal research results. These areas are: (a) definition and perception of the experimental situation by the subjects; (b) possible interactive effects of a number of variables on cognitive performance rather than the effect


exerted by such variables independently; (c) range of difficulty and lack of specificity of the cognitive performance tasks usually employed as dependent variables in "hypnosis" experiments; and (d) use of experimental controls and overall hypnotic research methodology.

Defining a situation as "hypnosis" to a subject has been found to enhance hypnotic-like suggestibility. Here, of course, a crucial variable is the perception by the subject of "hypnosis" and hypnotic induction. The possibility exists that many subjects do their best to carry out instructions and suggestions merely because they are expected to do so. In carrying out investigations of hypnotic phenomena, it becomes necessary to control the perception of the experimental situation by the subjects. This becomes quite important when independent

5. For a significant discussion of these and other variables beyond the scope of this paper see Barber, T.X. A Scientific Approach to "Hypnosis." Princeton: D. Van Nostrand Company, 1968.


controls (who undergo no trance induction) are used in the experimental design.

One solution to such a dilemma is to use a subject as his own control. This, of course, standardizes the perception problems for each subject as each subject is involved in each experimental treatment. The efficacy of this solution is seriously in doubt. It has been shown that some subjects when used as their own control tend to comply with suggestions for improved hypnotic performance by purposely giving an inferior performance in the control condition. 8

Another solution would be to use "hypnotically naive" subjects (i.e. subjects possessing no concept of "hypnosis"). Subjects meeting this criterion would not be sensitized to the hypnotic situation; thus presumably they would be incapable of perceiving any "role" to play as a subject, having no preconceived expectations concerning a "hypnotic experience." This solution is inappropriate as it is most probable that subjects meeting this criterion (that of "hypnotic naivete") would be too young to participate in such a study.

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A third solution would be to use independent control and experimental groups emphasizing to the controls that they are expected to carry out all instructions to the best of their ability. Evidence exists to support this solution as an effective one.

Defining a hypnotic situation by using special instructions and independent controls could possibly be improved by distributing subjects over a continuum of duration of hypnotic induction procedures to which an individual is subjected. In this type of design, some subjects undergo no hypnotic induction, some hypnotic induction for a very short period of time (merely to define the situation as "hypnosis"); and finally, some for a much longer period of time, more typical of the "traditional" induction procedure. Traditionally hypnotic induction procedures typically include the following four independent variables: (a) the situation is defined as "hypnosis," (b) instructions are administered that are designed to motivate the subject to give a good performance, (c) suggestions of eye-heaviness, eye closure, relaxation, drowsiness, and sleep are administered; and (d) it is suggested to the subject that he can now easily respond to test

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suggestions and can easily experience suggested effects. As individuals are subjected to more and more intensive efforts to induce "hypnosis," there should be an increased willingness to comply with the experimenter's instructions; if not, no real difference should be found between those experiencing very short hypnotic induction procedures and those experiencing longer, more traditional hypnotic induction procedures.

Two variables of interest, because of their involvement with both hypnosis and the performance of cognitive tasks, are suggestibility and motivating suggestions or instructions. Research results support an increased level of performance of subjects undergoing hypnotic induction procedures as well as supporting increased performance of subjects receiving motivating instructions. Research also reports


no significant differences in the performance of suggestible and non-suggestible subjects undergoing hypnotic induction on cognitive tasks. Research investigating the effect of motivating instructions given under hypnotic and non-hypnotic conditions indicate no significant difference between "waking" subjects and subjects participating in hypnotic induction in their performance of cognitive tasks. The findings above are interesting enough in their own right, but do not go far enough, nor are they unequivocal in what they report. In summary, motivating instructions are found to enhance the performances of subjects undergoing hypnotic induction. When investigated under conditions where subjects are exposed to motivating instructions under both "hypnosis" and "waking" states, no significant differences in performance are found.

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Performances of selected suggestible subjects do not differ from those of selected non-suggestible subjects on cognitive performance tasks. There are a number of gaps in the research that require attention. Questions may be raised concerning the interaction of motivating instructions, level of suggestibility of subjects in both "hypnotic" and "waking" states as well as being concerned with the level of difficulty of the performance tasks used as the dependent variables. An attempt to answer these kinds of questions has been made. The research done on the interactive effect of motivating instructions, suggestibility, and task performance has demonstrated an enhancement of performance on less difficult tasks, but not the more difficult. The finding holds for "hypnotized" or unhypnotized subjects as well as subjects who are suggestible and non-suggestible. The research provides some indication and suggested structure to what perhaps would be a fruitful approach for further pursuing the issue of the effect of motivating instructions, level of suggestibility, and hypnotic induction. Studies investigating such phenomena as motivating instructions in suggestible and non-suggestible subjects under hypnotic induction and "waking" conditions, using independent controls, and a variety of cognitive performance tasks of varying difficulty would prove beneficial.

14. Parker and Barber, loc. cit.
15. Ibid.
Many investigators using performance tasks as the dependent variable have restricted their research to the investigation of the performance of a group of subjects on one task, two tasks, three tasks, and still others, up to 25 in one case, and thirty in another. These tasks not only represent an unspecified variety of cognitive performances but many levels of difficulty. Only two investigations reported any attempt at controlling the level of difficulty of task performance, other than randomly including many different kinds of tasks which implicitly were more or less difficult. These two studies represent the only two making an effort to specify, with some precision, the tasks used as dependent variables. There is


17. Young, loc. cit.; Stalmaker and Riddle, loc. cit.; Schulman and London, loc. cit.


20. Eysenck, loc. cit.

21. Salzberg, loc. cit.; Parker and Barber, loc. cit.
evidence to indicate that task difficulty should be delineated if results are to be generalized to tasks other than the ones under investigation. Further, the consideration of task difficulty is important as research indicates that hypnotic induction procedures interact with task difficulty and type and kind of task as well as suggestibility and motivating instructions. By including a number of rigorously defined and specified tasks of various levels of difficulty, many of the problems in this area of hypnotic induction research may possibly be alleviated.

In discussing research methodology employed in the investigation of "hypnosis," recent experimental evidence has demonstrated that many of the responses elicited from "hypnotized" subjects by suggestions of color blindness, analgesia, age-regression, hallucinations, ___

22. Parker and Barber, loc. cit.
23. Ibid.
27. Barber, T.X. Toward a theory of hypnotic behavior: positive


31. Ibid.
II. STATEMENT OF THE PROBLEM

The problem of this study becomes one of investigating the effects of the interaction of specified variables under defined conditions, employing adequate control, upon the performance of selected subjects on a number of specific cognitive tasks varying in difficulty. In other words, the problem of this research is to go perhaps one step further than previous studies. It is possible to design the experimental situation to overcome some of the previously identified weaknesses. This may be accomplished by determining the effect of the duration of hypnotic induction, the use of motivating instructions, and the level of suggestibility on the performance of specified cognitive tasks of varying difficulty. In general, then, this investigation should answer the following four questions:

1. Do suggestible and non-suggestible subjects differ in their performance on specified cognitive tasks of varying difficulty depending on the duration of the hypnotic induction procedures employed?

2. What is the effect of the duration of hypnotic induction on subjects receiving motivating instructions regardless of the level of suggestibility?

3. Does the use of motivating instructions with suggestible and non-suggestible subjects affect performance on specified cognitive tasks of varying difficulty independent of the
duration of hypnotic induction procedures?

4. Do suggestible subjects receiving motivating instructions and varying duration of hypnotic induction differ in performance on specified cognitive tasks of varying difficulty from non-suggestible subjects receiving the same treatment?

More specifically, an attempt will be made to answer the following questions which represent a more detailed breakdown of the variables to be investigated.

1. What is the effect of none, minimal, and extended hypnotic induction procedures on the cognitive task performance of:
   a. suggestible subjects receiving motivating instructions?
   b. suggestible subjects not receiving motivating instructions?
   c. non-suggestible subjects receiving motivating instructions?
   d. non-suggestible subjects not receiving motivating instructions?

2. What effect do motivating instructions have on the cognitive task performance of:
   a. suggestible subjects?
   b. non-suggestible subjects?

3. What effect does level of suggestibility have on the cognitive task performance of subjects not receiving motivating instructions?
III. IMPORTANCE OF THE STUDY

The proposed research has the potential to make four contributions to the study of hypnotic induction and task performance. The first contribution is one of potentially resolving some of the conflict between the results of already existing studies. The second is that of making a contribution to the research methodology employed in investigations of "hypnosis" by the use of new techniques and procedures representing innovations in the manner in which research in the area is conducted. A third contribution of the study will be the consideration of the cumulative interactive effect of a number of variables intimately associated with "hypnosis" on performance of a number of cognitive tasks of varying difficulty. Fourth, the study will potentially add to the general storehouse of knowledge concerning the experimental analysis of "hypnotic" behavior and human task performance.

Data concerning the importance of the administration of hypnotic induction procedures should resolve some of the existing difficulties in defining "hypnosis" as a construct. Contributions toward a theory of hypnotic behavior should also be made available in terms of the relative importance of individuals being subjected to varying amounts of hypnotic induction. The influence of task motivating instructions and level of suggestibility on the behavior of subjects undergoing no hypnotic induction, or hypnotic induction procedures of short or long duration, should prove meaningful from both a general behavioral point of view as well as the experimental analysis of "hypnotic" behavior.
perspective. Questions regarding the stability of "hypnotic" behavior will be considered. The performance of the subjects on a number of cognitive tasks of varying difficulty will be assessed under conditions expected to alter such stability (motivating instructions and suggestibility). The perception of the subjects of the "hypnotic situation" (those receiving minimal and extended induction procedures) and whether or not such perception has an effect on behavior will be another interesting phenomenon to investigate.

In summary, the importance of this study is that it attempts to investigate areas heretofore not investigated or investigated from a different perspective. This study will attempt to look at hypnotic phenomena as dynamic events interacting and reacting with other events that conceptually have a relationship to the behavior termed "hypnosis." In one sense this is the major importance of this study.

IV. ORGANIZATION OF THE REMAINDER OF THE DISSERTATION

The remainder of the dissertation is conveniently divided into four parts. The material in these four parts will be supported by documentation and exhibits appearing in the appendices.

The first of the four, a review of the literature, restricts discussion to those aspects of hypnosis relevant to this study, namely: hypnosis and learning (or cognitive performance), task motivating
instructions and hypnosis, hypnosis and suggestibility, and hypnosis and hypnotic induction procedures. The second area of the dissertation concerns itself with the method of investigation. Here, detailed information concerning the independent variables (duration of hypnotic induction, motivating instructions, level of suggestibility) and the dependent variable (cognitive task performance) will be given. The experimental design (a 3x2x2 factorial) will also be discussed.

The results of the study, the third area to be included, will present the results of the investigation, discuss the results, summarize them and compare them with the literature. This section of the dissertation will consider the evidence generated by the method of investigation in the light of the problem previously defined. The fourth and last area to be presented in the dissertation is that of summary and conclusions. This portion of the dissertation will restate the development of the investigation and set forth the conclusions of the research. Suggestions for further study or areas requiring research beyond the limit of the present undertaking will be noted.
CHAPTER II

REVIEW OF THE LITERATURE

The related research pertinent to this investigation may be grouped under four general areas: (a) hypnosis, learning and cognitive performance; (b) hypnosis and task motivating instructions; (c) hypnosis and suggestibility; and (d) hypnosis and hypnotic induction. These areas will serve as a structure for the review which will only deal with literature that has a bearing upon the main issues of this study. The review will be narrative in nature rather than evaluative as such evaluation and critique may be found in the statement and discussion of the problem of this investigation.

I. HYPNOSIS, LEARNING, AND COGNITIVE PERFORMANCE

In recent years there have been a number of reviews of hypnosis, learning, and cognitive performance. These reviews by Barber,¹

Hilgard, Uhr, and Weitzenhoffer have been supplemented by research studies of individuals further defining the relevant variables in this area. Barber in a 1965 critique of the methodology used in the investigation of the effects of hypnosis on learning and recall reviews thirty-one studies and concludes that hypnosis by itself does not significantly enhance either learning or recall. Suggestions motivating the subject or calling for improved performance are at times effective with nonhypnotic Ss as well as hypnotic Ss, and various experimental controls need to be incorporated into further research. In another review of broader scope, Barber again concludes that published empirical data does not support a relationship between hypnosis and enhancement of learning or recall.


Uhr, writing in 1958, concludes that the "sum of relevant experiments," are "inconclusive or of merely tangential interest."\(^7\) Uhr insists the data are so inadequate that nothing may be concluded (i.e. neither hypnosis can or it cannot improve learning). Hilgard, in a review of the literature since 1960 states that "evidence with respect to the influence of hypnosis upon learning and retention is ambiguous."\(^8\) Hilgard concludes concerning learning and performance, that on the whole, the evidence to date for facilitating learning or for producing "supernormal" performance under the influence of hypnotic induction is something less than favorable. He does caution that many unanswered questions remain. Weitzenhoffer, on the other hand, in a review written in 1955 presents a different view. His thesis is that suggestions given under hypnosis can improve acquisition and recall.\(^9\)

Representative of studies reporting hypnosis enhances learning

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7. Uhr, \textit{op. cit.}, p. 131
8. Hilgard, \textit{op. cit.}, p. 165
9. Weitzenhofer, \textit{loc. cit.}
proficiency are those of Hammer, Sears and Salzberg. Using nine subjects and twenty-five learning and cognitive tasks, Hammer investigated the effect of post-hypnotic suggestion on the improvement of hypnotizable subjects' application and efficiency. The twenty-five learning and cognitive tasks consisted of both simple and complex activities. Simple tasks involved motor capacity, attention, and perception, and complex tasks involving association, learning memory, judgment, reading, and application. The subjects served as their own controls and were administered the tasks four times (twice as waking subjects and twice under post-hypnotic suggestion with suggestions for improved performance). The results of this study indicated that nineteen of the tasks demonstrated a significantly different waking state/post-hypnotic suggestion performance beyond the .05 level (5 of the 19 were at the .01 level). Six tasks showed no significant difference in


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performance. Of the six tasks five were "complex" rather than "simple."

Salzberg investigated the effects of hypnotic, post-hypnotic, and waking suggestion on the learning of tasks that varied in complexity (a counting task, memory task, and abstraction task). In an earlier experiment, Salzberg had administered each of two forms of three tests twice; once under treatment conditions (hypnosis, post-hypnotic suggestion, waking suggestion) and once under normal waking conditions. An N of four was used in each group. The hypnotic group performed the tasks twice in the normal waking state and twice under hypnosis following suggestion. The post-hypnotic group was administered the tasks twice in the normal waking state without suggestion and twice in a waking state following post-hypnotic suggestion. The waking suggestion group completed the tasks twice in the normal waking state and twice following waking suggestion. The normal waking group performed all tasks twice under normal waking conditions only. In a second study, the first study was replicated using six in each group and dropping


the normal waking group. Both studies demonstrated similar results. Hypnotic and post-hypnotic groups did significantly better under suggestion that the waking suggestion group. The waking suggestion group did significantly poorer than the normal waking group.

Sears, using fifty subjects in a matched experiment (N/25 control, N/25 experimental) investigated the learning and recall of Morse Code. Each of the subjects was given thirty hours of standard Morse Code training. The experimental group learned and practiced while under hypnosis, the control group under normal waking conditions. Results indicated no significant difference (at either the .05 or .01 level) in performance until after thirty hours of training. After thirty hours of training, significance at the .01 and .05 level of confidence was found at four or five word per minute levels. The learning of Morse Code was improved by the use of hypnosis.

Studies representative of the failure of hypnosis to demonstrate an enhancement of learning and cognitive performance are Young, 16


Gray, Schulman and London, and Parker and Barber. Young investigated the effect of hypnosis on nonsense syllables and adjective noun learning. Young used twenty-two subjects in four groups (light, deep and somnambulistic trances, and a waking control) on the two learning tasks previously cited. His findings indicate a slight edge for those subjects in the somnambulistic trance over both the control and other trance groups. It is doubtful that the difference is significant.

In an effort to demonstrate that spelling can be taught more readily under the influence of hypnosis than in the normal state, Gray used six male college students. Two equivalent lists of words were taught under two conditions: (a) under hypnosis and (b) normal waking state. Suggestions for correct spelling were given the hypnosis group. Each subject was his own control. Results of this study indicate a mean difference of 1.9 percent between both lists in favor of the percent of errors on the list learned under normal waking conditions.


Again, hypnosis failed to facilitate learning any better than the waking state.

A more recent and sophisticated study by Schulman and London demonstrated that differences in degree of hypnotic susceptibility did not influence learning. Further, they determined that the application of hypnosis did not influence performance when compared to performance in the unhypnotized treatment. Sixty subjects were used in three groups (twenty very tranceable, twenty tranceable, and twenty untranceable as defined by the Stanford Hypnotic Susceptibility Scale). Each group was administered two verbal and one performance learning task (nonsense syllables, poetry, tremor test). Measures of dependent variable performance were obtained under hypnotic induction (Experimental Session I) and during a normal waking state (Experimental Session II). Experimental treatment sessions were counterbalanced across subjects. Regression analysis and analysis of dispersion revealed no significant differences in the performance of subjects in the hypnotized and unhypnotized treatment groups.

Parker and Barber investigated hypnosis, task motivating


21. Parker and Barber, op. cit., p. 499
instructions, and learning performance. A pretest was given to forty subjects on three learning tasks: digit symbol substitution, memory for words, and abstract reasoning. Ten of the subjects were retested under a motivating instructions treatment. These ten subjects were previously rated as non-suggestible. Thirty of the forty subjects (rated as suggestible) were divided into three groups of ten each and retested under one of the following conditions: task motivating instructions, hypnotic induction with task motivating instructions, and control (no hypnotic inductions nor motivating instructions). Analysis of variance of the post-test performance of the four groups indicated no significant difference between the groups on memory for words or abstract reasoning, but did indicate a significant difference on digit symbol substitution. Parker and Barber concluded that "task motivating instructions given alone or following a hypnotic induction procedure did not significantly affect performance on the memory for words or abstract reasoning tasks and task motivating instructions produced a comparable enhancement of performance on the digit symbol substitution task in hypnotized and unhypnotized subjects and in suggestible and non-suggestible subjects."

An interesting study representative of the impairment function of hypnosis on learning and/or cognitive performance is Rosenhan and

22. Parker and Barber, op. cit., p. 499.
These authors concluded that hypnosis impairs performance of susceptible subjects on a rote memory task while facilitating the performance of unsusceptible subjects, (degree of susceptibility established by the Stanford Hypnotic Susceptibility Scale). Using thirty-two undergraduate subjects, these investigators formed a group of sixteen susceptible and sixteen unsusceptible subjects. All thirty-two subjects were pretested on ten nonsense syllables presented on a memory drum under counterbalanced hypnotized and unhypnotized conditions. The performance of susceptible subjects declined during hypnosis, while that of the unsusceptible subjects improved as indicated by an analysis of variance. Significantly more nonsense syllables were recalled by unsusceptible subjects while under hypnosis than when not hypnotized. The reverse was true for the susceptible subjects.

II. HYPNOSIS AND TASK MOTIVATING INSTRUCTIONS

The research on motivational suggestions and task motivating instructions may be considered under two general categories: one, in which tasks motivating instructions are concerned with influence on a learning or performance task, and two, those studies concerned with

the inter-relationship of tasks motivating instructions and other relevant variables involved with hypnosis and hypnotic induction. Task motivating instructions as a description of a variable include what is more commonly termed "suggestions for" heightened recall, more adequate performance, more proficient learning, etc.

Many studies have investigated task motivating instructions and learning behavior. This section will discuss those of Fowler, Hopes, Lyon-James, Parker and Barber, Rosenthal, as well as White, Fox, and Harris. Other studies such as those of Eisele and


27. Parker and Barber, loc. cit.


Higgins,\textsuperscript{30} Illovsky,\textsuperscript{31} Krippner,\textsuperscript{32} Lamothe,\textsuperscript{33} Lodato,\textsuperscript{34} McCord,\textsuperscript{35} McCord and Sherrill,\textsuperscript{36} Stalnaker and Riddle,\textsuperscript{37} Sears,\textsuperscript{38} Salzberg,\textsuperscript{39} will be merely noted. Fowler,\textsuperscript{40} as a result of findings of two pilot studies, completed a larger study involving forty subjects in two groups (an experimental group of twenty-five and a control group of fifteen). The pilot study results indicated that suggestions of improved retention and comprehension given under hypnosis affected

\begin{itemize}
\item \textsuperscript{30} Eisele, G. and Higgins, J.J. Hypnosis in educational and moral problems. \textit{American Journal of Clinical Hypnosis}, 1962, 4, 259-263.
\item \textsuperscript{33} Lamothe, G.V. La Hypnosis en ensenanza. \textit{Acta Hipnosis Latino America}, 1960, 1, 15-30.
\item \textsuperscript{34} Lodato, E.J. Hypnosis as an adjunct to test performance. \textit{American Journal of Clinical Hypnosis}, 1964, 6, 271-273.
\item \textsuperscript{36} McCord, H. and Sherrill, C.I. A note on increased ability to do calculus post-hypnotically. \textit{American Journal of Clinical Hypnosis}, 1961, 6, 124.
\item \textsuperscript{38} Sears, \textit{loc. cit.}
\item \textsuperscript{39} Salzberg, \textit{loc. cit.}
\item \textsuperscript{40} Fowler, \textit{loc. cit.} 
\end{itemize}
verbal reports of subjects. The subjects reported improved comprehension and retention when in fact there was no objective effect of the suggestions on their performance. In the larger study, Fowler pretested all subjects on the Iowa Silent Reading Test and the Otis Mental Ability Test. The experimental group was hypnotized and given suggestions of increased concentration, increased comprehension, memory and accuracy. The control group was given similar suggestions without hypnosis. Both groups were retested in the waking state on an equivalent form of the Iowa and Otis. The suggestions given the experimental group had no greater effect on test achievement than the suggestions given the control group, but the suggestions did serve to raise the reading scores for both groups. Fowler then continued the experiment and hypnotized the experimental group an additional ten hours (over a six week period). He gave both the experimental and control groups suggestions and remedial instructions to improve reading. Upon retest (the administration of a third equivalent form of the Iowa and the Otis) Fowler again found no difference between the groups but did find an improvement in test performance in both groups.

Hopes found that positive suggestions (for improved performance) did not assist in the acquisition of nonsense syllables compared to non-suggestive conditions. He also determined that negative suggestions

41. Hopes, loc. cit.
inhibited learning proficiency in both groups. Hopes pretested all Ss (N=18) in a hypnotic state on acquisition of a list of nonsense syllables and then retested them on an equivalent list. On the retest, Hopes had six groups. Three of the six groups were retested in the hypnotic state after receiving suggestions: (a) positive to enhance learning proficiency (Group 1), (b) negative to impair learning proficiency (Group 2), and (c) no suggestions (Group 3). The remaining three groups received similar treatment as post-hypnotic suggestions.

Lyon-James had his subjects study written material on the chemical and physical properties of tungsten. He used thirty-six selected good hypnotic subjects divided into three groups (two experimental and one control) of twelve each. The subjects studied the material for three minutes under waking conditions and then were administered an immediate recall test and subsequently two delayed recall tests (one at three weeks and one at nine weeks). Experimental I group studied the material after receiving post-hypnotic suggestions of enhanced concentration and memory. This group was also hypnotized prior to the three and nine weeks' delayed recall test and given post-hypnotic suggestion for improved recall. Experimental II group received the same treatment as Experimental I except for the hypnotic induction and post-hypnotic suggestion prior to the three and nine weeks' delayed recall test. The control group, of course, was not hypnotized at all but was

42. Lyon-James, loc. cit.
given suggestions to try hard to concentrate and remember. The results of the study support the general findings of previously reported research. The control group did not differ from Experimental I or Experimental II, and Experimental I and Experimental II did not differ from each other on immediate or delayed recall.

Rosenthal worked with thirteen subjects and performed seven experiments employing as a learning task the memorization of meaningful and nonsense material. In experiments 1, 2, 4, and 6 the subject memorized, in the waking state, to the criteria of one perfect recitation. Recall was tested first in the waking state then in the counterbalanced hypnotic-waking conditions. Identical motivating instructions were given for recall in waking and hypnotic conditions. In experiments 3, 5, and 7, on the other hand, Ss were told during the learning period that they had successfully learned some of the material and failed other material (all other aspects of these experiments were the same as 1, 2, 4, and 6). Upon retest, Ss in experiments 1, 2, and 6 recalled material as proficiently under waking conditions as under hypnosis. Experiment 4 subjects recalled meaningful material in a hypnotic state more proficiently than nonsense material. In experiments 3 and 7 subjects recalled failed material more proficiently under hypnosis than they recalled material upon which they were told they were successful.

43. Rosenthal, loc. cit.
Subjects in experiment 5 demonstrated no difference in performance between waking and hypnotic conditions.

White, Fox, and Harris investigated memory for recently learned meaningful and nonsense material rather than memory of remote learned material. They compared waking and hypnotic recall of three types of material: nonsense paired associates, poetry, and moving picture scenes. Subjects (N=8) were used as their own controls and were given identical suggestions for increased recall under all conditions. Nonsense paired associates and poetry were learned to a criterion of a single perfect recitation while the motion picture scenes were viewed once. Findings of the study demonstrated no significant difference in the recall of nonsense paired associates and motion picture scenes but enhanced recall of poetry under motivating instructions and hypnosis.

Parker and Barber in a recent definitive study found that task motivating instructions alone or combined with hypnotic induction did not affect performance on more complex tasks. Less complex tasks were enhanced by motivating instructions in groups tested in a waking state and a hypnotic state regardless of their level of suggestibility (low or high). Forty subjects were pretested on the Barber Suggestibility

44. White, Fox and Harris, loc. cit.
45. Parker and Barber, loc. cit.
Scale, digit symbol, memory for meaningful nouns, and an abstract reasoning test. From this basic subject data, four groups (N=10 in each group) were composed. Group A was highly suggestible and was retested after receiving task motivating instructions in the waking state. Group B was also highly suggestible and was retested after receiving task motivating instructions after hypnotic induction. Group C, another highly suggestible group, was retested without task motivating instructions and hypnotic induction. Group D, a low suggestible group, was retested after receiving task motivating instructions under waking conditions. No significant difference was found in Groups A, B, C, or D for memory for meaningful names or abstract reasoning. A significant difference was found for digit symbol substitution (in terms of enhancing performance) in Groups A, B, and D.

Three studies will be reported concerning task motivating instructions or suggestions and attitudes toward hypnosis, responses to primary suggestions, and effectiveness of task motivating instructions in the production of hypnotic-like behavior. These three studies were all completed by Barber and Calverley and represent important findings.

concerning task motivating instructions outside of their effect on learning performance. In the first study, Barber and Calverley investigated attitudes toward immediate test situations and motivation to perform well or poorly on assigned experimental tasks. They investigated the hypothesis "responsiveness to standardized test suggestions to arm levitation, sensory hallucination, body immobility, selective amnesia, and the like, can be enhanced or reduced by administering pre-test instructions designed to produce positive or negative attitudes and motives with respect to the test situation." Twenty-four subjects were pre-tested on the Barber Suggestibility Scale and assigned (after an initial selection session) at random to three groups (eight to each group). Group I was given pre-test instructions intended to produce positive attitudes towards the test situation and favorable motivation with respect to task performance. Group 2 was given neutral pre-test instructions. Group 3 received pre-test instructions designed to produce negative attitudes and motivation. Assessed again upon the BSS, Group 1 showed a high level of responses to test suggestions, Group 2 manifested an intermediate level, Group 3 demonstrated practically no response at all. Barber and Calverley concluded that "attitudes

toward the experimental situation and task motivation play important roles in determining responsiveness to suggestions of the type historically associated with the word hypnosis."\(^{48}\)

In another study, Barber and Calverley\(^{49}\) investigated three hypotheses involving task motivating instructions, degree of hypnotic induction (brief or extended), attitudes towards hypnosis, and response to suggestions (suggestibility). Seventy-five college students were administered a questionnaire to assess their attitudes towards hypnosis. Half of the group (N=37) expressed positive attitudes while half (N=38) expressed non-positive attitudes towards hypnosis. Each subject was tested on the BSS three weeks later and randomly assigned to three treatment groups: task motivation, hypnotic induction, direct suggestion (control). Of the twenty-five in each group one-half scored positive and one-half non-positive on the hypnosis attitude questionnaire. Each S in each group received his instructions and was then administered the BSS again. Two of the three hypotheses were verified. Subjects given task motivating instructions or extended hypnotic induction show greater response to suggestions than Ss given neither.

\(^{48}\) Ibid.

\(^{49}\) Barber, T.X. and Calverley, D.S. Toward a theory of hypnotic behavior: effects on suggestibility of task motivating instructions and attitudes towards "hypnosis." *Journal of Abnormal and Social Psychology*, 1963, 67, 6, 557-565.
Task motivating instructions and extended hypnotic induction both elicit high levels of suggestibility. The third hypothesis, response to suggestions varies with subjects' attitudes toward hypnosis, was not supported by the data of this investigation.

The final study to be reported by Barber and Calverley concerns the relative effectiveness of task motivating instructions and trance induction procedure in the production of hypnotic-like behavior. Fifty-six subjects participated in the study and made up four groups of fourteen students each. These four groups were necessary to define the two independent variables on two levels: task motivating instructions, trance induction procedure, task motivating instructions and trance induction procedure, no task motivating instructions and no trance induction procedure. Immediately after receiving his specific experimental treatment, each subject was administered the eight BSS tests. The major finding of this study was that the "groups receiving the trance induction procedure were more responsive to the test suggestions and showed more subjective involvement in the suggested effects than the control group which received neither task motivating instructions nor trance induction procedures." 50 A second finding of the study

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was that the trance induction group and the trance induction with motivating instructions group were not more responsive to test suggestions than was the task motivating instructions group alone.

III. HYPNOSIS AND SUGGESTIBILITY

In discussing suggestibility and hypnosis it is quite necessary that (1) the term be defined for its own sake and that (2) it be differentiated from "hypnotizability." Barber, in a recent publication states that the term suggestibility is used when "responses to standardized test-suggestions are assessed without prior administration of a hypnotic induction procedure." The term hypnotizability, on the other hand, is used when "responses to standardized test-suggestions are assessed subsequent to the administration of a hypnotic induction procedure." The term suggestibility is appropriate to the context of this study as all subjects will be evaluated on the suggestibility variable prior to any hypnotic induction procedure. Suggestibility will be discussed from two points of view: (a) the effects of personality on suggestibility and (b) the effect of interpersonal and situational variables on suggestibility.

In this same paper, Barber\textsuperscript{52} reviews the literature on hypnotizability, suggestibility, personality, and summarizes the findings of numerous empirical studies. These studies used the following instruments to investigate the relationship of hypnotizability, suggestibility, and various manifestations of personality functioning: Rosenzweig Picture-Frustration Study, Taylor Anxiety Scale, Bills-Vance-McLeon Index of Adjustment and Values, TAT, Maudsley Personality Inventory, Thurstone Personality Schedule, Bernreuter Personality Inventory, Neyman-Kohlsted Extroversion-Introversion Inventory, Allport Ascendance-Submission Test, Rorschach, MMPI, Edwards Personal Preference Schedule, Gilford-Zimmerman Temperament Survey, Leary Interpersonal Checklist, Journard Self-Disclosure Scale, Marlow-Crowne Social Desirability Scale, Cattell 16 Personality Factor Questionnaire, California Authoritarian Scale, California Psychological Inventory, Welch Anxiety and Repression Scales, Barron Independence of Judgment Scale, Cattell-Cohn Teacher's Rating Scale, Wechsler-Bellevue Intelligence Scale, and the Szondi Test. Numerous other studies used ratings, interviews, and clinical assessments of personality. Some of the aspects of personality functioning investigated were: impunitiveness, repression, hysteria, neuroticism, extroversion, prior imaginative-fantasy experiences, sociality, cooperativeness, depression, schizoid tendencies, dependancies, and affiliation. In summary, Barber concludes that the majority of studies reviewed failed to find relationships of significant magnitude between

\textsuperscript{52} Ibid.
hypnotizability or suggestibility and traits of personality. Studies by Eysenck, Furneaux and Gibson, Hilgard and Bentley, Land and Lazovik, Schulman and London, Stukat, Willey support this finding.

Some investigators (Eysenck, Faw and Wilcox, Ingham,)


Rosenzweig and Sarason, Sarbin and Modow, White) report that hypnotizability or suggestibility are related to a number of personality variables but such studies are isolated in their findings and have not been confirmed by other investigators. Based upon recent studies to be presented later, Barber concludes that "individual differences in response to suggestions are more closely related to differences among individuals in situationally-variable characteristics...rather than to differentiate among individuals in enduring characteristics of personality."

Evidence concerning the level of hypnotizability and suggestibility and the relationship between subject and experimenter may be considered from two points of view. Studies by Barber, Dorcus, Mears, 


66. Barber, op. cit., p. 312.


Pattie, Shaffer and others, have observed that some subjects are not very suggestible with some experimenters while quite suggestible with other experimenters. Investigators such as Butler, Gill and Brennan, Winkelstein and others (see Barber) suggest that the level of hypnotizability and suggestibility demonstrated a positive correlation with variation in the subject-experimenter relationship. They maintain that when close relationships exist between the subject and experimenter, suggestibility and hypnotizability are found to be at a high level. Attitudes towards the test situation and the experimental tasks also influence the level of hypnotizability and suggestibility.


Barber and Calverley in a series of studies\textsuperscript{75} supported by data from Sector\textsuperscript{76} as well as clinical observations of Pattie,\textsuperscript{77} Sarbin\textsuperscript{78} and White\textsuperscript{79} report that subjects reveal high levels of suggestibility and hypnotizability when they possess positive attitudes toward the test situation and are motivated to perform well on the experimental tasks. In a study completed in 1962, Barber and Calverley\textsuperscript{80} investigated suggestibility in 724 children and adults (ages 6 to 22) and their findings were as follows: the sexes did not differ in suggestibility, Ss between 6 and 12 were more suggestible than adults while children between 8 and 10 showed the highest levels of suggestibility, Ss between 14 and 22 demonstrated no difference in suggestibility.

\begin{itemize}
\item \textsuperscript{76} Secter, I.I. An investigation of hypnotizability as a function of attitude toward hypnosis. \textit{American Journal of Clinical Hypnosis}, 1960, 3, 75-89.
\item \textsuperscript{77} Pattie, \textit{loc. cit.}
\item \textsuperscript{78} Sarbin, T.R. Contribution to role-taking theory: I Hypnotic behavior. \textit{Psychological Review}, 1950, 57, 255-270.
\item \textsuperscript{79} White, R.W. An analysis of motivation in hypnosis. \textit{Journal of Genetic Psychology}, 1941, 24, 145-162.
\end{itemize}
Three further studies by Barber and Calverley are of interest concerning suggestibility and hypnosis. These studies investigated the effect of the experimenter's tone of voice on suggestibility, and the effects on suggestibility of five variables typically included in hypnotic induction procedures respectively. Investigating the effect of the tone of the experimenter's voice, Barber and Calverley used eighty-two female subjects assigned to two random groups of forty-one each. Subjects were told that the experiment would involve a test of imagination and were tested individually by one experimenter. Group A subjects were presented suggestions (BSS) forcefully implying that a positive response was desired and expected. Group B was presented suggestions (BSS) lackadaisically implying it really did not make any difference how the subject was to respond. Three judges "blind analyzed" tape recordings of the two sets of instructions and testified to the forcefulness and permissiveness of the suggestions. Objective and subjective scores were assigned for performance on the dependent variable as well as Ss subjective opinions of the implications of the experimenter's tone. Group A (forceful) received significantly higher

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BSS scores than Group B (lackadaisical).

Two studies assessed the effects of tape recorded and spoken suggestions on suggestibility. A group of eighty-four female subjects (forty-two in a tape group, forty-two in a spoken group) showed no significant difference in suggestibility (as measured by the BSS). The suggestions were administered by the same experimenter whether via tape recording or spoken in person. No essential significant difference was found between two groups of thirty-three male subjects who received a fifteen minute hypnotic induction then the BSS. Administration of the hypnotic induction and the BSS to one group was by tape recording, the other spoken; both by the same experimenter. (A similar study by Hoskivec, Svorad, and Lanc revealed equivocal results.)

Hypnotic induction procedures usually include five components:
(a) situation defined as hypnosis; (b) instructions to close eyes;
(c) suggestions of relaxation, drowsiness, slipp; (d) subject told he is expected to cooperate; and (e) suggestions that it will be easy to respond to further suggestions. Barber and Calverley carried out


three experiments to determine the effect of each of these variables on the suggestibility of subjects. Experiment I investigated the effect of the presence and absence of instructions to close eyes on suggestions to respond to the BSS. Forty-eight male college students were used and the results "indicated that eye closure per se is not a major variable affecting response to test suggestions under either hypnotic induction or control conditions." Experiment II sought to assess the relative effects of defining the situation as hypnosis, telling the subject he is expected to cooperate, and suggesting to the subject that he will now find it easy to respond to further suggestions. In this study (a 2x2x2 factorial) 136 female subjects were used. There were four major findings. Defining a situation as "hypnosis" has more effect on suggestibility than defining a situation as "control." Indicating to a subject he is expected to cooperate increases suggestibility. "Describing response to test suggestions as easy does not by itself exert an important effect on suggestibility." Suggestibility can be increased by telling subjects they are undergoing hypnotic induction plus the administration of motivating instructions plus describing responses to suggestions as easy. Using a mixed group of thirty-six males and thirty-eight females, Barber and Calverley carried out Experiment III which investigated the inclusion of suggestions of

84. Ibid., p. 100.
85. Ibid., p. 103.
relaxation, drowsiness, and sleep. The seventy-four subjects were randomly assigned to five experimental groups. Groups I, II, III, and IV had the situation defined as hypnosis and were given suggestions of relaxation, drowsiness and sleep for 0, 1, 5, and 10 minutes respectively. Group V had the situation defined as control and response to suggestions was defined as easy as well as motivational instructions administered. All groups were then administered the BSS. The results of Experiment III indicate that: suggestions of relaxation, drowsiness and sleep in combination with defining the situation as hypnosis is more effective in increasing suggestibility than defining the situation as hypnosis alone. Further, the above two components are as effective as the combination of motivational instructions and describing the response to suggestions as easy in increasing suggestibility.

The results of these experiments may be summarized as follows:

a. Defining the situation as hypnosis alone tended to increase levels of suggestibility.

b. Defining the situation as hypnosis plus administering suggestions of relaxation, drowsiness and sleep produced a higher level of suggestibility than defining the situation as hypnosis alone.

c. Administering motivating instructions in combination with describing response to suggestions as easy was as effective as defining the situation as hypnosis in combination with administering suggestions of relaxation, drowsiness, and sleep
in increasing the level of suggestibility of subjects.

d. Instructing the subject to close his eyes exerted no noticeable effect on the level of suggestibility.

IV. HYPNOSIS AND HYPNOTIC INDUCTION

A relevant variable in any discussion of hypnosis is the influence and effect of what is termed hypnotic induction or the procedure followed in "placing a subject under hypnosis." Studies involving procedures of hypnotic induction have been previously cited (Barber and Calverley 86) without any effort to define what is meant by hypnotic induction.

Hypnotic induction involves informing S that he will be hypnotized, giving S a standardized set of explanatory instructions and asking S to fixate on a light blinking in synchrony with the sound of the metronome (or some other similar perceptual control device). S then follows a procedure made up of suggestions of eye-heaviness, eye closure, relaxation, drowsiness, sleep and deep trance. This is followed by suggestions that S is entering a unique state in which he will be able to have interesting and unusual experiences. The duration of the procedure is anywhere from ten to twenty minutes depending upon

86. Barber and Calverley, (1965, 1964, 1965); loc. cit.
the subject. (See Friedlander and Sarbin,\textsuperscript{87} Marcuse,\textsuperscript{88} and Weitzenhoffer and Hilgard.\textsuperscript{89})

The investigation of the effect of hypnotic induction on a number of variables has been carried out by Barber and Calverley and summarized in a recent monograph on the Barber Suggestibility Scale.\textsuperscript{90} The authors report data in three primary areas of interest: hypnotic induction and objective and subjective scores on the BSS, hypnotic induction and the facilitation of response to suggestions other than those of the BSS, and hypnotic induction and the independent variables which make up a hypnotic induction procedure.

One hundred and eighty-six subjects were assigned randomly by sex to one of three experimental conditions (sixty-two subjects in each condition): hypnotic induction of fifteen minute duration, task motivating instructions, and direct suggestion. Under hypnotic inductions, subjects were told that they would be hypnotized. Under motivating instructions and direct suggestion the situation was defined as one of a test of imagination. Immediately upon completion of the


\textsuperscript{88} Marcuse, F.L. \textit{Hypnosis: Fact and Fiction}. Baltimore: Penguin


\textsuperscript{90} Barber and Calverley, 1965, \textit{loc. cit.}
experimental treatment, the subjects were assessed on response to the BSS. On the objective score scale of the BSS the hypnotic induction and task motivating groups did not differ significantly from each other. Both groups, however, obtained significantly higher scores than the direct suggestion group. On the subjective score scale of the BSS the results were exactly the same as on the objective score scale - the hypnotic induction and task motivating group did not differ significantly while they both differed significantly from the direct suggestion group. In summary, these results indicate that in terms of enhancing effectiveness of response to the BSS, hypnotic induction and task motivating instructions are equally as effective. Both are more effective than direct suggestion.

Investigating the effectiveness of "hypnotic induction" as a phenomenon in facilitating responses to suggestions other than to the BSS, Barber and his colleagues used a comparative study technique in carrying out a large number of studies comparing such responses to motivating instructions and direct suggestions. Suggestions of auditory and visual hallucinations, deafness, analgesia, time distortion, and color blindness are some of those investigated. Here the interest centers on the effect of hypnotic induction procedures on complex behaviors which are usually considered somewhat resistant to direct suggestion. In a study reported in 1964, Barber and
Calverley gave three randomly assigned groups of twenty-six females instructions to see an animal and hear a phonograph playing in the experimental room (neither were present). Again, as with the BSS, the hypnotic induction and task motivating instructions groups responded to such questions significantly better than those receiving direct suggestions but did not differ significantly from each other.

Suggestions of deafness were given to forty-two subjects, some subsequent to hypnotic induction, some subsequent to motivating instructions. Barber and Calverley report that suggestions of partial and total deafness are more effective in eliciting positive and subjective reports when given subsequent to motivating instructions rather than hypnotic induction. Hypnotic induction and task motivating instructions groups report more suggestive deafness than a control group not given deafness suggestions. No significant difference existed in objective deafness between experimental (induction and instruction) and control groups.

The effect of hypnotic induction on perceived pain has been


demonstrated by Barber and Hahn wherein not only subjective responses to pain producing stimuli but also physiological (objective) responses are reduced. Such reduction is in terms of like responses to a control condition. Here again, data collected on forty-eight Ss demonstrated a significant difference between control, task motivating instructions, and hypnotic induction. Two groups of sixteen subjects were given suggestions that "time would slow down" (time distortion). One group received the suggestions after task motivating instructions, the other immediately after hypnotic induction. Performance of both groups was compared to that of a control. Consistent with the other studies cited, both the induction and instruction group experienced a significantly greater degree of time distortion than the control. No significance was found between the induction and motivation group.

The influence of hypnotic induction on color blindness has been investigated by a number of studies, Barber and Deely,


Bravin, Rock and Shipley. Subjects in these experiments all had normal red/green color vision. When instructed subsequent to hypnotic induction or under task motivating instructions to ignore the colors red and green, they did so with significant results. Summarizing these data indicate that responses to suggestions may be significantly enhanced above the level of either direct suggestion or non-suggestion control condition by two sets of variables. One of these is subsumed under the title "hypnotic induction" and the other "task motivating instructions". The research concerned with the variables connected with hypnotic induction procedures had been previously discussed in the section of this review denoted as hypnosis and suggestibility (page 37). Here the interest in these variables was primarily concerned with the influence such variables had upon raising or lowering the suggestibility of hypnotic subjects. The inclusion of such data in the present discussion is concerned with the relevance of each of these variables to the hypnotic induction procedure itself. All of the five


variables seem to be important aspects of the hypnotic induction procedure (they all tend to heighten response to test suggestions) with the exception of "S instructed to close eyes" and "S instructed to cooperate." This is not to say that hypnotic induction is the only "enhancer" of response to test suggestions; there are, of course, others. What is meant is that the variables previously mentioned are important to the hypnotic induction procedure and should make up the operational definition of the hypnotic induction phenomenon.

V. SUMMARY

In the foregoing survey of research related to this proposed study, an attempt was made to offer supporting documentation for the rationale and concepts underlying the research as well as the justification of the problem as stated earlier. Data from the literature have shown the need for a continued attack upon the subject of hypnosis and the performance of cognitive tasks observing rigid demands of experimental design. It has further demonstrated a justification of both the dependent and independent variables of the proposed research as well as the reasonableness of the research questions. The data cited support the need for a study of the interactive effects of hypnosis, motivation, and suggestibility on the performance of cognitive tasks of varied difficulty.
CHAPTER III

METHOD OF INVESTIGATION

Some time will be spent in this section discussing both the independent and dependent variables, the experimental design, and analysis of data generated by the study. Duration of hypnotic induction, motivating instructions, level of task difficulty and level of suggestibility will be defined for the purpose of this study. The dependent variable consisting of four cognitive performance tasks also will be defined as well as justified by psychometric data. Details concerning subjects, experimental treatments, and analysis of data must be elucidated.

I. THE INDEPENDENT VARIABLES

To place any discussion of the independent variables of this study in perspective, one must consider the total universe of independent variables available to the investigation of hypnotic phenomena. This study investigates only three of the myriad available. Barber\(^1\) recently has specified classes of independent variables under which those of this study fall. Below appear the denotable independent variables subsumed under the topic hypnosis.

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A. Procedural variables (instructions and suggestions).

1. Procedural variables subsumed under the term "hypnotic induction" procedure.
   a. Statements which define the situation as "hypnosis".
   b. Motivational instructions.
   c. Suggestions of relaxation, drowsiness, and sleep.
   d. Statements that it is easy to respond to suggestions.

2. Other procedural variables.
   a. Specific wording of suggestions.
   b. Experimenter's tone of voice in presenting suggestions.
   c. Method used to present suggestions.
   d. Specific wording of the questions used to elicit subjective testimony.

B. Subject variables (personality, attitudes, expectations).

C. Experimenter variables (prestige, personality, attitudes, expectancies).

C. Subject-experimenter interaction variables (liking of experimenter for subject and vice-versa).

The three explicit independent variables of this study fall into only two of Barber's categories. Hypnotic induction and motivating instructions under procedural variables and level of suggestibility under subject variables. Barber's remaining independent variable categories are implicit unless controlled for by the experimental
protocol in some manner.

Duration of hypnotic induction, as an independent variable is defined at three levels - no hypnotic induction, minimal hypnotic induction, and extended hypnotic induction. Minimal hypnotic induction is operationally defined as the fixation of a subject's eyes on a blinking light in synchrony with the sound of a metronome while being given repeated suggestions of eye heaviness, eye closure, relaxation, drowsiness, sleep and entering "deep hypnosis" for thirty seconds. Hypnotic induction procedures usually contain a statement similar to "... you will be able to do all sorts of things I tell you to do ... you are going to experience many things I tell you to experience." Such a statement is quite close to those used as motivating instructions and as such will be omitted from the hypnotic induction procedures of this study. The inclusion of a statement similar to that above would contaminate the "use of motivating instructions" variable. This minimal hypnotic induction procedure is based upon a standard one used by Barber which is closely patterned after those presented in Friedlander and Sarbin, Marcuse, and Weitzenhoffer and Hilgard.

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2. Personal communication. T.X. Barber, Medfield Research Foundation, Medfield State Hospital, Harding, Massachusetts.


This induction procedure is merely an extension of the minimal hypnotic induction referred to above.

The purpose of the minimal hypnotic induction procedure was merely to define the situation as hypnotic to the subject. A thirty second duration was chosen because even under the most favorable of conditions and with the best of administrators it would be very difficult and highly improbable that a naive subject would induce hypnosis in thirty seconds. The fifteen minute hypnotic induction procedure on the other hand, should provide ample opportunities for naive subjects to induce hypnosis or at least experience enough of a hypnotic induction procedure to define the situation as one of hypnosis if they are so inclined.

Task motivating instructions consisted of the following segment of text read to the subject for one minute. "In this experiment, I am testing your ability to perform better on equivalent forms of the four tasks you have already completed. How well you do depends entirely on your willingness to try. If you try real hard you will do better. Everyone who has tried harder on these tests has done better the second time, and I am sure you can too. You'll be surprised how well you can really do, if you really try hard. I want you to score as high as you possible can because we are measuring the maximum ability of people who have really tried. I am asking for your cooperation in this
experiment to try to the best of your ability. If you don't try, the experiment will be worthless, I'll feel disappointed, and it will have been a waste of your time and mine. On the other hand, if you really try hard, to the very best of your ability, you can and will do much better. Are you ready? Now, try to do the very best you can, try real hard, really hard. Similar instructions have been used by Barber and Calverley and have been shown to motivate subjects toward task completion.

Level of suggestibility as a variable represents a dicotomized one (high and low) and may be defined empirically within the constraints of the Barber Suggestibility Scale. High suggestible subjects are those with a BSS score above the median of the population tested (Median = 7.6) while low suggestible subjects are those where the BSS score is below the median of the population tested. The mean of the high suggestible group is 11.95 with a range of 8 to 23, while for the low suggestible


7. Barber, T.X. Measuring "hypnotic-like" suggestibility with and without "hypnotic induction"; Psychometric properties, nouns, and variables influencing response to the Barber Suggestibility Scale (BSS). Psychological Reports. Monograph Supplement 3-V16, 1965. The Barber Suggestibility Scale (BSS) is a measure of suggestibility utilizing a standardized list of eight test suggestions and the subject's response to a questionnaire concerning his perception of his response to the eight test suggestions.
group it is 4.25 with a range of 0 to 7. There is no overlap in any of the groups. That is to say, the low suggestible group range from 0 to 7 only while the high suggestible group BSS scores range is 8 to 23 only. Efforts were made to maintain similar differences between high and low treatment groups. It would be ideal if no differences between high and low suggestible groups existed (see Table I).

<table>
<thead>
<tr>
<th>Definition</th>
<th>Hypnotic Induction</th>
<th>Motivating Instructions</th>
<th>High-Low Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment Number</td>
<td>HIGH</td>
<td>LOW</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>none</td>
<td>no</td>
<td>5.5</td>
</tr>
<tr>
<td>2</td>
<td>none</td>
<td>yes</td>
<td>8.0</td>
</tr>
<tr>
<td>3</td>
<td>minimal</td>
<td>no</td>
<td>7.7</td>
</tr>
<tr>
<td>4</td>
<td>minimal</td>
<td>yes</td>
<td>8.5</td>
</tr>
<tr>
<td>5</td>
<td>extended</td>
<td>no</td>
<td>8.7</td>
</tr>
<tr>
<td>6</td>
<td>extended</td>
<td>yes</td>
<td>7.8</td>
</tr>
</tbody>
</table>

The question of concern here is whether or not high and low suggestibility has been randomly distributed across treatments and to what degree there is "equal" suggestibility in each treatment cell? From visual inspection of Table I the only treatment cell about which a question can be raised is 1 (no hypnotic induction and no motivating instructions). All of the others are within acceptable limits. To continue to collect subjects until the appropriate combination of high and low BSS scores occurred would violate even more the criterion of
randomicity. The reason that a quasi-matching procedure on the BSS was required was that it was not administratively feasible to administer the BSS first and then distribute the subjects randomly across treatments. Since BSS scores were available in the order in which the students were assessed on this variable, a check on the random distribution obtained was possible. Post hoc assignment to all treatments was accomplished by assigning high and low BSS treatments in order of administration. The first subject with a low BSS score was assigned to Cell 1, the second to Cell 2, the third to Cell 3, etc., until all cells were filled. The same technique was employed with the subjects with high BSS scores. The resulting distribution of differences computed on the basis is shown in Table II.

### TABLE II

**COMPARISON OF ASSIGNED AND RANDOM BSS MEANS BY EXPERIMENTAL TREATMENT**

<table>
<thead>
<tr>
<th>Treatment Number</th>
<th>Hypnotic Induction</th>
<th>Motivating Instructions</th>
<th>Level of Suggestibility</th>
<th>Assigned BSS $\bar{X}$</th>
<th>Random BSS $\bar{X}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>None</td>
<td>No</td>
<td>Low</td>
<td>4.8</td>
<td>3.4</td>
</tr>
<tr>
<td>2</td>
<td>None</td>
<td>No</td>
<td>High</td>
<td>10.3</td>
<td>11.4</td>
</tr>
<tr>
<td>3</td>
<td>None</td>
<td>Yes</td>
<td>Low</td>
<td>4.1</td>
<td>5.1</td>
</tr>
<tr>
<td>4</td>
<td>None</td>
<td>Yes</td>
<td>High</td>
<td>12.0</td>
<td>12.3</td>
</tr>
<tr>
<td>5</td>
<td>Minimal</td>
<td>No</td>
<td>Low</td>
<td>3.6</td>
<td>4.5</td>
</tr>
<tr>
<td>6</td>
<td>Minimal</td>
<td>No</td>
<td>High</td>
<td>11.3</td>
<td>12.7</td>
</tr>
<tr>
<td>7</td>
<td>Minimal</td>
<td>Yes</td>
<td>Low</td>
<td>4.1</td>
<td>3.6</td>
</tr>
<tr>
<td>8</td>
<td>Minimal</td>
<td>Yes</td>
<td>High</td>
<td>12.6</td>
<td>12.7</td>
</tr>
<tr>
<td>9</td>
<td>Extended</td>
<td>No</td>
<td>Low</td>
<td>4.3</td>
<td>3.6</td>
</tr>
<tr>
<td>10</td>
<td>Extended</td>
<td>No</td>
<td>High</td>
<td>13.0</td>
<td>13.9</td>
</tr>
<tr>
<td>11</td>
<td>Extended</td>
<td>Yes</td>
<td>Low</td>
<td>4.6</td>
<td>4.1</td>
</tr>
<tr>
<td>12</td>
<td>Extended</td>
<td>Yes</td>
<td>High</td>
<td>12.4</td>
<td>11.5</td>
</tr>
</tbody>
</table>

Range
- Low: $3.6-4.8$  $3.4-5.1$
- High: $10.3-13.0$  $11.4-13.9$
Visual inspection of the range of scores as well as their magnitude indicate that an acceptable approximation of a random distribution was obtained even when subjects were assigned treatments by balancing BSS scores.

II. THE DEPENDENT VARIABLE

Barber also has specified classes of dependent variables that place those in this study in new perspective. The present investigation concerns only one dependent variable but measurable at four different levels. The denotable dependent variables subsumed under the topic hypnosis are listed below.

A. Responses to test suggestions.
   1. Muscular rigidities.
   2. Analgesia.
   4. Age regression.
   5. Deafness, color blindness, and other "physiological effects".
   6. Amnesia.

B. Hypnotic appearance (limpness, relaxation, lack of spontaneity, psychomotor retardation, fixed facial expression trance stare).

C. Reports of unusual experience.

D. Testimony of having felt hypnotized.

The only category of Barber's dependent variables under which the dependent variable of this study could fall as explicit would be responses to test suggestions. Implicit, of course, is the subjects testimony of having felt hypnotized.

The dependent variable of this study was cognitive performance as manifested by four tasks of varying difficulty. Each of the four tasks was examined using the following seven criteria in terms of whether or not the tasks could:

1. demonstrate an acceptable degree of reliability (Reliability).
2. indicate at least one form of acceptable validity (Validity).
3. possess at least one other equivalent form (Comparability).
4. be a task sensitive to small but meaningful changes in performance (Sensitivity).
5. be at a different level of difficulty on a continuum from easy to hard (Difficulty).
6. require a different skill or ability from any of the other selected tasks (Variety).
7. be no longer than five minutes each (Time).

Details concerning the pilot studies that generated the data underlying the following discussion of the dependent variable are
Evidence has indicated a differential effect of hypnotic induction on performance of tasks of varying difficulty (Parker and Barber⁹, Salzburg¹⁰; thus, the necessity to include tasks empirically representative of different levels of difficulty. Level of task difficulty is a relative criterion variable. One can look at the problem empirically by comparing actual test score or phenomenologically by comparing the subjects' perception of how difficult one test was from the other.

Empirically, task difficulty may be defined two ways: a) the percent of the total possible score earned by the subject, and b) the percent of the total possible score earned by the subject per unit time (on a speed rather than power base). Both of these methods probably represent an oversimplification of the problem of psychometric difficulty and, at best, only an approximation of any real differences that exists between the tests. Although differences were found between means of tests on both Forms A and B of the cognitive performance tasks (see Table III) only those for the Digit Symbol test were statistically significantly different from other test means on both forms.

---


TABLE III

\( \bar{X} \) AND s OF COGNITIVE PERFORMANCE TASKS
(Percent Correct Method)

<table>
<thead>
<tr>
<th>Performance Task</th>
<th>Form A</th>
<th></th>
<th>Form B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \bar{X} )</td>
<td>s</td>
<td>( \bar{X} )</td>
<td>s</td>
</tr>
<tr>
<td>Addition Test</td>
<td>37.22</td>
<td>13.49</td>
<td>35.71</td>
<td>11.59</td>
</tr>
<tr>
<td>Digit Symbol</td>
<td>73.40</td>
<td>13.01</td>
<td>75.28</td>
<td>12.25</td>
</tr>
<tr>
<td>Series Completion</td>
<td>39.61</td>
<td>14.73</td>
<td>40.59</td>
<td>16.06</td>
</tr>
<tr>
<td>Object-Number</td>
<td>42.52</td>
<td>29.50</td>
<td>48.20</td>
<td>31.34</td>
</tr>
</tbody>
</table>

Although the tasks can be ranked by difficulty: Addition Test (most), Series Completion, Object-Number, Digit Symbol (least) such a ranking is contrived as revealed by testing the difference between means. Nevertheless utilizing this inadequate ranking there are really only two levels of difficulty. The more difficult consists of the Addition Test, Series Completion, and Object-Number. The easier is made up of the Digit Symbol Test only.

In order to take into consideration the differences in the time element of each cognitive performance task, the percent scores of each subject on each test was divided by the administration time of the test. The means of these percent correct/time scores appear in Table IV. (The data presented below is for Form A only as the forms are equivalent and the results of the previous computation on both forms were similar.) When the mean differences were tested for statistical significance, all means were found to be different beyond chance. Apparently treating
the performance tasks as speed rather than power tasks does differentiate between such tasks on a continuum from easy to difficult.

TABLE IV

\[ \bar{X} \text{ AND } s \text{ OF COGNITIVE PERFORMANCE TASKS} \]
\[ (\text{PERCENT CORRECT/TIME METHOD}) \]

<table>
<thead>
<tr>
<th>Performance Task</th>
<th>Time Factor (in seconds)</th>
<th>( \bar{X} )</th>
<th>( s )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addition Test</td>
<td>120</td>
<td>31.08</td>
<td>11.48</td>
</tr>
<tr>
<td>Digit Symbol</td>
<td>120</td>
<td>60.90</td>
<td>10.75</td>
</tr>
<tr>
<td>Series Completion</td>
<td>90</td>
<td>43.75</td>
<td>16.38</td>
</tr>
<tr>
<td>Object-Number</td>
<td>210</td>
<td>20.48</td>
<td>14.22</td>
</tr>
</tbody>
</table>

Admittedly because of the artifact of measurement, some tests will be favored (either as easy or difficult) but nonetheless a hierarchy of difficulty can be established: Object-Number (most difficult), Addition Test, Series Completion, Digit Symbol (least difficult).

Probably the most meaningful definition of task difficulty for this study is a phenomenological or perceptual one. How is task difficulty defined by the subjects' perception of the task? This variable is one consistent with some of the independent control variables of the study such as: how the subject defines a situation as hypnosis, the degree to which the subjects permit themselves to be influenced by motivating instructions, and the interest of the subject in the study. This particular definition of task difficulty is
operationally defined in terms of the subject's ranking of the tests in order of their difficulty as judged by the subject. Data required for making judgments within this definition of difficulty were obtained by asking subjects to respond to the following item on a post-experimental questionnaire.

From your experience with the four tests in this experiment, how would you rank them in terms of their difficulty? Rank the easiest test number 1, and the most difficult test number 4. The other two tests that fall between the two extremes should receive the rank of 2 and 3. Circle the numeral (1, 2, 3, or 4) to the right of the title of the test that best expresses your opinion of the test.

<table>
<thead>
<tr>
<th>Least Difficult</th>
<th>Most Difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addition Test</td>
<td>1  2  3  4</td>
</tr>
<tr>
<td>Digit Symbol Test</td>
<td>1  2  3  4</td>
</tr>
<tr>
<td>Series Completion Test</td>
<td>1  2  3  4</td>
</tr>
<tr>
<td>Object-Number Test</td>
<td>1  2  3  4</td>
</tr>
</tbody>
</table>

Mean scores were computed for each test and the final ranking was as listed below (each task title will be followed by its mean score, the higher the mean, the more difficult the task, Range 1-4): Object-Number (3.32), Series Completion (3.13), Addition (2.28), and Digit Symbol (1.25). It is interesting to inspect the percent of subjects assigning the values 1, 2, 3, and 4 to the cognitive performance tasks. The Object-Number task had 54% assign a value of 4, Series Completion 51% assign a value of 3, Addition was 71% for 2, and Digit Symbol 91%
Comparatively speaking, there was little agreement between all three methods of defining difficulty except in the case of Digit Symbol and Object-Number. When the data for subject perception of task difficulty were analyzed by all possible combinations of the variables of the investigation (a total of 35), three orders of difficulty occurred. These orders with the number and percent of variable combinations supporting each order of difficulty appear below.

Order 1 (Easy to Difficult) Preferred by 21 of 35 or 60%.
Digit Symbol, Addition, Series Completion, Object-Number.

Order 2 (Easy to Difficult) Preferred by 12 of 35 or 35%.
Digit Symbol, Addition, Object-Number, Series Completion.

Order 3 (Easy to Difficult) Preferred by 2 of 35 or 9%.
Digit Symbol, Addition, Object-Number and Series Completion tied.

No trend appeared in any of the data generated by Orders 2 and 3 concerning the kinds of variables with which these orders could be associated. These data certainly support the prior task difficulty data already reported. A comparative table of the final difficulty ranking of all three methods may be consulted below.
TABLE V

DIFFICULTY LEVELS OF FOUR COGNITIVE PERFORMANCE TASKS
BY THREE METHODS OF ESTIMATING DIFFICULTY

<table>
<thead>
<tr>
<th>Difficulty Level</th>
<th>Cognitive Performance Task</th>
<th>Method of Determining Task Difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>% Correct</td>
</tr>
<tr>
<td>Most</td>
<td>Object-Number</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Series Completion</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Addition</td>
<td>4</td>
</tr>
<tr>
<td>Least</td>
<td>Digit Symbol</td>
<td>1</td>
</tr>
</tbody>
</table>

When difficulty or difficulty level is referred to in this study the order of difficulty used will be the phenomenological one: digit symbol (easy) addition, series completion, object-number (difficult).

Little attention has been paid by other investigators to the problem of specification of the various tasks selected as the dependent variables. This is an important aspect of research for two reasons. First, tasks should be independent of each other, calling for a unique performance. Using tasks which overlap performance abilities tend to bias results and contaminate one task performance with another. Duration of hypnotic induction might very well affect performance on Task A and because of some shared skill or ability, show a spurious effect on Task B. To be confident that the independent variable/dependent variable relationship is not spurious, each task must call for a unique performance from the subject. In some cases it may be
impossible to guarantee that tasks are independent from one another. If such is the case, the degree of relationships between tasks should at least be known so as to be taken into consideration when drawing inferences from the data.

Second, each task must be of such a nature to be sensitive to indicating significant (non-chance) changes in subjects' performance. It would be very easy to bias the experiment in the direction of demonstrating no effect of any of the independent variables merely by choosing tasks that would not be amenable to indicating change in performance. Using a vocabulary test to indicate the effect of motivating instructions on a verbal comprehension task would be a grave error as it is quite doubtful that any change in performance would come about due to anything else except the learning of more vocabulary. The selection of performance tasks amenable to change must be done with a great deal of care and judgment. It is crucial to the hypotheses of this study that if a change in cognitive performance does occur, it can be measured. The criterion of sensitivity will be difficult to meet empirically. If performance changes on the administration of the second form of the test, an awkward situation develops as it becomes difficult to demonstrate comparability of the two tasks (with consequent invalidation of the reliability estimates). It a small group is used as a pilot study measuring the effect of say, motivating instructions, one of the hypotheses of the study itself is being tested and not the sensitivity of the task to changes in performance.
It is also important for the tasks to adequately sample as wide a range of ability as possible. It is not enough to sample one or two tasks and make generalizations to task performance in general. It is felt that by providing four measures of four factors that a fairly representative sample of task performance would be collected within the parameters of administrative and experimental conditions. Parallel form reliabilities have been computed on all tests as well as intercorrelations of the four tests to indicate magnitudes of relationship between the instruments and to serve as a check on their factor uniqueness.

The four cognitive performance tasks making up the dependent variable were selected from two different sources. The first form the Kit of Reference Tests for Cognitive Factors (Addition Test and Object-Number Test). The second from the literature on hypnosis and cognitive performance (Series Completion Test and Digit Symbol Test).

The two cognitive performance tasks making up the dependent variable, selected from the Kit of Reference Tests for Cognitive Factors, were selected from a source of over seventy factorially pure tests on twenty-four cognitive factors ranging in administration time from 1.5 to 15 minutes. All seventy tests are suitable for administration to subjects in grades 6 to 16, possess an equivalent form, and are

keyed to empirical studies that have established each test as a measure of a particular factor. The two tasks, then meet all criteria for selection except those of reliability, difficulty and sensitivity and were chosen from the twelve of the seventy meeting time constraints. Both forms of all the twelve potential performance tasks were administered to a group of subjects for the purposes of establishing the criteria of reliability, difficulty, and sensitivity.

Of the over 100 tests mentioned in the literature only twenty-six demonstrated any facility at reflecting changes in performance in a hypnotic induction study to a level of statistical significance (see Appendix B). Of the twenty-six available cognitive performance tasks, only two were compatible with those selected from the Kit of Reference Tests for Cognitive Factors as well as meeting all of the a priori criteria specified except reliability, difficulty and sensitivity. Both forms of the two tasks were also administered to a group of subjects to establish their reliability, variety, and difficulty (see Appendix A).

The results of the two procedures for selecting the performance tasks was the identification and the "field testing" of four tests guaranteeing a variety of tasks to be performed, representing tasks that had demonstrated empirically a capability to reflect the influence of hypnotic induction procedures, and meeting a set of rather rigid a priori criteria for inclusion in the study.
Following is a brief outline of each of the selected cognitive performances tasks while a copy of the test itself may be found in Appendix C.

<table>
<thead>
<tr>
<th>Performance Task</th>
<th>Factor</th>
<th>Addition Test - A speed test of the addition of sets of three 1 or 2 digit numbers.</th>
<th>Number Facility - The ability to manipulate numbers in arithmetical operations rapidly.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Item</td>
<td></td>
<td>4 7 12 84 7 34 17 45 31 80</td>
<td>9 6 5 54 38 81 50 41 52 78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 15 67 72 80 51 74 89 19 15</td>
<td>14 28 84 210</td>
</tr>
<tr>
<td>Length and Time</td>
<td></td>
<td>60 items and 2 minutes</td>
<td></td>
</tr>
<tr>
<td>Grade Level</td>
<td></td>
<td>6 to 16</td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td></td>
<td>French</td>
<td></td>
</tr>
<tr>
<td>Performance Task</td>
<td></td>
<td>Object-Number Test - Subject examines 20 word-number pairs. Words are later presented to him in different order. S writes the appropriate number.</td>
<td>Associative (Rote) Memory - the ability to remember bits of unrelated material.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample Item</th>
<th>Object</th>
<th>Number</th>
<th>Object</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>window</td>
<td>73</td>
<td>desk</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>desk</td>
<td>41</td>
<td>glass</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>carpet</td>
<td>19</td>
<td>window</td>
<td>73</td>
<td></td>
</tr>
<tr>
<td>door</td>
<td>84</td>
<td>door</td>
<td></td>
<td></td>
</tr>
<tr>
<td>glass</td>
<td>90</td>
<td>carpet</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Memory List**

**Recall List**

- 15 items, 3 minutes for memorizing, 2 minutes for testing
- 6 to 16
- Christal\textsuperscript{13}, French\textsuperscript{14}, Kelly\textsuperscript{15}
- Series Completion Test - Subject must complete an incomplete series of numerals, letters or words.
- Abstract reasoning - the ability to respond to common features of situations or perceptions presented serially.

<table>
<thead>
<tr>
<th>Sample Item</th>
<th>bird</th>
<th>nest</th>
<th>cow</th>
<th>barn</th>
<th>car</th>
<th>garage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>9 12 5</td>
</tr>
<tr>
<td>hair</td>
<td>hare</td>
<td>pair</td>
<td>pare</td>
<td>pare</td>
<td>pier</td>
<td></td>
</tr>
</tbody>
</table>


Length and Time 16 incomplete series, 90 seconds

Grade Level 8 to 16

References Salzburg\textsuperscript{16}, Fecher\textsuperscript{17}, Shipley\textsuperscript{18}

Performance Task Digit Symbol Test - The subject is given a digit symbol code which he is to follow while placing the appropriate symbol under a given digit.

Factor Visual-Motor Coordination - The ability to synchronize eye-hand movements rapidly, accurately, and efficiently.

Sample Item Digit Symbol Code
\[
\begin{array}{cccccc}
1 & 2 & 3 & 4 & 5 \\
4 & 2 & 1 & 3 & 5 \\
0 & + & c & - & x \\
4 & 3 & 1 & 5 & 2
\end{array}
\]

Length and Time 100 blank/digit combinations, 90 seconds

Grade Level 6 to 16

\textsuperscript{16} Salzburg, \textit{loc. cit.}


\textsuperscript{18} Shipley, W.C. A comparison of two techniques for measuring intellectual impairment and deterioration. \textit{Psychological Bulletin}, 37; 438-9, July 1940.
In summary, it is appropriate to discuss the dependent variable in terms of the seven criteria mentioned earlier.

Reliability of each of the four cognitive tasks was approached from two aspects. Alternate form reliability was tested by Pearson product moment correlation. Significance of all r's from zero was tested using the Wallace and Snedecor tables. Since Forms A and B were to be used as independent measures of cognitive performance, Kuder-Richardson internal consistency reliability was calculated (K-R 21) for each form of each test. Table VI lists the individual reliabilities obtained.

References


### TABLE VI

#### ALTERNATE FORM AND INTERNAL CONSISTENCY RELIABILITIES FOR THE FOUR COGNITIVE PERFORMANCE TASKS

<table>
<thead>
<tr>
<th>Cognitive Performance Task</th>
<th>Alternate Form Reliability</th>
<th>Internal Consistency Reliability Form A</th>
<th>Internal Consistency Reliability Form B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addition</td>
<td>.87</td>
<td>.95</td>
<td>.90</td>
</tr>
<tr>
<td>Series Completion</td>
<td>.84</td>
<td>.77</td>
<td>.80</td>
</tr>
<tr>
<td>Digit Symbol</td>
<td>.80</td>
<td>.89</td>
<td>.88</td>
</tr>
<tr>
<td>Object-Number</td>
<td>.89</td>
<td>.97</td>
<td>.95</td>
</tr>
</tbody>
</table>

Validity was established by identifying at least two experimental studies establishing the cognitive performance task as measures of a particular factor. The criterion has been met and the references are listed with the brief outline of each of the cognitive performance tasks.

The criterion of comparability was initially met by having two equivalent forms of each performance task. The initial question to ask is how comparable or equivalent are the two forms that have been used? Ghiselli's criteria for equivalent forms states that "two tests are parallel when:

1. the mean of the scores is exactly the same for all parallel tests.
2. the variances of the scores is exactly the same for all parallel tests.

---

3. the scores on all parallel tests are correlated with each other to exactly the same degree.

4. the scores on all parallel tests are correlated to exactly the same degree with the scores on any other variables."

The data presented below speak to these four specific criteria. In general, all forms met each of the criteria within the implied constraints. A problem arises in Ghiselli's use of the word "exactly". None of the forms met this rigid criterion - none of the variables correlated "exactly." All values are, however, within tolerable limits.

<table>
<thead>
<tr>
<th>Cognitive Performance Task</th>
<th>Mean</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Form A</td>
<td>Form B</td>
</tr>
<tr>
<td>Addition</td>
<td>21.95</td>
<td>21.81</td>
</tr>
<tr>
<td>Series Completion</td>
<td>6.31</td>
<td>6.48</td>
</tr>
<tr>
<td>Digit Symbol</td>
<td>73.16</td>
<td>75.16</td>
</tr>
<tr>
<td>Object-Number</td>
<td>6.37</td>
<td>6.97</td>
</tr>
</tbody>
</table>

Mean scores for all forms fell well within a limit that was not statistically significantly different from each other. Variances when tested for equality demonstrated that they came from the same population and did not differ (these data are summarized in Table VII). Interform
correlations (Criterion 3) were reported in the discussion of reliability earlier. With all forms intercorrelating .80 or above, certainly they met this demand. The degree of correlation of each form with the same variables (Criterion 4) was also complied with. Forms A and B of Addition, Digit Symbol, and Object-Number were correlated with Series Completion Form A as shown in Table VIII. All correlations were of similar magnitude for each form of each test.

TABLE VIII

CORRELATIONS OF FORMS A AND B OF THE COGNITIVE PERFORMANCE TASKS WITH A THIRD VARIABLE

<table>
<thead>
<tr>
<th>Cognitive Performance Task</th>
<th>Series Completion (Form A)</th>
<th>Form A</th>
<th>Form B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addition</td>
<td></td>
<td>.77</td>
<td>.75</td>
</tr>
<tr>
<td>Object-Number</td>
<td></td>
<td>.48</td>
<td>.59</td>
</tr>
<tr>
<td>Digit Symbol</td>
<td></td>
<td>-.02</td>
<td>-.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Addition (Form A)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Form A</td>
<td>Form B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.77</td>
<td>.75</td>
</tr>
</tbody>
</table>

Sensitivity of the cognitive performance task to changes in the subjects' performance has only been established by the judgment of the experimenter and a number of colleagues. Two of the tasks (Digit Symbol, and Series Completion) have some precedent as they have been found to be sensitive in previous studies. All four tasks, upon investigation, seem to be capable of demonstrating this characteristic.
Of all the seven criteria, this one is the weakest. The tasks chosen seemed to be the ones most susceptible to the influence of an intervening variable upon readministration of the task test.

Difficulty as a criterion was discussed rather fully earlier. According to the subjects' perception of the difficulty of the four cognitive performance tasks they may be thought of as separate and distinct levels of difficulty in the following order (from easy to difficult): Digit Symbol, Addition, Series Completion, Object-Number. On an empirical basis, not only does the order of difficulty change, but there is some doubt concerning the number of levels of difficulty. In one case, Object-Number, Series Completion, and Addition make up one level (more difficult) and Digit Symbol makes up the other (less difficult). When time is considered, the tasks are ranked (easy to difficult): Digit Symbol, Object-Number, Series Completion, Addition.

The criterion of variety, or the constraint that each of the cognitive performance tasks required a different skill or ability from any of the other selected tasks may be thought of in terms of factor pureness. If each cognitive performance task test was a measure of an independent factor, then the criterion of variety could be met. In order to check the factor pureness of the tasks, all four were intercorrelated utilizing Spearmen's rank order correlation coefficients (N=30). The results of this computation are presented below (Table IX)
for both forms A and B. The only correlations of a magnitude great enough to be significant are Series Completion and Object-Number and Series Completion and Addition.

**TABLE IX**

INTERCORRELATIONS OF COGNITIVE PERFORMANCE TASKS (FORMS A AND B)

<table>
<thead>
<tr>
<th></th>
<th>FORM A</th>
<th>FORM B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Series Completion</td>
<td>Series Completion</td>
</tr>
<tr>
<td>Digit Symbol</td>
<td>-.02</td>
<td>.07</td>
</tr>
<tr>
<td>Series Completion</td>
<td>-.07</td>
<td>.37</td>
</tr>
<tr>
<td>Addition</td>
<td>.77</td>
<td>.48</td>
</tr>
<tr>
<td>Object-Number</td>
<td>.37</td>
<td>.43</td>
</tr>
<tr>
<td>Addition</td>
<td>.07</td>
<td>.55</td>
</tr>
<tr>
<td>Object-Number</td>
<td>.39</td>
<td>.32</td>
</tr>
</tbody>
</table>

The results indicate that the Series Completion Test is significantly intercorrelated with the Addition Test and the Object-Number Test. Fortunately, this is the only shared factor in the study. The magnitude of the intercorrelations with Object-Number and the fact that there is no significant intercorrelation on Form B is not as convincing as it is with the Addition Test. In terms of variety then, most optimistically we could say that all cognitive performance factors are independent of one another except for a shared skill between Addition and Series Completion. Most pessimistically, one would have to add Object-Number and admit a contamination of three of the four cognitive performance tasks.
All four of the tasks met the time criterion in that all were either five minutes in length or under. Following are the test administration times, excluding direction reading and practice problems: Addition Test - 2 minutes, Series Completion - $1\frac{1}{2}$ minutes, Digit Symbol - $1\frac{1}{2}$ minutes, Object-Number - 5 minutes.

III. SUBJECTS AND CONTROLS

Subjects in this study were selected from nursing students attending Northeastern University and enrolled in both the associate and baccalureate degree programs ($N=44$) and a group of nursing students attending various hospital schools of nursing and enrolled in diploma programs ($N=60$). These latter subjects were receiving their psychiatric nursing instructional sequence at Medfield State Hospital, Harding, Massachusetts, and were tested in the hospital setting. The remaining subjects were made up of a miscellaneous group of individuals at Northeastern University. A great effort was made to fill each cell of the experimental paradigm. Participants in the pilot studies (Addpendix A) ranged from graduate students at Northeastern University to senior high school students. A group of twelve Northeastern University employees acted as volunteers for an administrative trial run of the study.

As previously discussed, a number of variables must be controlled in experiments involving hypnotic induction. Control of subject
variables, prior training, interest in the experiment, motivation to perform well on criteria tasks, relationship between experimenter and subject, and the manner in which the situation is defined to the subject all represent potential sources of contamination of the data collected. Only two choices of control are open to the experimenter: (1) the elimination of the source of contamination or (2) determination of the influence of the variable on the data collected. Both choices are represented in this study.

Subject variables are controlled by the use of the Barber Suggestibility Scale (BSS) administered under a direct-suggestion condition as described elsewhere (Barber and Calverley, Barber and Glass). The BSS was used to randomly assign equal numbers of suggestible and non-suggestible subjects to treatment groups. Many subject variables were controlled by the selection of the subject group. Such control was obtained by using nursing students who tend to be remarkably homogeneous in physical, mental and emotion characteristics due to the "natural selection" that takes place in choosing


nursing as a career. Prior training was controlled by using subjects with no previous experience with hypnosis. This was a requirement easily met, as many, if not all subjects were freshmen or second year students which represent a yet unspoiled and untapped source of experimental subjects.

Interest in the experiment was perhaps the most difficult control criterion to be met as it is quite difficult to determine when control of the variable has been achieved. Two efforts were made to maintain interest in the experiment: (1) the use of unique methods of presentation of performance tasks and (2) explanation of the purpose and value of the project. A one item "interest questionnaire" was completed by each subject upon termination of the experimental session and this instrument functioned as yet another attempt to assess this variable and to ascertain its influence on the data collected. Subjects were asked to indicate their interest in the experiment by completing the following item:

As far as I am concerned, I found the experiment:

(check only ONE of the five boxes below):

a. Definitely interested, I am sorry it was over.

b. Interesting, I was happy to participate.

c. Quite neutral, nothing more or less than an experience.
d. Not interesting, could have better spent my time.
e. Definitely not interesting at all, the whole thing was a drag.

Results of the subject response to this item are reported in Chapter IV where they are more relevant. Suffice it to say now that an overwhelming majority of subjects were quite interested in the experiment.

Motivation to perform well on the criterion task was a major independent variable of the study. It was controlled by the use of motivating instruction. Motivation other than that controlled by motivating instructions was assumed to be randomly distributed among the subject population. The relationship between subject and experimenter was controlled by limiting the contact between investigator and the subject in two ways. First, initial assessment on the BSS was completed via tape recording and an independent judge, not the experimenter. Second, the hypnotic induction and performance task sessions were administered via tape recording (Barber and Calverley\textsuperscript{27}). In the test situations, an associate of the experimenter functioned

\textsuperscript{27} Barber, T.X. and Calverley, D.S. The comparative effects on "hypnotic-like" suggestibility of recorded and spoken suggestions. \textit{Journal of Consulting Psychology,} 1964(a), 28, 4, 384-385.
as the monitor. The experimenter had no contact with the subjects except "hello", "goodbye", and "thank you" during the entire study.

Definition of the experimental situation to the subject was a major independent variable of the study. The situation was defined as "hypnosis" to one group of subjects by informing them that as subjects of this experiment, they were members of the experimental group and as such, were to be "hypnotized". The other group was told that as subjects of the experiment they were the members of the waking control group, and as such, were not to be "hypnotized". For those "hypnotized" the situation was further defined by the actual hypnotic induction procedure in which the subject participated. All subjects were asked to estimate the percent of time and extent to which they perceived themselves "under hypnosis" during the experiment by responding to the following item:

As well as I can remember, during the experiment, I was:

a. not hypnotized ______% of the time
b. lightly hypnotized ______% of the time
c. moderately hypnotized ______% of the time
d. deeply hypnotized ______% of the time

NOTE: The sum of the % should total 100%.

These data will also be reported in Chapter IV in greater detail as it is quite relevant to the study proper. For some individuals,
the mere idea they might be hypnotized (and in fact were not) defined
the situation as hypnosis for them.

IV. PROCEDURES AND TREATMENTS

Subjects were recruited for the study by an independent agent
(an instructor or an associate of the experimenter) using the following
brief announcement:

"A research project investigating reasoning and thinking
in human beings is being initiated here at Northeastern
University (or Medfield State Hospital). For a number of
administrative reasons, (nursing or physical education)
students represent an appropriate group to use in this
investigation. In this study, each subject will be treated
differently. Some subjects will be hypnotized, and some will
not. Two sessions will be required, the first involving
about ten minutes, the second, about one hours. In the first
session, all subjects will be administered a test of
imagination, and will be scheduled from the (day) to the
(day) of (month). The second session, the experiment
proper, will be scheduled from the (day) of (month) to
the (day) of (month). A total of 120 subjects is
required. Although participation in the experiment is not
required, you are strongly urged to do so, as such experiences,
quite often, are a source of greater understanding of others as well as oneself."

Subjects receiving a fee for participating in the experiment were told that they would be paid.

The 120 subjects28 required by the study were first assessed on the Barber Suggestibility Scale (Appendix D). Subjects were scheduled every fifteen minutes for the administration of the BSS, and all subjects received the BSS prior to the experimental treatment proper. Each subject was greeted and scheduled for the experimental treatment. They were then placed in an isolated room for the administration of the BSS, given instructions on how to operate the tape playback device, told how to fill out the BSS questionnaire, and left to complete the "test of imagination". The BSS was administered via audio tape and earphones. The experimenter recorded the BSS as well as the experimental treatment audio tapes. Upon completion of the BSS, subjects were asked if they had over been hypnotized. If not, they were instructed to return for the experiment and their BSS questionnaire collected and scored.

The subjects were then quasi-randomly assigned to treatment groups maintaining equal number of high and low suggestible subjects.

28. Actually, there were 259 subjects initially tested on the BSS from which the 120 were chosen.
in each treatment cell (ten high suggestible subjects and ten low suggestible subjects for each of six cells). As noted previously, high suggestible subjects were those above the BSS median while those below the median were considered low suggestible.

An attempt was made while assigning subjects to cells to maintain the same accumulative BSS high/low difference in each cell. In other words, BSS values were taken into account when assigning subjects to treatments. This was necessary in order to maintain an equal distribution of levels of suggestibility of high and low suggestible subjects in each treatment. It would be possible for one treatment cell to have low suggestible subjects with ones and twos on the BSS and high suggestible subjects with eighteens and nineteens while in another cell, low suggestibles had fives and sixes while high suggestibles had eights and nines. This was done by cumulatively obtaining the difference between a given cell's high and low BSS scores and comparing them across cells so that all treatments had approximately the same high/low difference.

When a subject returned for an experimental treatment, they were again instructed on how to operate the tape playback device and given an envelope containing all materials required for the experimental session. Each subject was asked at this time whether or not she wished to remain as a subject in the study (such a question was asked
again on the tape). If the response was negative, each subject was discharged from any responsibility immediately; if positive, the subject was instructed to put on the earphones and begin the experiment. The entire session was administered with audio tape and specially printed materials. The study monitor frequently "looked in" on the experimental session in order to observe the subject's behavior and ascertain her well being.

An experimental session consisted of: (a) the administration of special instruction, (b) completion of a battery of four cognitive performance-task pre-tests, (c) the administration of the experimental treatments, (d) completing an equivalent battery of four cognitive performance tests, and (e) the completion of a subject/experiment/interest/perception of hypnotic induction/difficulty of cognitive performance test questionnaire (Appendix F). When the experimental session was finished, subjects turned in their data to the monitor, and were paid their subject fee.

As reported earlier, alternate form and internal consistency reliability were quite high and cognitive performance task test forms demonstrated that they met the definition of parallel forms. Even so, in order to counter any systematic order of administration error bias, test forms were alternated. In this procedure, one subject received Form A first, and Form B second, the next subject received
Form B first and then Form A. In total then, sixty subjects were administered the cognitive performance task test in the order A→B while sixty subjects received the order B→A.

A total of twelve experimental treatments were required to test the hypotheses of this study. Formally stated, these hypotheses read: (1) that the interactive effect of hypnotic induction of extended duration, high level of subject suggestibility, and motivating instructions will facilitate performance on cognitive skill tasks of varying difficulty more than other possible combinations of these variables, (2) that the performance on cognitive skill tasks of varying difficulty of suggestible subjects receiving motivating instructions will be greater than that of non-suggestible subjects receiving motivating instructions, (3) that suggestible subjects not receiving motivating instructions do not differ in their performance on cognitive skill tasks of varying difficulty from non-suggestible subjects not receiving motivating instructions, and (4) that the more difficult the cognitive performance task the less such differences will be manifest between the previously mentioned variables. These hypotheses represent declarative statements of the questions delineated in the statement of the problem. The independent variables making up the treatments are: duration of hypnotic induction, level of suggestibility, use of motivating instructions, and level of task difficulty. Table X below indicates both the treatment groups and the N of each.
Six treatment conditions (each with a high and low suggestible group for twelve cells) were defined by a script (for the audio tape) which for all six appears in Appendix E. Each tape was identical except for two portions: that portion dealing with hypnotic induction, and that portion dealing with motivating instructions. Table XI indicates the content of each of the experimental sessions by script or session number. A verbal description of each of the treatment conditions follows:

**TABLE X**

**EXPERIMENTAL TREATMENT OF CELLS**

<table>
<thead>
<tr>
<th>Duration of Hypnotic Induction</th>
<th>Motivating Instructions</th>
<th>No Motivating Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Minimal (30 sec)</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Extended (15 min)</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

1. No hypnotic induction, motivating instructions, high suggestibility
2. No hypnotic induction, motivating instructions, low suggestibility
<table>
<thead>
<tr>
<th>Experimental Session Content</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Initial Instructions</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Cognitive Performance Tasks</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Interpolated Activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-16 minutes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>2-15(\frac{1}{2}) minutes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3-15 minutes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>4-14(\frac{1}{2}) minutes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>5-13(\frac{1}{2}) minutes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>6-1 minute</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Hypnotic Induction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-15 minutes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2-(\frac{1}{2}) minutes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Motivating Instructions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 minute</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Cognitive Performance Tasks</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Final Instructions</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Sign Off</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
3. No hypnotic induction, no motivating instructions, low suggestibility
4. No hypnotic induction, no motivating instructions, high suggestibility
5. Minimal hypnotic induction, motivating instructions, high suggestibility
6. Minimal hypnotic induction, motivating instructions, low suggestibility
7. Minimal hypnotic induction, no motivating instructions, high suggestibility
8. Minimal hypnotic induction, no motivating instructions, low suggestibility
9. Extended hypnotic induction, motivating instructions, high suggestibility
10. Extended hypnotic induction, motivating instructions, low suggestibility
11. Extended hypnotic induction, no motivating instructions, high suggestibility
12. Extended hypnotic induction, no motivating instructions, low suggestibility

Those subjects involved in treatments where no or minimal hypnotic induction or no motivating instructions were utilized were required to spend equivalent amounts of time (from one minute to sixteen minutes)
in free activity. Magazines were provided, smoking permitted, and a free choice of activity was allowed. The only constraint imposed was that of requesting that the subjects remain in the testing room and that they did not work on either the pre or post cognitive performance tasks.

V. ANALYSIS OF DATA

A 3x2x2 analysis of variance factorial design was used to determine the main and interactive treatment effects of: (a) three levels of hypnotic induction, (b) two levels of motivating instructions, and (c) two levels of suggestibility. The dependent variables are the difference scores between pre and post cognitive performance test scores. The analysis of variance is summarized in Table XII.

TABLE XII
SUMMARY OF ANALYSIS OF VARIANCE

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>A(Duration of Hypnotic Induction)</td>
<td>SSA</td>
<td>p-1</td>
<td>MSa</td>
</tr>
<tr>
<td>B(Motivating Instruction)</td>
<td>SSb</td>
<td>q-1</td>
<td>MSb</td>
</tr>
<tr>
<td>C(Suggestibility)</td>
<td>SCC</td>
<td>r-1</td>
<td>MSC</td>
</tr>
<tr>
<td>AB</td>
<td>SSab</td>
<td>(p-1)(q-1)</td>
<td>MSab</td>
</tr>
<tr>
<td>AC</td>
<td>SSac</td>
<td>(p-1)(r-1)</td>
<td>MSac</td>
</tr>
<tr>
<td>BC</td>
<td>SSbc</td>
<td>(p-1)(q-1)(r-1)</td>
<td>MSbc</td>
</tr>
<tr>
<td>ABC</td>
<td>SSabc</td>
<td>(q-1)(r-1)</td>
<td>MSabc</td>
</tr>
<tr>
<td>Within Cell(Experimental error)</td>
<td>SS</td>
<td>pqr</td>
<td>MSw cell</td>
</tr>
<tr>
<td>Total</td>
<td>SS total</td>
<td></td>
<td>df</td>
</tr>
</tbody>
</table>
Where mean squares were significant (F test) for simple main effects and interactions, Duncan's Multiple Range Test values were computed to ascertain which corresponding pair of factor level combinations produce significant differences in the difference scores. Such an analysis of data not only permits answering questions concerning main and interaction effects upon cognitive task performance by three independent variables (subject suggestibility, task motivating instructions, duration of hypnotic induction), but also provides information as to which pairs of independent variables differ significantly in their influence on the dependent variable as well as analyzing for a significant trend in dependent variable values as the duration of hypnotic induction increases. Percent of the variance attributable to significant main effects and interactions was also computed using Cohen's formula. Further analysis was made utilizing data concerning task difficulty and the subjects' perception of the situation as hypnosis. Attempts were made to utilize the interest-in-experiment data also, but because of the restricted range of these data, it is questionable as to the worth of the effort.

VI. SUMMARY

In this 3x2x2 analysis of variance factorial design involving

three durations of hypnotic induction, two aspects of task motivating instructions, two degrees of suggestibility, and four perceived levels of cognitive task performance difficulty, one hundred twenty subjects were assessed on the Barber Suggestibility Scale and randomly assigned to six experimental treatment conditions on a high and low suggestibility criterion.

These six experimental conditions consisted of: no hypnotic induction and motivating instruction, no hypnotic induction and no motivating instructions, minimal hypnotic induction and motivating instructions, minimal hypnotic induction and no motivating instructions, extended hypnotic induction and motivating instruction, and extended hypnotic induction and no motivating instructions.

Each experimental session involved the subjects being administered, via audio tape and printed media, four cognitive performance task tests (an Addition Test, a Digit Symbol Test, an Object-Number Test, and a Series Completion Test) that had met seven a priori psychometric criteria. The subject then participated in one of the six experimental conditions and was administered an alternate form of the four cognitive performance task tests taken prior to the experimental treatment. Finally, the subject responded to a post-experiment questionnaire which attempted to sample the subjects' perception of the relative difficulty of the four cognitive performance task tests, the degree to which they
were under hypnotic induction, and the extent of their interest in the experiment.
CHAPTER IV

RESULTS AND DISCUSSION

It is the purpose of this chapter of the dissertation to present the results of the data analysis and discuss these results in terms of the hypotheses of this investigation, previous work reported in the literature, and hypnosis in general. The results will be presented both from the perspective of the dependent variables (the cognitive performance tasks) and the point-of-view of the independent variable (the conditions of the experiment proper). Data on two variables of relevance to the question of experimental control, subject interest in the experiment and perception of depth of hypnosis will also be presented.

I. PRESENTATION OF THE RESULTS

Data for each of the four cognitive performance tasks will be presented both in narrative and tabular form. An analysis of variance summary table as well as tables of main effect and interaction means will be included. Data were summarized for each subject for each cognitive performance task and a complete total dependent variable score computed. An analysis of variance of these data was completed and reported. The results of such an analysis of the composite or total score is immediately suspect. It has been demonstrated that the
cognitive performance tasks were at different levels of difficulty and required the application of a variety of skills by the subjects. One would suspect that such data would average to "no significance." In the rare case where some significance would develop, it would probably be quite difficult to interpret.

**Digit Symbol.** No significant main or interactive treatment effects were revealed by the analysis of the data concerning performance on this cognitive task (Table XIII). The only treatment effect mean square approaching the .05 level of significance was duration of hypnotic induction. The F test value of 2.31 is significant at the .11 level and perhaps indicates a trend in the direction of the greater degree of hypnotic induction the greater the difference between the pre and post experimental measures on the variable.

### TABLE XIII

**DIGIT SYMBOL ANALYSIS OF VARIANCE SUMMARY**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypnotic Induction</td>
<td>550.86</td>
<td>2</td>
<td>275.43</td>
<td>2.31</td>
</tr>
<tr>
<td>Motivating Instructions</td>
<td>165.66</td>
<td>1</td>
<td>165.66</td>
<td>1.38</td>
</tr>
<tr>
<td>Level of Suggestibility</td>
<td>180.07</td>
<td>1</td>
<td>180.07</td>
<td>1.58</td>
</tr>
<tr>
<td>Induction x Instructions</td>
<td>260.67</td>
<td>2</td>
<td>130.31</td>
<td>1.09</td>
</tr>
<tr>
<td>Induction x Suggestibility</td>
<td>101.61</td>
<td>2</td>
<td>50.80</td>
<td>-</td>
</tr>
<tr>
<td>Instructions x Suggestibility</td>
<td>3.02</td>
<td>1</td>
<td>3.02</td>
<td>-</td>
</tr>
<tr>
<td>Induction x Instructions x</td>
<td>51.45</td>
<td>2</td>
<td>25.72</td>
<td>-</td>
</tr>
<tr>
<td>Suggestibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Treatments</td>
<td>12876.30</td>
<td>108</td>
<td>119.22</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>14189.59</td>
<td>119</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This can be seen by looking at the total mean differences on the duration of hypnotic induction dimension (Table XIV). The mean differences increase as the duration of hypnotic induction becomes greater which supports this trend.

**TABLE XIV**

**MEAN DIFFERENCE SCORES BETWEEN PRE AND POST COGNITIVE PERFORMANCE TASK TESTS FOR THE TWELVE TREATMENT GROUPS**

<table>
<thead>
<tr>
<th>Task</th>
<th>Motivating Instructions</th>
<th>Level of Suggestibility</th>
<th>Hypnotic Induction</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>None</td>
<td>Minimal</td>
</tr>
<tr>
<td>MI</td>
<td>Low</td>
<td>3.80</td>
<td>-0.50</td>
<td>5.10</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>4.10</td>
<td>5.00</td>
<td>7.60</td>
</tr>
<tr>
<td>NMI</td>
<td>Low</td>
<td>2.50</td>
<td>6.40</td>
<td>7.50</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>1.90</td>
<td>8.20</td>
<td>12.70</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>3.75</td>
<td>4.78</td>
<td>8.23</td>
</tr>
<tr>
<td>MI</td>
<td>Low</td>
<td>1.10</td>
<td>-0.50</td>
<td>0.70</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0.80</td>
<td>0.60</td>
<td>0.70</td>
</tr>
<tr>
<td>NMI</td>
<td>Low</td>
<td>1.30</td>
<td>1.00</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0.10</td>
<td>0.80</td>
<td>0.80</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>0.83</td>
<td>0.48</td>
<td>0.68</td>
</tr>
<tr>
<td>MI</td>
<td>Low</td>
<td>-1.10</td>
<td>1.10</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0.90</td>
<td>3.70</td>
<td>0.20</td>
</tr>
<tr>
<td>NMI</td>
<td>Low</td>
<td>0.80</td>
<td>0.40</td>
<td>-0.10</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0.00</td>
<td>-3.70</td>
<td>-2.70</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>0.15</td>
<td>0.38</td>
<td>-0.65</td>
</tr>
<tr>
<td>MI</td>
<td>Low</td>
<td>-0.02</td>
<td>-0.06</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0.30</td>
<td>-0.09</td>
<td>0.90</td>
</tr>
<tr>
<td>NMI</td>
<td>Low</td>
<td>0.00</td>
<td>1.80</td>
<td>0.90</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>-0.80</td>
<td>0.60</td>
<td>2.90</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>-0.20</td>
<td>0.90</td>
<td>1.27</td>
</tr>
<tr>
<td>MI</td>
<td>Low</td>
<td>2.60</td>
<td>3.40</td>
<td>5.20</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>5.00</td>
<td>3.60</td>
<td>9.10</td>
</tr>
<tr>
<td>NMI</td>
<td>Low</td>
<td>3.80</td>
<td>9.60</td>
<td>8.90</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>1.30</td>
<td>5.90</td>
<td>12.90</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>3.17</td>
<td>5.62</td>
<td>9.00</td>
</tr>
</tbody>
</table>

* It must be remembered that the means reported in this table are mean difference scores - the post-test group mean minus the pre-test group mean. For example, the no hypnotic induction group completed "on the average" four more digit symbols on the post-experimental cognitive performance task, while the extended hypnotic induction group completed "on the average" eight more.
Series Completion. Referring to Table XV, it may easily be determined that there were no significant main or interaction effects on this variable. These results are confirmed by the mean difference scores (Table XIV) only three of which are above 1.00 and all are less than 1.50. Evidently, none of the three independent variables, at any level, affect pre/post treatment performance on the cognitive task.

### TABLE XV

**SERIES COMPLETION ANALYSIS OF VARIANCE SUMMARY**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypnotic Induction</td>
<td>2.48</td>
<td>2</td>
<td>1.24</td>
<td>-</td>
</tr>
<tr>
<td>Motivating Instructions</td>
<td>1.01</td>
<td>1</td>
<td>1.10</td>
<td>-</td>
</tr>
<tr>
<td>Level of Suggestibility</td>
<td>0.07</td>
<td>1</td>
<td>.04</td>
<td>-</td>
</tr>
<tr>
<td>Induction x Instructions</td>
<td>6.85</td>
<td>2</td>
<td>3.42</td>
<td>-</td>
</tr>
<tr>
<td>Inductions x Suggestibility</td>
<td>6.54</td>
<td>2</td>
<td>3.27</td>
<td>-</td>
</tr>
<tr>
<td>Instructions x Suggestibility</td>
<td>1.13</td>
<td>1</td>
<td>1.13</td>
<td>-</td>
</tr>
<tr>
<td>Induction x Instructions x</td>
<td>7.10</td>
<td>2</td>
<td>3.55</td>
<td>-</td>
</tr>
<tr>
<td>Suggestibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Treatments</td>
<td>490.30</td>
<td>108</td>
<td>4.53</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>514.30</td>
<td>119</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Addition Test. The analysis of the Addition Test data revealed a significant interaction treatment effect at the .05 level and a main effect significant at the .15 level (Table XVI, page 101). Again, as in the Digit Symbol data, this is only a trend indication. The interaction effect is between motivating instructions and level of
suggestibility and accounts for 3% of the variance\(^1\) while the main
effect (at an unacceptable level of significance) accounts for 2%.

### TABLE XVI

**ADDITIONAL ANALYSIS OF VARIANCE SUMMARY**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypnotic Induction</td>
<td>23.22</td>
<td>2</td>
<td>11.61</td>
<td>-</td>
</tr>
<tr>
<td>Motivating Instructions</td>
<td>85.01</td>
<td>1</td>
<td>85.01</td>
<td>2.27</td>
</tr>
<tr>
<td>Level of Suggestibility</td>
<td>6.07</td>
<td>1</td>
<td>6.07</td>
<td>-</td>
</tr>
<tr>
<td>Inductions x Instructions</td>
<td>104.02</td>
<td>2</td>
<td>52.01</td>
<td>1.38</td>
</tr>
<tr>
<td>Induction x Suggestibility</td>
<td>29.70</td>
<td>2</td>
<td>14.85</td>
<td>-</td>
</tr>
<tr>
<td>Instructions x Suggestibility</td>
<td>126.08</td>
<td>1</td>
<td>126.08</td>
<td>3.36</td>
</tr>
<tr>
<td>Induction x Instructions x Suggestibility</td>
<td>13.20</td>
<td>2</td>
<td>6.60</td>
<td>-</td>
</tr>
<tr>
<td>Within Treatments</td>
<td>4041.50</td>
<td>108</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4428.80</td>
<td>119</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The interaction treatment effect of motivating instructions and
level of suggestibility is especially interesting when the cell means
for the interaction are examined (Table XVII, page 103). Low
suggestible subject are apparently not influenced by the presence or
absence of motivating instructions while the performance of high sug­
estible subjects is influenced. Further, the performance of high
suggestible subjects receiving motivating instructions increases
(slightly) while those not receiving motivating instructions indicate a
decrement in pre/post performance.

---

1. \(\eta^2 = \frac{df \times F}{df \times F + df_w}\)

Cohen, J. "Some statistical issues in psychological research". In Wolman, B.B Handbook of
TABLE XVII
ADDITION TEST MOTIVATING INSTRUCTIONS
AND LEVEL OF SUGGESTIBILITY INTERACTION MEANS

<table>
<thead>
<tr>
<th></th>
<th>Motivating Instructions</th>
<th>No Motivating Instructions</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of Suggestibility - Low</td>
<td>0.00</td>
<td>0.37</td>
<td>0.18</td>
</tr>
<tr>
<td>Level of Suggestibility - High</td>
<td>1.60</td>
<td>-2.13</td>
<td>-0.27</td>
</tr>
<tr>
<td>Total</td>
<td>0.80</td>
<td>-0.90</td>
<td>-0.04</td>
</tr>
</tbody>
</table>

Although the F value for the main effect, motivating instructions, is not at the .05 level, it is significant enough to be noted as a trend. The means of this main effect (Table XIV) indicate that pre/post-test performance on the Addition Test improves for those receiving motivating instructions and decreases for those who have not.

Object-Number. The object-number cognitive task performance data were not significant in either main or interaction effects. The F value of motivating instructions is significant at $\alpha = .18$. Again, only trend information, and not too positive trend information at that. (See Table XVIII)
### TABLE XVIII

OBJECT-NUMBER ANALYSIS OF VARIANCE SUMMARY

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypnotic Induction</td>
<td>37.00</td>
<td>2</td>
<td>18.50</td>
<td>1.42</td>
</tr>
<tr>
<td>Motivating Instructions</td>
<td>30.01</td>
<td>1</td>
<td>20.01</td>
<td>2.31</td>
</tr>
<tr>
<td>Level of Suggestibility</td>
<td>1.21</td>
<td>1</td>
<td>1.21</td>
<td>-</td>
</tr>
<tr>
<td>Induction x Instructions</td>
<td>24.36</td>
<td>2</td>
<td>12.18</td>
<td>-</td>
</tr>
<tr>
<td>Induction x Suggestibility</td>
<td>22.26</td>
<td>2</td>
<td>11.13</td>
<td>-</td>
</tr>
<tr>
<td>Instructions x Suggestibility</td>
<td>.01</td>
<td>1</td>
<td>.01</td>
<td>-</td>
</tr>
<tr>
<td>Induction x Instructions x Suggestibility</td>
<td>8.92</td>
<td>2</td>
<td>4.46</td>
<td>-</td>
</tr>
<tr>
<td>Within Treatments</td>
<td>1404.20</td>
<td>108</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1527.97</td>
<td>119</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Accumulated Total Cognitive Performance. Inspecting Table XIX it will be noted that there are no significant or near significant main or interaction effects. As stated earlier, none were really expected as the variables under consideration probably are not additive.

### TABLE XIX

ACCUMULATED TOTAL ANALYSIS OF VARIANCE SUMMARY

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypnotic Induction</td>
<td>648.31</td>
<td>2</td>
<td>342.15</td>
<td>1.42</td>
</tr>
<tr>
<td>Motivating Instructions</td>
<td>149.63</td>
<td>1</td>
<td>149.63</td>
<td>-</td>
</tr>
<tr>
<td>Level of Suggestibility</td>
<td>16.13</td>
<td>1</td>
<td>16.13</td>
<td>-</td>
</tr>
<tr>
<td>Induction x Instructions</td>
<td>183.51</td>
<td>2</td>
<td>91.75</td>
<td>-</td>
</tr>
<tr>
<td>Induction x Suggestibility</td>
<td>174.71</td>
<td>2</td>
<td>87.35</td>
<td>-</td>
</tr>
<tr>
<td>Instructions x Suggestibility</td>
<td>61.64</td>
<td>1</td>
<td>61.64</td>
<td>-</td>
</tr>
<tr>
<td>Induction x Instructions x Suggestibility</td>
<td>36.34</td>
<td>2</td>
<td>18.17</td>
<td>-</td>
</tr>
<tr>
<td>Within Treatments</td>
<td>25909.20</td>
<td>2</td>
<td>239.90</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>27215.47</td>
<td>119</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The same data will not be presented from the perspective of the independent variable, the conditions of the experiment. Since none of the main effect F values were statistically significant and only one of the interaction effects (motivating instructions x level of suggestibility on the Addition Test) was significant (α = .05) this presentation will not be as meaningful as it could be. Mean scores by independent variable to be used in the following presentation are noted in Table XX below.

**Hypnotic Induction.** Data revealed by this study concerning the influence of the duration of hypnotic induction on pre/post-test experiment cognitive task performance is non-existent. Digit Symbol was the only dependent variable indicating any potential relationship. Inspecting the mean difference scores (Table XX) there seems to be a trend in the direction of an increase in mean difference score (especially to be noted in Digit Symbol).
**TABLE XX**

**DEPENDENT VARIABLE MEAN SCORES BY INDEPENDENT VARIABLE**

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Level</th>
<th>Digit Symbol</th>
<th>Series Com.</th>
<th>Addition</th>
<th>Object Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypnotic Induction</td>
<td>None</td>
<td>3.75</td>
<td>0.82</td>
<td>0.15</td>
<td>-0.05</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>4.78</td>
<td>0.47</td>
<td>0.47</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>Extended</td>
<td>8.23</td>
<td>0.67</td>
<td>-0.65</td>
<td>1.27</td>
</tr>
<tr>
<td>Motivating Instructions</td>
<td>No</td>
<td>6.53</td>
<td>0.75</td>
<td>-0.88</td>
<td>0.98</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>4.18</td>
<td>0.56</td>
<td>0.80</td>
<td>-0.01</td>
</tr>
<tr>
<td>Levels of Suggestibility</td>
<td>Low</td>
<td>4.13</td>
<td>0.63</td>
<td>0.18</td>
<td>0.58</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>6.58</td>
<td>0.68</td>
<td>-0.26</td>
<td>0.38</td>
</tr>
</tbody>
</table>

**Motivating Instructions.** Motivating instructions seems to be the most active of the independent variables with one significant interaction treatment effect of the Addition Test (motivating instructions x level of suggestibility) and two near significant main effects (Addition Test, Object-Number). Again, the mean difference scores reveal little. It may be noted however, that in all cases except Addition, the mean difference scores were greater for those not receiving motivating instructions. Digit symbol reports the only means of any consequence.

**Level of Suggestibility.** The interaction treatment effect with motivating instructions was the only occurrence of this independent variable demonstrating any relationship with a dependent variable (Addition Test). Those subjects in the high suggestible group have greater, but not statistically significantly different, mean difference...
scores for Digit Symbol and Series Completion while they have lower, but not statistically significantly different, mean difference scores for Addition and Object-Number. For the low suggestible subjects the converse is true.

In presenting the results of the study in terms of the initial questions posited, each one will be stated and reviewed independently.

Do suggestible and non-suggestible subjects differ in their performance on specific cognitive performance tasks of varying difficulty depending on the duration of the hypnotic induction procedures employed? This question concerns a duration of hypnotic induction and level of suggestibility interaction. The simple answer is no - suggestible and non-suggestible subjects do not differ on any of the four cognitive performance tasks independent of or dependent on duration of hypnotic induction and level of suggestibility (Table XXI, page 108). No pattern seems to emerge from any of the data except Digit Symbol. Digit Symbol data, if significant, would support a thesis that the interaction of high suggestibility and extended hypnotic induction produce a mean difference of the greatest magnitude.
What is the effect of the duration of hypnotic induction on subjects receiving motivating instructions regardless of the level of suggestibility? Question 2 concerns the duration of hypnotic induction and motivating instructions interaction. Again, the answer to the question is none. The duration of hypnotic induction and motivating instructions interaction do not seem to effect the performance of subjects on the four levels of cognitive performance. Although none of the mean differences are significant, the Digit Symbol data raises some interesting speculations (Table XXII). These mean differences appear to be the only ones of a magnitude worth considering. One would predict that subjects receiving both hypnotic induction and motivating instructions would demonstrate the more significant differences. This is not the case. The greatest mean differences are in the no motivating instructions group. In fact, the inclusion of motivating instructions seems to have had a negative effect.

### TABLE XXI

**DURATION OF HYPNOTIC INDUCTION AND LEVEL OF SUGGESTIBILITY MEAN DIFFERENCES ON THE FOUR COGNITIVE PERFORMANCE TASKS**

<table>
<thead>
<tr>
<th>Duration of Hypnotic Induction</th>
<th>Task</th>
<th>None</th>
<th>Minimal</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Digit</td>
<td>3.15</td>
<td>2.95</td>
<td>6.30</td>
<td></td>
</tr>
<tr>
<td>High Symbol</td>
<td>3.00</td>
<td>6.60</td>
<td>10.15</td>
<td></td>
</tr>
<tr>
<td>Low Series</td>
<td>0.45</td>
<td>0.70</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>High Comp.</td>
<td>1.20</td>
<td>0.25</td>
<td>0.60</td>
<td></td>
</tr>
<tr>
<td>Duration of Hypnotic Induction</td>
<td>Task</td>
<td>None</td>
<td>Minimal</td>
<td>Extended</td>
</tr>
<tr>
<td></td>
<td>Add.</td>
<td>-0.15</td>
<td>0.70</td>
<td>-0.05</td>
</tr>
<tr>
<td></td>
<td>0.45</td>
<td>0.00</td>
<td>-1.25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Obj.</td>
<td>-0.10</td>
<td>0.60</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td>Num.</td>
<td>0.00</td>
<td>0.15</td>
<td>1.90</td>
</tr>
</tbody>
</table>
Question three concerns the interaction of two different independent variables; those of motivating instructions and level of suggestibility. Does the use of motivating instructions with high and low suggestible subject affect performance of specified cognitive tasks of varying difficulty independent of the duration of hypnotic induction procedures? Data concerning this question appears in Table XXIII and the question may be answered in the negative except for the Addition Test where the level of suggestibility and motivating instructions interaction is significant. Apparently, motivating instructions has little effect on low suggestible subjects but did effect the performance of those who were highly suggestible. Not receiving motivating instructions was actually detrimental to high suggestible subjects while receiving them enhanced performance for the same group. It is interesting to note the opposite results, although not statistically significant, on the Digit Symbol task.
TABLE XXIII

MOTIVATING INSTRUCTIONS AND LEVEL OF SUGGESTIBILITY
MEAN DIFFERENCES ON THE FOUR COGNITIVE PERFORMANCE
TASKS

<table>
<thead>
<tr>
<th>Task</th>
<th>Level of Suggestibility</th>
<th>Level of Suggestibility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>No Dig.</td>
<td>5.46</td>
<td>7.60</td>
</tr>
<tr>
<td>Yes Sym.</td>
<td>2.80</td>
<td>5.36</td>
</tr>
<tr>
<td>No Ser.</td>
<td>0.93</td>
<td>0.56</td>
</tr>
<tr>
<td>Yes Comp.</td>
<td>0.42</td>
<td>0.38</td>
</tr>
</tbody>
</table>

Do suggestible subjects receiving motivating instructions and varying duration of hypnotic induction differ in performance on specified cognitive tasks of varying difficulty from non-suggestible subjects receiving the same treatment? The question deals with the differences between high and low suggestible subjects independent of motivating instructions and hypnotic induction. There were no data to support a significant level of suggestibility main effect on any of the four cognitive performance tasks. Table XXIV contains the mean difference scores of the high and low suggestible subjects independent of the remaining two independent variables. Inspecting the data for trend information, one can only speculate on the differences in the values for Digit Symbol and Addition. In the former, the high suggestible groups seem to have performed better whereas in the latter, the low suggestible group demonstrated positive results.
Data concerning the perception of the subjects of the degree of the depth of the hypnosis under which they were operating will be presented utilizing an analysis of variance. The questions to be answered in this case concern which of the main effects or interactions is or are responsible for the difference in the subjects' estimates of the depth of their hypnotic induction. Table XXV indicates two main effects (duration of hypnotic induction and level of suggestibility) that are significant at the .01 level. One interaction effect (induction x suggestibility) although not significant at an acceptable level (\( \alpha = .08 \)) indicates a trend. The two main effects account for 34% and 13% of the variance respectively while the interaction effect accounts for 5%.

<table>
<thead>
<tr>
<th>Level of Suggestibility</th>
<th>Cognitive Performance Tasks</th>
<th>Digit Series</th>
<th>Symbol Completion</th>
<th>Addition</th>
<th>Object Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td></td>
<td>4.03</td>
<td>0.68</td>
<td>0.18</td>
<td>0.51</td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>6.58</td>
<td>0.64</td>
<td>-0.26</td>
<td>0.58</td>
</tr>
</tbody>
</table>

TABLE XXIV

LEVEL OF SUGGESTIBILITY MEAN DIFFERENCE SCORES ON THE FOUR COGNITIVE PERFORMANCE TASKS
<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypnotic Induction</td>
<td>149618.85</td>
<td>2</td>
<td>74869.42</td>
<td>27.20</td>
</tr>
<tr>
<td>Motivating Instructions</td>
<td>5109.08</td>
<td>1</td>
<td>5109.08</td>
<td>1.85</td>
</tr>
<tr>
<td>Level of Suggestibility</td>
<td>47640.68</td>
<td>1</td>
<td>47640.68</td>
<td>17.32</td>
</tr>
<tr>
<td>Induction x Instructions</td>
<td>8354.45</td>
<td>2</td>
<td>4177.22</td>
<td>1.51</td>
</tr>
<tr>
<td>Induction x Suggestibility</td>
<td>14918.55</td>
<td>2</td>
<td>7459.27</td>
<td>2.71</td>
</tr>
<tr>
<td>Instructions x Suggestibility</td>
<td>10.19</td>
<td>1</td>
<td>10.19</td>
<td>-</td>
</tr>
<tr>
<td>Induction x Instructions x Suggestibility</td>
<td>1672.03</td>
<td>2</td>
<td>836.01</td>
<td>-</td>
</tr>
<tr>
<td>Within Treatments</td>
<td>297017.10</td>
<td>108</td>
<td>2750.15</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>523340.93</td>
<td>119</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Since the F value for hypnotic induction was significant, a Duncan's Multiple Range Test \(^2\) was used to determine which pairs of means differed significantly.

No hypnotic induction and minimal hypnotic induction group estimates were significantly different from extended hypnotic induction but not from each other (Table XXVI). The means themselves (Table XXVII) indicate that subjects tended to perceive greater depth of hypnosis dependent upon the duration of hypnosis (the greater the duration of hypnosis, the greater the perception of the depth of hypnosis). This observation holds for both low and high suggestibility groups except that the perception of depth and hypnosis was greater

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in the high suggestible group. The high suggestible \times extended duration of hypnotic induction group's estimate was the highest.

**TABLE XXVI**

**DEPTH OF HYPNOSIS DUNCAN'S MULTIPLE RANGE TEST**

<table>
<thead>
<tr>
<th>MEANS</th>
<th>No Hypnotic Induction</th>
<th>Minimal Hypnotic Induction</th>
<th>Extended Hypnotic Induction</th>
<th>Shortest Significant Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Hypnotic Induction</td>
<td>10.82</td>
<td>32.95</td>
<td>94.30</td>
<td>( \alpha = .05 )</td>
</tr>
<tr>
<td>Minimal Hypnotic Induction</td>
<td>-</td>
<td>22.13</td>
<td>83.38*</td>
<td>( R_2 = 23.30 )</td>
</tr>
<tr>
<td>Extended Hypnotic Induction</td>
<td>-</td>
<td>-</td>
<td>61.35*</td>
<td>( R_3 = 24.51 )</td>
</tr>
</tbody>
</table>

* A significantly different mean difference at the .05 level.

**TABLE XXVII**

**HYPNOTIC INDUCTION AND LEVEL OF SUGGESTIBILITY MAIN EFFECT AND INTERACTION MEANS**

<table>
<thead>
<tr>
<th>Level of Suggestibility - Low</th>
<th>No Hypnotic Induction</th>
<th>Minimal Hypnotic Induction</th>
<th>Extended Hypnotic Induction</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.55</td>
<td>19.00</td>
<td>58.75</td>
<td>26.10</td>
<td></td>
</tr>
<tr>
<td>Level of Suggestibility - High</td>
<td>21.10</td>
<td>46.90</td>
<td>129.85</td>
<td>65.95</td>
</tr>
<tr>
<td>Total</td>
<td>10.82</td>
<td>32.95</td>
<td>94.30</td>
<td>43.52</td>
</tr>
</tbody>
</table>

Subject interest in the experiment was high for all groups in the experiment. On a five point scale A - E with A = 4, the overall total
mean was 2.98 or B. Individual group means are reported in Table XXVIII. Interest in the experiment increased with the duration of hypnotic induction, the inclusion of motivating instructions, and for highly suggestible groups. No test of the statistical significance of this increased interest was completed. Although the interactive effect of the three independent variables would have been interesting to investigate, it was felt the requirements of the study did not warrant such an analysis nor did the data lend itself to such an analysis (N = 120, distributed as follows: A-16, B-69, C-16, D-1, E-0). The group interest mean of these subjects who were involved the least in the study (no hypnotic induction, no motivating instructions, low suggestibility) was 2.88. This compares with a group interest mean of 3.40 for those subjects involved in the study to a maximum degree (extended hypnotic inductions, motivating instructions, high suggestibility).

**TABLE XXVIII**

**INTEREST IN EXPERIMENT MEANS BY INDEPENDENT VARIABLE GROUP**

<table>
<thead>
<tr>
<th>Total (All Subjects)</th>
<th>2.98</th>
<th>No Motivating Instructions</th>
<th>2.88</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. Hypnotic Induction</td>
<td>2.82</td>
<td>Motivating Instructions</td>
<td>3.08</td>
</tr>
<tr>
<td>Minimal Hypnotic Induction</td>
<td>2.97</td>
<td>Low Suggestibility</td>
<td>2.73</td>
</tr>
<tr>
<td>Extended Hypnotic Induction</td>
<td>3.18</td>
<td>High Suggestibility</td>
<td>3.20</td>
</tr>
</tbody>
</table>

* 0 - No interest, 2 - moderate interest, 4 - maximum interest.
As an afterthought of the study, it was decided to compare cognitive test mean differences on the two extreme experimental treatment cells. The treatment defined as no hypnotic induction, no motivating instructions, and low suggestibility could be expected to show little if any pre/post-test gain. On the other hand, the cell characterized by extended hypnotic induction, motivating instructions, and high suggestibility would be expected to demonstrate the more significant pre/post-test gain. A Fisher's t (for correlated observations) was computed for each set of means for each cognitive performance task and the accumulated total. Two of the ten t's were statistically significant indicating that individuals performed significantly better on the post-test than on the pre-test. Digit Symbol in the extended hypnotic induction, motivating instructions, high suggestibility treatment beyond the .005 level and Series Completion in the no hypnotic induction, no motivating instruction, low suggestibility treatment at the .02 level. This finding is quite interesting as neither analysis of variance indicated any potentially significant mean difference. Mean differences on Digit Symbol were of a magnitude to make them suspicious but the significant mean difference on Series Completion came as a complete surprise.
II. DISCUSSION

In general, the results of this study support the generalization that some aspects of human behavior are highly resistant to change. The largest pre-test/post-test mean difference was the Digit Symbol Test (+5.35) and the least was the Addition Test (-0.04). The other two tasks, the Series Completion Test (+0.65) and the Object-Number Test (+0.48) fell between these two extremes. None of the values were significant (F Test). Perhaps no changes in pre/post-test performance occurred because none of the dependent variables were relevant to such a change. In other words, all hypotheses concerning expected changes in behavior due to the influence of duration of hypnotic induction, level of suggestibility, and motivating instructions must be rejected. It is difficult to believe this statement in view of the literature illustrating the positive effect of such variables on task performance. The only cognitive performance task showing any statistically significant ($\alpha = .05$) change in pre/post-test performance was the Addition Test. The interactive effect of motivating instructions and level of suggestibility improves the post-test performance of highly suggestible subjects receiving motivating instructions ($M_D = -2.13$ as against 0.37 for the low suggestible/no motivating instructions group and 1.60 for the high suggestible/motivating instructions subjects).
Although only one cognitive performance task demonstrated statistical significance in pre/post-test mean difference, other independent variables (all except Series Completion) revealed borderline statistical significance but not to an overwhelming degree by any means. Only three (hypnotic induction on Digit Symbol and motivating instructions on Addition and Object-Number) out of a total of fifteen potential main effects and one (motivating instructions x level of suggestibility on Addition) of a potential of twenty interactions indicated any mean differences near an acceptable level of significance.

There is a potential of 35 effects (15 main and 20 interactive) that could be established as a result of this study. One would expect at least two to be significant by chance alone (.05 x 35 = 1.75). In reality only one of the possible 35 was found significant (instructions x suggestibility on Addition). Thus, this one significant effect may be considered a chance occurrence.

It is possible that these four cognitive performance tasks are so stable as learning or performance variables that they are not amenable to change, at least, under the conditions of this investigation. The data might have been significant if, for example, practice opportunities had been provided for each subject prior to the taking of the post-test. This introduces another reason why no change was experienced. Perhaps the experimental protocol utilized inhibited rather than enhanced the
expression of such change. Another supposition concerning the lack of change has to do with the instruments themselves. The performance tasks themselves (visual-motor coordination, abstract reasoning, associative (rote) memory, number facility) may be sensitive enough to change but the devices used to obtain measures of such performance may be masking a real significant difference in pre-test to post-test behavior. Unfortunately, none of the above discussion can be verified or negated by the data of this study and must remain conjecture.

Regardless of which one of the three difficulty schemes utilized (Chapter III) the difficulty of the performance tasks did not seem to be relevant to mean differences for each of the tests. It must be noted however that the Digit Symbol Test (on all difficulty scales ranked "easiest") consistently had the highest mean difference (Table XV) not one of which was statistically significant. Digit Symbol was also the "least cognitive" of any of the four tests. It should perhaps be noted here that there was some intercorrelation of the Addition Test, Series Completion and Object-Number. These results tend to support such inter-relationships. Thus, as far as these data are concerned, difficulty of cognitive performance task seems to exert little, if any influence.

Controls in this study were numerous and representative of those required as suggested in the literature (procedural, subject,
experimenter, and subject/experimenter interaction). Subject/experimenter interaction was nil if any at all as was such experimenter variables as prestige, personality, attitudes or expectancies (except those communicated via audio-tape to subjects experiencing motivating instructions). Subject variables were perhaps the most "uncontrolled" in the study. All subjects were "hypnotically naive" and possessed many common characteristics (at least those associated with the selection of nursing as a career and acceptance into a diploma nursing program). Subject interest in the study was high (overall mean of 2.98 on a 0 to 4 scale). Procedural variables were also controlled such as wording of suggestions, experimenter's tone of voice, and methods used to present the suggestions.

Although data support the use of an audiotape hypnotic induction procedure\(^3\), an important variable is the quality of the experimenter's tone of voice. The taped protocols (which include the hypnotic induction and motivating instructions elements) were not subjected to an analysis as to their forcefulness or permissiveness (forceful implying that a positive response is desired). Barber and Calverley\(^4\) report

\(^3\) Barber, T.X. and Calverley, D.S. The comparative effects on "hypnotic-like" suggestibility of recorded and spoken suggestions. *Journal of Consulting Psychology*, 1964, 28, 4, 384-385.

that those tapes characterized as forceful resulted in higher, more significant, responses to test suggestions. It is possible that the taped protocols were not forceful enough to elicit a positive response from the subjects.

It is possible that the control of subject/experimenter interaction was too restrictive and inhibited any real "feeling" from being communicated through the motivating instructions. Although subject interest was high, it is quite possible that the automated experimental protocol connotated a tacit compliance with the directions but little commitment. Interest scores perhaps were spurious due to the degree to which the study defined hypnosis. Of those subjects receiving some form of hypnotic induction, 78% indicated they were "under hypnosis" some of the time and 22% indicated they were "not hypnotized". Of those not subjected to a hypnotic induction procedure, 25% perceived themselves as "hypnotized" and 75% did not. The degree to which subjects perceived themselves as in a "hypnotic trance" at least some time during the experiment increased with duration of hypnotic induction (25% no hypnotic induction, 73% moderate hypnotic induction, and 85% extended hypnotic induction). One wonders how those subjects defined hypnosis who received the extended hypnotic induction and stated they were not hypnotized (15%) and those who received no hypnotic induction and stated they were hypnotized (25%).
Attitudes toward the experimental situation were generally positive as shown by the interest scores. Barber and Calverley demonstrated that "attitudes toward the experimental situation and task motivation play important roles in determining responsiveness to suggestions"\textsuperscript{5}. No data is available concerning the attitudes of the subjects about task motivation. Barber and Calverley\textsuperscript{6} in yet another study have also shown that response to suggestions is not related to the subject's attitudes toward hypnosis; however, defining the situation as "hypnosis" was found to be more effective in increasing levels of suggestibility than defining it as "control"\textsuperscript{7}. Further, the interactive effect of defining the situation as hypnosis and administering suggestions of relaxation, drowsiness, and sleep produced a yet higher level of suggestibility. The same study also reported that the administration of motivating instructions and describing the response to test

5. Ibid.


suggestions as easy were as effective as the last noted combination in increasing the level of suggestibility of subjects. Unfortunately, the data from this study did not support the same conclusions for cognitive performance tasks. Such data represent still another indication of the complexity of the concept of hypnosis.

Hypnosis as a concept or construct is quite complex and perhaps the complexity is responsible for the lack of dramatic results of this study. It is possible that the particular independent variables here investigated are simply not the ones individually or in combination that are relevant to behavior changes on the class of dependent variables dealt with in this study. The focus of such complexity is probably not limited to the independent variables but is also represented in certain of the inter-relationships of the dependent variables.

The independent variables making up this study, duration of hypnotic induction, level of suggestibility, and task motivating instructions may be examined themselves. The purpose of doing this is to develop some insights as to the lack of any conclusive results of the present research. The lack of data indicating any influence of the duration of hypnotic induction may arise from two sources.

The first, concerns the question of whether or not subjects were actually "hypnotized". The only criterion used was that of subject
report, "I was not, lightly, moderately, deeply hypnotized x% of the time". Other indications of the "state of hypnosis" such as hypnotic appearance and reports of unusual experiences were not utilized. Questions concerning the reliability of subjects reporting that they were "hypnotized" may be raised. There are some data supporting the asking of such questions. Fifteen percent of those receiving minimal or extended hypnotic induction reported that they were not "hypnotized". To counterbalance these data 25% of those not receiving hypnotic induction reported that they were "hypnotized".

The second, raises some questions in the area of the influences of individual differences and duration of hypnotic induction. Perhaps a relevant variable to consider in one of varying the time of the hypnotic induction procedure so as to allow for individual differences in reaching the "hypnotic state". Perhaps a fifteen minute induction procedure is too long for some and too short for others. This again raises questions concerning the issue of which subjects were completing cognitive performance tasks under the influence of "hypnosis" and which were not. It is known that 85% of those who underwent hypnotic induction procedures at least perceived themselves as being in a "hypnotic state".

Motivating instructions raises many of the same types of questions as hypnotic induction. The present research did not demonstrate any influence of motivating instructions on cognitive task performance.
One very obvious explanation is that the instructions were not motivating. This could very easily be true as these instructions were administered via audiotape (these instructions have been demonstrated as motivating upon personal, face-to-face, administration). Perhaps the experimenter's presence is a crucial variable in giving motivating instructions. Some "outside" criterion of the instructions actually being motivating is needed. Data from the study indicate that subjects were "interested" in the experiment but such a statement is a far cry from one testifying to the fact that as subjects they were motivated to perform better on the post-test by the instructions they received to try harder.

Concerning level of suggestibility the data are on more solid ground. The instrument utilized in establishing levels of suggestibility is valid and reliable and has demonstrated its feasibility on many prior occasions. Here again one may be dealing with a continuous variable rather than a discrete variable. Perhaps individual differences are expressed in terms of various levels of suggestibility rather than only two that are mutually exclusive. If the design of the study called for a number of suggestibility categories this independent variable may have demonstrated a greater influence on post-test performance of the subjects.

A word must be said concerning the significant t test results for Digit Symbol and Series Completion. One possible explanation of these
data revolves around some findings of Parker and Barber. These investigations found that the interactive effect of motivating instructions, suggestibility, and task performance demonstrated an enhancement of performance on less difficult tasks but not on the more difficult. Their findings held true for "hypnotized" or "unhypnotized" subjects as well as those who were suggestible and non-suggestible. It is interesting to note that two of the tasks used by Parker and Barber were Digit Symbol and Series Completion.

A mechanism operating to give the two significant t's as demonstrated by the afterthought portion of this study could be something like the following. As the cognitive level of the task increases the enhancing influence of motivating instructions, duration of hypnotic induction, and level of suggestibility becomes less and less potent and no longer facilitates performance. In fact such influence might inhibit performance on the more cognitive tasks. On such tasks, those more cognitive, such influence might actually be detrimental to the performance of subjects because of something inherent in the performance of the task itself. When dealing with cognitive processes, which are involved in both the dependent and independent variables, a contamination might occur. It must be remembered that Digit Symbol demands less of one cognitively than Series Completion. If one thinks of motivating instructions, duration of hypnotic induction, and level of suggestibility involving cognitive processes then the potential

"interfering" effect of such variables could have more influence on Series Completion than on Digit Symbol. One would then expect that task involving the fewer cognitive processes to be more enhanced by the independent variables under investigation.

Another explanation may revolve around characteristics of the subjects themselves. The data of this study, unlike those of Parker and Barber, suggest that for the more difficult (or cognitive) tasks subjects who are more suggestible (hence more influenced by hypnotic induction and motivating instructions) may inhibit their performance. Those subjects not as susceptible to the influence of hypnotic induction and motivating instructions do not "operate" under the constraints of these variables. In other words, the differential in performance between the two extreme groups may be due to subject variables not task content or process variables.

The results of this study support the view of Barber\(^{10}\), Uhr\(^{11}\), and Hilgard\(^{12}\). After reviewing the literature on hypnosis and learning,


all three conclude that the evidence is far from conclusive concerning the influence of hypnosis on learning. The present data are at odds with the conclusions of a review by Weitzenhoffer.\textsuperscript{13}

Young\textsuperscript{14} utilized subjects at four different levels of hypnotic induction (none, light, deep somnambulistic) on two learning tasks and reports similar results to those of this study where he found no statistically significant difference in performance but a slight edge for those subjects experiencing the greatest degree of hypnotic induction. Schulman and London\textsuperscript{15} found no difference in performance of high suggestible and low suggestible individuals. These findings are identical to the ones represented in this investigation. The present study complements one by Parker and Barber\textsuperscript{16} concerning hypnosis and task motivating instructions. Task motivating instructions alone or in

\begin{itemize}
  \item \textsuperscript{14} Young, P.C. An experimental study of mental and physical functions in the normal and hypnotic state. \textit{American Journal of Psychology}, 1925, 36, 214-232.
  \item \textsuperscript{16} Parker, P.D. and Barber, T.X., \textit{loc. cit}.
\end{itemize}
combination with hypnotic induction did not affect task performance. The one significant interaction effect (motivating instructions x level of suggestibility) on the Addition Test supports the Parker and Barber findings on the Digit Symbol Test - that performance was enhanced for high suggestible subjects by receiving motivating instructions.

Fowler investigated improved performance given motivating instructions under hypnosis and not under hypnosis and found no significant effect of such instructions. Hopes reported similar results except that he had included instructions of a negative sort and found that such instructions actually impaired learning. These findings are in general agreement with the findings of this study. It should be noted, even though the data are not significant, that on all tasks except Addition those subjects receiving motivating instructions demonstrated lower mean difference scores.

Although the data are not directly relevant to the findings of


this study, work by White, Fox and Harris makes an interesting point. They found while investigating memory for recently learned meaningful and nonsense material that motivating instructions and hypnosis demonstrated no significant difference in the recall of nonsense material (paired associates) but enhanced recall of meaningful material (poetry). Perhaps the cognitive performance tasks in this study were perceived as nonsense or at least meaningless material and this in part was responsible for the lack of statistically significant results.

Another finding of Parker and Barber relevant to motivating instructions and hypnosis concern the complexity of the task. Less complex tasks (Digit Symbol Test) were enhanced by motivating instructions while the more complex ones were not. Although the present study did not confirm this finding (unless the Addition Test is less complex than the Digit Symbol Test) the largest mean difference scores were consistently in the area of the least complex tasks (Digit Symbol Test). Barber and Calverley found that hypnotic induction and task motivating instructions


20. Parker and Barber, *loc. cit.*

were equally as effective in enhancing response to the BSS and both were more effective than direct suggestion. No data from the present study supports such a conclusion nor do many similar investigations by Barber and Calverley support findings from this study. This is true of a large number of studies carried out by Barber and his colleagues on hypnotic induction, motivating instructions, direct suggestion of auditory and visual hallucinations, deafness, analgesia, time distortion, and color blindness.

III. SUMMARY

Results of the study may be summarized under the headings of cognitive performance tasks, independent variables, and original hypotheses. Results concerning the cognitive performance tasks indicate none out of a potential of fifteen significant main effects and only one out of a potential total of twenty interactive effects. The one significant interaction was on the Addition Test between motivating instructions and level of suggestibility.

The independent variables fared no better as the only statistical significance to report is the interaction of motivating instructions and level of suggestibility. Hypnotic induction, motivating instructions, and level of suggestibility had no other main effect or interaction significant.
Not one of the four hypotheses generated during the initial stages of the study were verified. Suggestible and non-suggestible subjects do not differ in their performance on specific cognitive performance tasks of varying difficulty and such performance is not dependent upon duration of hypnotic induction. Duration of hypnotic induction has no effect on the task performance of subjects who receive motivating instructions independent of the level of suggestibility. The use of motivating instructions with high suggestible and low suggestible subjects does not affect performance on specified cognitive tasks of varying difficulty independent of the duration of hypnotic induction. Suggestible subjects receiving motivating instructions and varying duration of hypnotic induction do not differ in performance on specified cognitive performance tasks from non-suggestible subjects receiving the same treatment.

High suggestible subjects and those receiving the extended hypnotic induction procedure estimated a greater degree of depth of hypnotic induction. Subject interest in the experiment was high. Interest in the experiment increased with: the duration of hypnotic induction, the inclusion of motivating instructions, and for highly suggestible subjects.

The results of this study support much of the previous research as reported in the literature concerning hypnosis, learning, and
cognitive performance. It is also quite apparent from the results that hypnosis as a hypothetical construct is quite complex and that human behavior is highly stable and quite resistant to change (at least as far as the cognitive tasks used in this study are concerned).

The reason for this lack of change may be specific for the four cognitive performance tasks themselves. Practice opportunities if permitted may have brought about a change in post-test performance. Perhaps a different experimental protocol could have elicited a significant performance differential.

Difficulty did not seem to be relevant to the magnitude of the mean difference scores regardless of the cognitive tasks (or the definition of difficulty used). Controls may have been too restrictive, especially those concerning the experimenter's voice and motivating instructions. The use of audiotape could inhibit subject responsiveness in these two areas. Attitudes towards and interest in the experiment were positive and high.

A series of external "checks" on the independent variables should have been completed. The reliability and validity of the tests of hypnosis, motivating instructions, and suggestibility should have been investigated with as much vigor as those pilot studies concerning the dependent variables.
The results of the present study support the findings of Young concerning duration of hypnotic induction (no significant difference in performance of subjects at four levels of hypnotic induction). The Schulman and London study dealing with level of suggestibility (reporting no significant difference between low and high suggestible groups) are also supported by the results of this study. Work by Parker and Barber, Fowler, and Hopes dealing with motivating instructions independently and combined with level of suggestibility is complemented by the present research. Post-test performance was not enhanced by the use of motivating instructions alone but the interactive effect of motivating instructions and suggestibility was reflected in a higher pre/post-test gain score.

22. Young, loc. cit.
24. Parker and Barber, loc. cit.
25. Fowler, loc. cit.
This chapter will summarize this investigation of the effects of hypnotic induction, motivating instructions, and level of suggestibility on cognitive performance. Conclusions will be drawn and suggestions for further study will be presented. Conclusions concerning the findings of this study relevant to the experiment proper, hypnosis and cognitive performance in general, and the experimental protocol are appropriate. A number of suggestions for further study germaine to this study and the investigation of hypnosis in general will be included.

I. SUMMARY

Investigations of the effect of hypnotic induction procedures on cognitive performance tasks have produced equivocal results running the full spectrum from enhancement to impairment. Most studies indicate no significant effect. One reports an actual impairment. In the light of recent research, many of these investigations do not consider areas which may or may not be responsible for such equivocal research results.
One hundred and twenty subjects were utilized in a 3x2x2 factorial investigation. This study concerned the interactive effect of (a) duration of hypnotic induction, (b) motivating instructions, and (c) level of suggestibility on cognitive performance.

Subjects were classified as to high and low suggestibility using the Barber Suggestibility Scale (BSS) and randomly assigned to one of twelve groups. Four cognitive performance task tests (Addition, Digit Symbol Substitution, Series Completion, and Object-Number Memory) were administered. The subjects then received no hypnotic induction, minimal (30 seconds), or extended (15 minutes) hypnotic induction in conjunction with motivating instructions or minus the motivating instructions. Subjects then completed an alternate form of the four cognitive performance tasks. A post-experiment questionnaire was administered after the alternate form of the cognitive performance tasks.

The entire experiment was automated utilizing audiotape and administered by an independent assistant. None of the subjects had been previously hypnotized. Alternate forms of the cognitive performance task tests were administered in a counterbalanced order to counteract any systematic error variance.

Quantitative results indicate that the experimental situations were defined as hypnosis by the subjects. Subjects felt that the
experiment was interesting and they were happy to participate. The results of the analysis of variance for each dependent variable was disappointing. There were no main effects significant of the .05 or below level. Only one interaction effect was significant at the .05 level (motivating instructions x level of suggestibility on the Addition Test) and none at the .01 level. Main effect trends (F values not significant at the .05 or below level but significant at levels between .06 and .20) were also very scarce. Main effect trends were hypnotic induction on Digit Symbol and motivating instructions on Addition and Object-Number.

All four initial hypotheses of the study must be rejected based upon the data collected by this investigation. The results of this study follow those of the literature where the data is far from conclusive concerning the effect of hypnosis on learning. The results of this study indicate that level of suggestibility and task motivating instructions also have little effect on the cognitive performance tasks utilized.

II. CONCLUSIONS

There are two general conclusions that may be drawn from this study that have been drawn on numerous previous occasions under a variety of circumstances. The first is that human behavior is very
difficult to change by the systematic application of various contingencies. The magnitudes of the pre and post cognitive task performance scores were so small that one could almost determine the results of the study by inspection. This finding is not unique in psychology in general and learning in particular.

The second conclusion is that the hypothetical construct labeled "hypnosis" that lies between very specific antecedent and consequent events is a very complex phenomenon. One wonders whether or not such a complex phenomenon is capable of being studied analytically. Efforts to investigate the dynamics of the "black box" rather than concentrating on the "input" (antecedent) events and "output" (consequent) events will probably always be doomed to failure because of such complexity.

Specific conclusions of the study itself revolve around the initial hypotheses and the independent variables. Hypnotic induction, motivating instructions, or level of suggestibility independently seem to have no effect on cognitive performance. This conclusion concern each of the independent variables and their influence on the dependent variables. Those subjects who received hypnotic induction and motivating instructions had no greater pre/post-test mean differences than controls. This was true regardless of the level of suggestibility of subjects.
Hypnotic induction, level of suggestibility, or motivating instructions in any combination have no effect on cognitive performance. The interactive effect of the three independent variables on dependent variable performance was nil. This conclusion is unfortunate as one would intuitively predict, both rationally and from the literature, that a consortium of three such relevant independent variables would in fact be quite a powerful behavior change agent.

Another specific conclusion concerning the independent and dependent variables in this study is that the level of difficulty of the cognitive task does not affect the influence of hypnotic induction, motivating instructions, or level of suggestibility on the cognitive tasks. Task difficulty did not account for any significant differential in performance from task to task. Although subject performance differed from task to task, the mean difference shift from pre to post-test was not so different. The task difficulty question is a difficult one as one is never quite sure just what "difficulty" really means or if it can be equated from task to task.

Questions may be raised concerning the degree of cognitive involvement of the subjects in the performance task itself. "Subjecting one's self" to hypnotic induction procedures and being motivated by instructions are two cognitive behaviors. Responding to cognitive performance tasks also calls for cognitive behavior. Perhaps the one
variable confounds the other. If this position has some validity one would expect individuals in those experimental treatments high in cognitive involvement (extended hypnotic induction and motivating instructions) to perform better on tasks requiring less cognitive involvement (Digit Symbol). One would also expect individuals in those experimental treatments low in cognitive involvement (no hypnotic induction and no motivating instructions) to perform better on tasks requiring more cognitive (Series Completion). These expectations were confirmed but only as an afterthought of the research proper.

Findings, as noted above, although not in agreement with authors of the majority of studies represented in the literature are in agreement with multiple reviewers of the adequacy of these studies. When assessing the "track record" of the work done on hypnosis and learning and cognitive performance, the weight of the evidence is in the direction of the enhancement of performance. When recognized authorities in the field of hypnosis analyze these studies in terms of the hypotheses tested and the techniques utilized in testing them, their opinion is that the evidence is far from conclusive that hypnosis facilitates learning performance. There is however, some support for those studies indicating an enhancement effect of both hypnosis and motivating instructions. Trend information (from near significant statistical results) tends to indicate that cognitive performance can be influenced in a positive direction by either hypnosis or motivating instructions.
There are some conclusions peripheral to the main questions of the study that should be mentioned. First, the administration of the Barber Suggestibility Scale via audiotape did not significantly decrease the level of the BSS scores. Comparing the BSS results of the subjects of this study with others did not reveal a notable difference. Second, although this study was entirely automated, subjects were able to testify to the same degree, as subjects in a non-automated experiment, that they were able to "experience hypnosis" in about the same magnitude. This of course involves two considerations. One, in terms of the situation being defined as hypnosis (which it was even for some subjects not receiving hypnotic induction). Two, in terms of the subjects' perception of the degree to which they were "hypnotized". The third peripheral conclusion that should be noted is that even with the absence of experimenter involvement, the study maintained the subject's interest at a high level. This was probably due to the general content of the experiment (hypnosis) which probably "masked" any lack of interest in the performance tasks or lack of interest generated by the "automated" experimental protocol.

III. SUGGESTIONS FOR FURTHER STUDY

There are a number of suggestions one can make for further study and they are all concerned with a more adequate design of the method of investigation. It is felt that no definite answer has resulted from
this study concerning the effect of hypnotic induction, motivating instructions or level of suggestibility on cognitive performance. The data generated by this study are not so convincing that it can stand without comment. The following suggestions are relevant to the area of hypnosis and learning, in general as well as to a replication of the present study.

One very real methodological problem was that of the random assignment of subjects to experimental treatment cells. The present study became "trapped" by administrative expediency and found it impossible to extricate itself. A solution to the random assignment of subjects would be to establish a low suggestible subject pool and a high suggestible subject pool based upon data collected via the BSS. From those two pools assign subjects on a random basis to the experimental treatment cells by selecting first any subject until all cells are filled.

There must be developed a standard series of cognitive performance tasks or learning tasks that may be used by different investigators to study different experimental questions. Such a standard series is needed so that data from study to study can be compared. This series of tasks should have at least three alternative forms and meet all the dependent variable criteria noted in this study. Two problems arise concerning the meeting of these criteria. Some method must be devised
to determine different levels of task difficulty. This might be empirical, perceptual, cognitive or by consensus; but it is something that must be done. The question of the influence of the kinds of independent variables investigated by this study and task difficulty cannot be answered by the kinds of definitions of difficulty now available. Task sensitivity to actual changes in performance is another crucial question to be resolved. Research must be carried out to determine a series of performance or learning tasks that are equally sensitive to the subtle changes that must be measured. Some confidence must be developed in the instruments used to measure the dependent variables investigated.

Any further research in the areas of concern of this study should consider pilot investigations of the independent variables as well as the dependent variables. Attempts should be made to establish the degree to which subjects meet classical definitions of being in a "hypnotic trance state" as well as providing for individual differences in terms of the duration of hypnotic induction procedures. Perhaps there is an optimum length of time a subject should undergo hypnotic induction procedures. Motivating instructions should be analyzed either by pilot study or expert judgment to determine whether or not they are in fact motivating. This is of crucial importance when such task motivating instructions are audiotaped. The whole question of suggestibility should be looked into in terms of various levels.
Perhaps studies of the nature of the present one should only concern themselves with subjects beyond one standard deviation, the upper and lower one-third, or some other type of definition of low and high suggestible subjects. It is conceivable that a study involving four levels of suggestibility would provide some interesting data for analysis.

When automated experimental protocols are utilized in hypnosis and learning studies (thus limiting the interaction of the experimenter and the subject), some effort should be dedicated to making an evaluation of the experimenter's voice as it appears on the audiotape. Outside estimates should be obtained from qualified judges (as well as typical subjects) concerning the "positiveness" or "forcefulness" of the voice presentation. This is especially true when including motivating instructions in the investigation. Attitudes of subjects towards the cognitive performance tasks or learning experiences should be sampled and only those eliciting "high positive" should be used. A control task ("low negative") may be utilized to indicate any differential performance due to subject task attitude or subject perception. This suggestion raises the age old question of using nonsense or meaningful materials in hypnotic induction studies.

The importance of differentiating between cognitive performance and learning is an important consideration. If one accepts the very
simplest of the definitions of learning, one is impressed with the fact that a very small number of the studies in the area of hypnosis and learning meeting that criterion definition. If learning is a change in behavior due to "practice" very few if any opportunities for such "practice" are given. What is needed is a genuine learning task.

With the advent of programmed learning the task of obtaining suitable media to meet this need is considerably easier. Yet other techniques that would be interesting to employ would be the use of videotape and contingency management reward systems to control the subjects' perception of the study, subject attitudes toward the tasks, and subject motivation.

Once the issue has been settled concerning the adequacy of a particular dependent variable being a learning or performance task another one immediately takes its place. Does one attempt to provide the same learning tasks at varying levels of difficulty or varying learning tasks at the same level of difficulty, or varying learning tasks at varying levels of difficulty? The third alternative tends to be an empirical question dependent upon data collected in order

1. "Learning is the process by which an activity originates or is changed through reacting to an encountered situation, provided that the characteristics of the change in activity cannot be explained on the basis of native response tendencies, motivation, or temporary states of the organism (e.g. fatigue, drugs, etc.)." Hilgard, E.R., Theories of Learning (2nd Edition). New York: Appleton-Century-Croft, Inc., 1956, p. 14.
to answer the first two. Although the first two questions raise some
interesting experimental design problems either one would be a candidate
for a meaningful study. Until some very basic preliminary work is done
upon learning tasks, differences between them, and something termed
difficulty cognitive performance research in the area of hypnosis and
learning will raise more questions than it answers.


Barber, T. X. Experimental controls and the phenomena of "hypnosis": a critique of hypnotic research methodology. *Journal of Nervous and Mental Diseases*, 1962, 134, 493-505.


Barber, T. X. Antisocial and criminal acts induced by "hypnosis": a review of experimental and clinical findings. *AMA Archives of General Psychiatry*, 1961, 5, 301-312.


Barber, T. X. and Calverley, D. S. The comparative effects on "hypnotic-like" suggestibility of recorded and spoken suggestions. *Journal of Consulting Psychology*, 1964, 28, 4, 384-385.


Barber, T. X. and Calverley, D. S. Toward a theory of hypnotic behavior: effects on suggestibility of defining the situation as hypnosis and defining response to suggestions as easy. *Journal of Abnormal and Social Psychology*, 1964, 68, 6, 585-592.


Barber, T. X. and Calverley, D. S. Effect of E's tone of voice on hypnotic-like suggestibility. *Psychological Reports*, 1964, 15, 139-144.


Barber, T. X. and Calverley, D. S. Experimental studies in "hypnotic behavior": suggested deafness evaluated by delayed auditory feed-back. *British Journal of Psychology*, 1964, 55, 439-446.


Barber, T.X. and Calverley, D.S. Toward a theory of hypnotic behavior: effects on suggestibility of task motivating instructions and attitudes towards "hypnosis". *Journal of Abnormal and Social Psychology*, 1963, 67, 6, 557-565.


Das, J. P. Learning and recall under hypnosis and in the waking state: a comparison. AMA Archives of General Psychiatry, 1961, 4, 517-527.


Glass, L. B. and Barber, T. X. A note on hypnotic behavior, the definition of the situation and the placebo effect. Journal of Nervous and Mental Diseases, 1961, 132, 539-541.


White, M. M. Physical and mental traits of individuals susceptible to hypnosis. *Journal of Abnormal and Social Psychology*, 1930, 25, 293-298.


APPENDIX A

Relevant Dependent Variable Studies
It was necessary to carry out a number of preliminary studies concerning the dependent variables in order to obtain data that would allow the investigator to make judgements concerning the reliability, factor pureness, equivalency of forms, and difficulty of the cognitive performance tests that make up the dependent variable. The judgements based upon these data collected in the preliminary studies are reported in the main body of this dissertation. Only the details and data generated by these studies are reported in this appendix.

Another purpose for carrying out this series of investigations was to answer procedural questions concerning the experimental protocols. Data bearing on this area are, of course, not relevant to the dependent variable but are included in this appendix for convenience. There were five preliminary studies conducted for a variety of purposes and on a variety of subjects.

<table>
<thead>
<tr>
<th>Study Number</th>
<th>Purpose</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dependent Variable Selection</td>
<td>25 Northeastern University Graduate Students in Education</td>
</tr>
<tr>
<td>2</td>
<td>Dependent Variable Selection and Psychometric Evaluation</td>
<td>25 Northeastern University Undergraduate Students</td>
</tr>
<tr>
<td>3</td>
<td>Dependent Variable Selection and Psychometric Evaluation</td>
<td>25 Northeastern University Undergraduate Students</td>
</tr>
<tr>
<td>4</td>
<td>Dependent Variable Psychometric Evaluation</td>
<td>16 Senior High School Students</td>
</tr>
<tr>
<td>5</td>
<td>Experimental Protocol Trial</td>
<td>12 Northeastern University Undergraduate Students</td>
</tr>
</tbody>
</table>
Although all five studies are described, only the results of study 4 will be reported in detail as that is the one responsible for providing the data for the final determination of those cognitive performance tasks that would be used to make up the dependent variable.

Study 1 - Study 1 was concerned with collecting data on twelve of the 72 cognitive performance tasks available from French, et al. (French, J.W. et al. *Kit of Reference Tests for Cognitive Factors*. Princeton: Educational Testing Service, 1963). Those twelve tests were:

- Copying Test (Cf-3)
- Shortest Road Test (Le-2)
- Object-Number Test (Ma-2)
- Addition Test (N-1)
- Finding A's Test (P-1)
- Necessary Arithmetic
  - Operations Test (R-4)
- Gestalt Transformation Test (Re-1)
- Nonsense Syllogism Test (Rs-1)
- Card Rotation Test (S-2)
- Maze Tracing Speed Test (Ss-1)
- Paper Folding Test (Vz-2)
- Match Problem V Test (Vz-2)

On the basis of data from the 25 subjects and other considerations (time, sensitivity, ease of administration) six of the twelve tests were chosen for further consideration.

Study 2 - Because of an unfortunate administrative circumstance, the six tests making up the trial battery of cognitive performance tasks were field tested in two groups of three each (three in Study 2 and three in Study 3). To each of these three performance tasks was added a test selected from those tests previously shown to be significant from the literature on hypnosis, and learning (see Appendix B). Study 2 collected data on the Object-Number Test, the Series Completion
Test, the Nonsense Syllogism Test, and the Digit Symbol Test.

Study 3 - The remarks above concerning Study 2 are pertinent for Study 3. Study 3 administered the Necessary Arithmetic Operations Test, the Gestalt Transformation Test, the Shortest Road Test, and the Addition Test.

As a result of the analysis of data from Studies 2 and 3, the tests selected for inclusion in the study were the Addition Test, the Digit Symbol Test, the Series Completion Test, and the Object-Number Test. The Gestalt Transformation Test, Necessary Arithmetic Operations Test, Shortest Road Test, and Nonsense Syllogism Test were all rejected because of inadequacies in meeting the criteria of reliability, factor pureness, or equivalent forms. Although reliabilities, difficulty analysis, and equivalent form determinations could be completed on data from Studies 2 and 3, test intercorrelations (of all four tasks finally selected) could not. Originally, there were to be six cognitive performance tasks to be included in the investigation, but due to time constraints it was decided to reduce the tasks to four. The four selected tests remained to be intercorrelated to test their factor pureness.

Study 4 - Study 4 consisted of the administration of both forms (A and B) of the four tests finally selected to sixteen senior high school students. Data from this administration as well as Studies 2
and 3 where applicable were analyzed and conclusions drawn. Descriptive statistics (based upon an N of 41 from Studies 2, 3, and 4) of each of the four cognitive performance tasks and in terms of mean standard deviation and range are given below. These data are based upon raw score number correct with no correction for guessing.

<table>
<thead>
<tr>
<th>Source of Data</th>
<th>N</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 2</td>
<td>25</td>
<td>Object-Number Test</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Digit Symbol Test</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Series Completion Test</td>
</tr>
<tr>
<td>Study 3</td>
<td>25</td>
<td>Addition Test</td>
</tr>
<tr>
<td>Study 4</td>
<td>16</td>
<td>Object-Number Test</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Digit Symbol Test</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Series Completion Test</td>
</tr>
<tr>
<td>Study 2 and</td>
<td>41</td>
<td>Addition Test</td>
</tr>
<tr>
<td>Study 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study 3 and</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Study 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test</th>
<th>Statistic</th>
<th>Form A</th>
<th>Form B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addition</td>
<td>N</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td>37.2</td>
<td>35.7</td>
</tr>
<tr>
<td></td>
<td>s</td>
<td>13.5</td>
<td>11.6</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>12-70</td>
<td>8-73</td>
</tr>
<tr>
<td>Series Completion</td>
<td>N</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td>39.6</td>
<td>40.6</td>
</tr>
<tr>
<td></td>
<td>s</td>
<td>14.7</td>
<td>16.1</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>6-63</td>
<td>6-75</td>
</tr>
<tr>
<td>Digit Symbol</td>
<td>N</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td>73.4</td>
<td>75.3</td>
</tr>
<tr>
<td></td>
<td>s</td>
<td>13.01</td>
<td>12.25</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>36-94</td>
<td>41-94</td>
</tr>
<tr>
<td>Object Number</td>
<td>N</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td>42.5</td>
<td>48.2</td>
</tr>
<tr>
<td></td>
<td>s</td>
<td>29.5</td>
<td>31.3</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>7-100</td>
<td>0-100</td>
</tr>
</tbody>
</table>
Data for reliability estimates were gathered from Studies 2, 3, and 4. Pearson product moment correlation coefficients were computed between Forms A and B on all four tasks to measure reliability of the measurement instruments. The resulting reliabilities (Addition .87, Object-Number .89, Series Completion .84, and Digit Symbol .80) were all significant at the .01 level. Internal consistency reliabilities were also computed utilizing Kuder-Richardson Formula 21 for Forms A and B. Kuder-Richardson reliabilities for the four tests were as follows:

<table>
<thead>
<tr>
<th>Test</th>
<th>Form A</th>
<th>Form B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addition</td>
<td>.93</td>
<td>.90</td>
</tr>
<tr>
<td>Object-Number</td>
<td>.97</td>
<td>.95</td>
</tr>
<tr>
<td>Series Completion</td>
<td>.77</td>
<td>.80</td>
</tr>
<tr>
<td>Digit Symbol</td>
<td>.89</td>
<td>.88</td>
</tr>
</tbody>
</table>

Test intercorrelations were computed only on the data from Study 4.

Spearman Rank Order Correlation coefficients were used for both Forms A and B. The intercorrelations appear in the table below. Significant values were assigned using the Wilcoxon table (Wilcoxon, F. Some Rapid Statistical Procedures. Stamford, Conn., American Cyanamid Co., 1949).
Form A

<table>
<thead>
<tr>
<th></th>
<th>Series Completion</th>
<th>Addition</th>
<th>Object-Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digit Symbol</td>
<td>-.02</td>
<td>-.07</td>
<td>.37</td>
</tr>
<tr>
<td>Series Completion</td>
<td>.77**</td>
<td></td>
<td>.48*</td>
</tr>
<tr>
<td>Addition</td>
<td></td>
<td>.39</td>
<td></td>
</tr>
</tbody>
</table>

Form B

<table>
<thead>
<tr>
<th></th>
<th>Series Completion</th>
<th>Addition</th>
<th>Object-Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digit Symbol</td>
<td>.07</td>
<td>.43</td>
<td>-.09</td>
</tr>
<tr>
<td>Series Completion</td>
<td>.55*</td>
<td></td>
<td>.37</td>
</tr>
<tr>
<td>Addition</td>
<td></td>
<td>.32</td>
<td></td>
</tr>
</tbody>
</table>

* .05 level
** .01 level

Form equivalency and test difficulty determination are reported in Chapter III of the dissertation proper in great detail.

Study 5 - The purpose of Study 5 was to evaluate the experimental protocols, the taped instructions, the post experimental questionnaire, and the study materials. Study 5 also tested the various pieces of equipment required. This investigation utilized twelve subjects, one in each cell of the 3x2x2 design. As a result of this trial a number of problems were detected and corrected prior to the actual investigation.
APPENDIX B

A List of Twenty-Four
Cognitive Performance Tasks Utilized in
Prior Hypnotic Induction and Learning Studies
Listed below are those cognitive performance task tests (a few psychomotor skill tests) that demonstrated a significant difference in performance, one from the other, after hypnosis. The name of the task is given along with the reference in which the task was mentioned. Those * are either identical or similar to those used in the present study.


- Audio Reaction Time
- Line Drawing
- Precision of Movement
- Muller-Lyer Illusion
- Color Equation I
- Color Equation II
- Arm Movement
- Plotting
- *Adding and Subtracting
- Tapping


- Tapping (Index of Fatigue)
- Drawer Finding
- *Digit Symbol
- Meaningful Symbols
- Speed of Association


- *Digit Symbol


- *Nonsense Syllables

Success/Failure Nonsense Material
Meaningful Material (Poetry)


Counting Task
*Memory Task

*Simplicity Task


*Observation Memory

Morse Code

White, R. S.; Fox, G. F.; and Harris, W. W. Hypnotic hyperamnesia for recently learned material. *Journal of Abnormal and Social Psychology*, 1940, 35, 88-103.

Meaningful Material (Poetry and Motion Picture Scenes)
APPENDIX C

Cognitive Performance Task Tests
On the succeeding pages are the four cognitive performance task tests used in this study. Both Forms A and B are included. Below are references and sources of the tests.

<table>
<thead>
<tr>
<th>Test</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIGIT SYMBOL TEST</td>
<td>Wechsler, D. <em>Wechsler-Bellevue Intelligence Scale</em>. New York: The Psychological Corporation, 1946, Form I and Form II.</td>
</tr>
<tr>
<td>OBJECT-NUMBER TEST</td>
<td>Same as above.</td>
</tr>
</tbody>
</table>
TEST 1 - DIGIT SYMBOL TEST (FORM A)

This is a test to determine how well you can substitute symbols for digits. Look at the divided boxes below:

```
  1  2  3  4  5  6  7  8  9
  N Z x o u A L 1
```

Notice that each has a numeral in the upper part and a little mark in the lower part. Notice also that each numeral has a different mark under it. Now look at the second set of divided boxes below.

```
  2  1  4  6  3  5  2
  N  
```

Notice that these boxes have only numerals and all but two of the squares underneath are empty. The first two boxes have been filled in to demonstrate your task. You should place in each empty square the symbol corresponding to the numeral in the square above. The next empty square is below the numeral "4" therefore you should fill the empty square with the symbol "L". You should complete the remaining empty squares by filling in the appropriate symbol. You may use the numeral-symbol chart to help you.

The correct responses are as follows: L, O, Z, U, N

When the test begins, you are to fill in as many squares as you can WITHOUT SKIPPING any before you are told to stop. Your score on this test will be the number of squares correctly filled in. You will have two minutes for this test.

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.

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From the Wechsler-Bellevue Intelligence Scale (Form 1).
DIGIT SYMBOL TEST (FORM A)

STOP
TEST 1 - DIGIT SYMBOL TEST (FORM B)

This is a test to determine how well you can substitute symbols for digits. Look at the divided boxes below:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>+</td>
<td>-</td>
<td>7</td>
<td>V</td>
<td>C</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

Notice that each has a numeral in the upper part and a little mark in the lower part. Notice also that every numeral has a different mark under it. Now look at the second set of divided boxes below:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>1</th>
<th>4</th>
<th>6</th>
<th>3</th>
<th>5</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notice that these boxes have only numerals and all but two of the squares underneath are empty. The first two boxes have been filled in to demonstrate your task. You should place in each empty square the symbol corresponding to the numeral in the square above. The next empty square is below the numeral "4" therefore you should fill the empty square with the symbol "L". You should complete the remaining empty squares by filling in the appropriate symbol. You may use the numeral-symbol chart to help you.

The correct responses are as follows: L, V, +, 7.

When the test begins, you are to fill in as many squares as you can WITHOUT SKIPPING any before you are told to stop. Your score on this test will be the number of squares correctly filled in. You will have two minutes for this test.

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.

Copyright 1947, The Psychological Corporation. All rights reserved. From the Wechsler-Bellevue Intelligence Scale (Form I).
<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>7</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>1</td>
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<tr>
<td>2</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>7</td>
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<td>8</td>
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<td>7</td>
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<tr>
<td>7</td>
<td>1</td>
<td>9</td>
<td>4</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>
TEST 2 - SERIES COMPLETION TEST (FORM A)

This is a test of your ability to complete an incomplete series. You will be given a list of words, numerals, syllables, initials that is incomplete. Your task is to discover the rule used in the series and supply the next word, numeral, syllable, or initial in the series. Remember to read each series statement carefully before making a response.

Now try the practice incomplete series below. In the first example (a), the series is composed of five numerals each of which is two greater than the previous numeral. Following that rule, the next digit in the series would be "24". You complete the rest of the series listed.

a. 14 16 18 20 22 24
b. J K I L M K N O __
c. man house pig pen cow ___
d. up down in out backward ___
e. 30 40 35 45 40 50 45 55 ___
f. 12 o'clock/6 o'clock 9 o'clock/3 o'clock 1 o'clock/___ o'clock

The answers to the other five problems are as follows: b. M, c. Barn, d. forward, e. 50, f. 7.

Your score on this test will be the number of series completed correctly. You will have one and one-half minutes (90 seconds) for this test.
SERIES COMPLETION TEST (FORM A)
Page 2

1. 1 2 3 4 5 ___
2. Z Y X W V U ___
3. NE/SW SE/NW E/W N/___
4. escape scape cape ___
5. numb number plum ___
6. tot tot bard drab 537 ___
7. 57326 73265 32657 26573 ___
8. fare fair pale ___
9. knit in spud up both to stay ___
10. tldua adult tidma admit refta ___
11. surgeon 1234567 snore 17635 rogue ___
12. tar pitch throw saloon bar rod fee tip end
   plank ___ meals
13. on one tone ___
14. two w four r one o three ___
15. 81 64 49 36 25 16 ___
16. 406 350 316 300 226 250 ___

STOP
TEST 2 - SERIES COMPLETION TEST (FORM B)

This is a test of your ability to complete an incomplete series. You will be given a list of words, numerals, syllables, initials, that is incomplete. Your task is to discover the rule used in the series and supply the next word, numeral, syllable, or initial in the series. Remember to read each series statement carefully before making a response.

Now try the practice incomplete series below. In the first example (a), the series is composed of five numerals each of which is two greater than the previous numeral. Following that rule, the next digit in the series would be "24". You complete the rest of the series listed.

a. 14 16 18 20 22 24
b. 7 8 7 8 9 8 9 10 9 ___
c. car road plane air boat water ski ___ ___
d. insert remove convex concave expand ___ ___ ___
e. 16 18 17 19 20 19 21 ___
f. Washington California Maine ___ ___ ___

The answers to the other five problems are as follows: b. 10, c. snow, d. contract, e. 20, f. Florida.

Your score on this test will be the number of series completed correctly. You will have one and one-half minutes (90 seconds) for this test.
1. white  black  short  long  down  _ _
2. AB  BC  CD  D_ 
3. 12321  23432  34543  456_ 
4. oh ho rat tar mood  _ _ _
5. so son soon  _ _ _ _
6. A Z B Y C X D _
7. mist is wasp as pint in tone  _
8. hale hail pear  _ _ _
9. Scotland landscape scapegoat  _ _ _ ee
10. hsoer shore isght sight Isaev  _ _ _ _
11. tam tan rib rid rat raw hip  _ _
12. 3124  82  73  154  46  13  _ _
13. cash crash peach  _ _ _ _ _
14. lag leg pen pin big bag rob  _ _
15. 8  11  15  20  26  33  _ _ _
16. 54  32  18  16  6  8  _ _

STOP
This is a test to see how quickly and accurately you can add. It is not expected that you will finish all the problems in the time allowed.

You are to write your answers in the boxes below the problems. Several practice problems are given below with the first one correctly worked. Practice for speed on the others. This practice may help your score.

Practice Problems:

141  142  143  144  145  146  147  148  149  150

The correct answers to the remaining practice problems are as follows: 28, 84, 210, 125, 166, 141, 175, 102, 173.

Your score on this test will be the number of problems that are added correctly. Work as rapidly as you can without sacrificing accuracy. You will have two minutes for this test.
<p>| | | | | | | | | | | | |</p>
<table>
<thead>
<tr>
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<th></th>
</tr>
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<tbody>
<tr>
<td>8</td>
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<td>12</td>
<td>43</td>
<td>67</td>
<td>23</td>
<td>83</td>
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</tr>
<tr>
<td>3</td>
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<td>75</td>
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<td>49</td>
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<td>45</td>
<td>32</td>
<td>65</td>
<td>45</td>
<td>43</td>
<td>39</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

STOP
TEST 3 - ADDITION TEST (FORM B)

This is a test to see how quickly and accurately you can add. It is not expected that you will finish all the problems in the time allowed.

You are to write your answers in the boxes below the problems. Several practice problems are given below with the first one correctly marked. Practice for speed on the others. This practice may help your score.

Practice Problems:

<p>| | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
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<td>85</td>
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<td>35</td>
<td>18</td>
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<td>8</td>
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<td>82</td>
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<tr>
<td>2</td>
<td>15</td>
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<td>73</td>
<td>81</td>
<td>52</td>
<td>75</td>
<td>90</td>
<td>18</td>
<td>16</td>
</tr>
</tbody>
</table>

The correct answers to the remaining practice problems are as follows: 30, 87, 213, 128, 169, 144, 178, 103, 176.

Your score on this test will be the number of problems that are added correctly. Work as rapidly as you can without sacrificing accuracy. You will have two minutes for this test.

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.

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This is a test of your ability to learn combinations of words and numbers. In each part of the test you will study a page showing 15 object names with numbers. After studying the page showing both objects and numbers, you will turn to a page showing the names of the objects in a different order. You will be asked to write down the numbers that go with them.

Here is a practice list. Study it until you are asked to turn to the practice test page. You will have one minute.

<table>
<thead>
<tr>
<th>object</th>
<th>number</th>
</tr>
</thead>
<tbody>
<tr>
<td>window</td>
<td>73</td>
</tr>
<tr>
<td>desk</td>
<td>41</td>
</tr>
<tr>
<td>carpet</td>
<td>19</td>
</tr>
<tr>
<td>door</td>
<td>84</td>
</tr>
<tr>
<td>glass</td>
<td>90</td>
</tr>
</tbody>
</table>

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PRACTICE TEST PAGE

For the first object below, the correct number has been written. Write all of the other numbers that you can remember.

<table>
<thead>
<tr>
<th>object</th>
<th>number</th>
</tr>
</thead>
<tbody>
<tr>
<td>desk</td>
<td>41</td>
</tr>
<tr>
<td>glass</td>
<td></td>
</tr>
<tr>
<td>window</td>
<td></td>
</tr>
<tr>
<td>door</td>
<td></td>
</tr>
<tr>
<td>carpet</td>
<td></td>
</tr>
</tbody>
</table>

The correct answers for the remaining objects are: 90, 73, 84, 19.

Your score will be the number marked correctly. Even if you are not sure of the correct answer to a question, it will be to your advantage to guess.

There are two pages in this test.

The first of these is a memory page which you are to study for two minutes.

The second is a test page on which you are to write the numbers that go with the objects. You will have 90 seconds to write.
Study this list. You will have two minutes.

<table>
<thead>
<tr>
<th>Object</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>tree</td>
<td>58</td>
</tr>
<tr>
<td>floor</td>
<td>29</td>
</tr>
<tr>
<td>chair</td>
<td>33</td>
</tr>
<tr>
<td>wall</td>
<td>56</td>
</tr>
<tr>
<td>shoe</td>
<td>17</td>
</tr>
<tr>
<td>table</td>
<td>78</td>
</tr>
<tr>
<td>coat</td>
<td>49</td>
</tr>
<tr>
<td>roof</td>
<td>22</td>
</tr>
<tr>
<td>dish</td>
<td>36</td>
</tr>
<tr>
<td>pillow</td>
<td>43</td>
</tr>
<tr>
<td>post</td>
<td>65</td>
</tr>
<tr>
<td>tile</td>
<td>35</td>
</tr>
<tr>
<td>plate</td>
<td>26</td>
</tr>
<tr>
<td>shade</td>
<td>40</td>
</tr>
<tr>
<td>rock</td>
<td>62</td>
</tr>
</tbody>
</table>

STOP
STOP
Write the number that belongs with each of the objects. You will have 90 seconds.

<table>
<thead>
<tr>
<th>Object</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>coat</td>
<td>—</td>
</tr>
<tr>
<td>post</td>
<td>—</td>
</tr>
<tr>
<td>pillow</td>
<td>—</td>
</tr>
<tr>
<td>floor</td>
<td>—</td>
</tr>
<tr>
<td>shoe</td>
<td>—</td>
</tr>
<tr>
<td>shade</td>
<td>—</td>
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<tr>
<td>tile</td>
<td>—</td>
</tr>
<tr>
<td>roof</td>
<td>—</td>
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<tr>
<td>wall</td>
<td>—</td>
</tr>
<tr>
<td>rock</td>
<td>—</td>
</tr>
<tr>
<td>tree</td>
<td>—</td>
</tr>
<tr>
<td>chair</td>
<td>—</td>
</tr>
<tr>
<td>dish</td>
<td>—</td>
</tr>
<tr>
<td>table</td>
<td>—</td>
</tr>
</tbody>
</table>
This is a test of your ability to learn combinations of words and numbers. In each part of the test you will study a page showing 15 objects names with numbers. After studying the page showing both objects and numbers, you will turn to a page showing the names of the objects in a different order. You will be asked to write down the numbers that go with them.

Here is a practice list. Study it until you are asked to turn to the practice test page. You will have one minute.

<table>
<thead>
<tr>
<th>Object</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>screen</td>
<td>37</td>
</tr>
<tr>
<td>blotter</td>
<td>14</td>
</tr>
<tr>
<td>rug</td>
<td>91</td>
</tr>
<tr>
<td>gate</td>
<td>48</td>
</tr>
<tr>
<td>stick</td>
<td>22</td>
</tr>
</tbody>
</table>

DO NOT TURN THE PAGE UNTIL ASKED TO DO SO.
PRACTICE TEST PAGE

For the first object below, the correct number has been written. Write all of the other numbers that you can remember.

<table>
<thead>
<tr>
<th>Object</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>blotter</td>
<td>14</td>
</tr>
<tr>
<td>stick</td>
<td></td>
</tr>
<tr>
<td>screen</td>
<td></td>
</tr>
<tr>
<td>gate</td>
<td></td>
</tr>
<tr>
<td>rug</td>
<td></td>
</tr>
</tbody>
</table>

The correct answers for the remaining objects are: 22, 37, 48, 91.

Your score will be the number marked correctly. Even if you are not sure of the correct answer to a question, it will be to your advantage to guess.

There are two pages in this test.

The first of these is a memory page which you are to study for two minutes.

The second is a test page on which you are to write the numbers that go with the objects. You will have 90 seconds to write.

DO NOT TURN THIS PAGE UNTIL TOLD TO DO SO.
MEMORY PAGE

Study this list. You will have two minutes.

<table>
<thead>
<tr>
<th>Object</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>mop</td>
<td>23</td>
</tr>
<tr>
<td>jacket</td>
<td>18</td>
</tr>
<tr>
<td>brick</td>
<td>54</td>
</tr>
<tr>
<td>mat</td>
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<td>clip</td>
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<tr>
<td>bed</td>
<td>59</td>
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<td>ceiling</td>
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</tr>
<tr>
<td>vase</td>
<td>44</td>
</tr>
<tr>
<td>poker</td>
<td>13</td>
</tr>
<tr>
<td>razor</td>
<td>91</td>
</tr>
</tbody>
</table>

STOP
Write the number that belongs with each of the objects. You will have 90 seconds.

<table>
<thead>
<tr>
<th>Object</th>
<th>Number</th>
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</thead>
<tbody>
<tr>
<td>mat</td>
<td></td>
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<tr>
<td>clip</td>
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<tr>
<td>poker</td>
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<td>board</td>
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<td>ceiling</td>
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<td>spoon</td>
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<td>vase</td>
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<td>mop</td>
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<td>bed</td>
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<td>jacket</td>
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<td>razor</td>
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<tr>
<td>piano</td>
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</tr>
<tr>
<td>brick</td>
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</tbody>
</table>
APPENDIX D

The Barber Suggestibility Scale*

The Barber Suggestibility Scale (BSS) was administered to all subjects during an independent session prior to the experimental treatment. The scale was administered by the experimenter via tape recording. The experimenter was not present during any portion of the administration of the BSS. Upon completion of the scale, the subjects responded to a questionnaire concerning the subjects' perception of their response to the eight test suggestions.

"I am going to test your ability to imagine. Since you can imagine better with your eyes closed, I want you to close your eyes and keep them closed and try to imagine the things I say."

1. **Arm Lowering** - "Hold your right arm straight out in front of you level with the floor. Concentrate on your arm and listen to me. Imagine that your right arm is feeling heavier and heavier, and that it's moving down and down. It weighs a ton! It's getting heavier and heavier. It's moving down and down, more and more. You can relax your arm now."

2. **Arm Levitation** - "Keep your eyes closed and put your left arm straight out in front of you in the same way. Concentrate on your arm and listen to me. Imagine that the arm is becoming lighter and lighter, that it's moving up and up. It feels as if it doesn't have any weight at all, and it's moving up and up, more and more. It's as light as a feather, it's weightless and rising in the air. It's lighter and lighter, rising and lifting, more and more. It's lighter and lighter, moving up and up. It doesn't have any weight at all, and it's moving up and up, more and more, higher and higher."

3. **Hand Lock** - "Keep your eyes closed. Clasp your hands together tightly, and interlace the fingers. Put them in your lap. Concentrate on your hands and hold them together as tightly as you can. Imagine that your hands are two pieces of steel that are welded together, so that it's impossible to get them apart. They're stuck, they're welded, they're clamped. When I ask you to pull your hands apart, they'll be stuck and they won't come apart no matter how hard you try. They're stuck together. They're
two pieces of steel welded together. You feel as if your fingers were clamped in a vise. Your hands are hard, solid, rigid! The harder you try to pull them apart, the more they will stick together. It's impossible to pull your hands apart! The more you try the more difficult it will become. Try, you can't. Try harder, you can't. You can unclasp your hands now."

4. Thirst "Hallucination" - "Keep your eyes closed. Imagine that you've just finished a long, long walk in the hot sun. You've been in the hot sun for hours, and for all that time you haven't had a drink of water. You've never been so thirsty in your life. You feel thirstier and thirstier. Your mouth is parched, your lips are dry, your throat is dry. You have to keep swallowing and swallowing. You need to moisten your lips. You feel thirstier and thirstier, drier and drier. Thirstier and thirstier, dry and thirsty. You're very, very thirsty! Dry and thirsty! Dry and thirsty! Now, imagine drinking a cool, refreshing glass of water."

5. Verbal Inhibition - "Keep your eyes closed. Imagine that the muscles in your throat and jaw are solid and rigid, as if they're made of steel. They're so solid and rigid, that you can't speak. Every muscle in your throat and mouth is so tight and so rigid that you can't say your name. The harder you try to say your name, the harder it becomes. You can't talk! Your larynx has tightened up; your throat and jaw feel as if they are in a vise. Your throat is clamped so tightly that you can't talk; you can't say your name. The harder you try, the harder it will be. It's useless, the words won't come out! You can't speak your name! It's impossible to talk! The harder you try to say your name, the harder it will become. Try, you can't. Try harder, you can't. You can say your name now."

6. Body Immobility - "Keep your eyes closed. Imagine that for years and years you've been sitting in that chair just as you are now. Imagine that you've been sitting in that chair for so long that you've stuck to it! It's as if you're part of the chair. Your whole body is heavy, rigid, solid and you weigh a ton. You're so heavy that you can't budge yourself! It's impossible for you to stand up, you're stuck right there! Your body has become part of the chair. When I ask you to stand up, you won't be able to do it! You're stuck tight! The harder you try, the tighter you'll be stuck and you won't be able to get up! You're heavy in the chair! Stuck in the chair; you
can't stand up. You're so heavy and stuck so tight. You can't stand up, you're stuck! Try, you can't. Try harder! you can't! You can relax now."

7. "Posthypnotic-like" Response - "When this experiment is over in a few minutes and your eyes are open, I'll click like this (E presents auditory stimulus) and you'll cough automatically. At the moment I click (E presents stimulus) you'll cough. It will happen automatically. When I click like this (stimulus is presented), you'll cough immediately; I'll click and you'll cough. When your eyes are open, I'll click (stimulus is presented) and you'll cough. When I click, you'll cough."

8. Selective Amnesia - "Your eyes are still closed but I'm going to ask you to open them in a minute. When they are open, I'm going to ask you to tell me about these tests. You'll remember all the tests and be able to tell me about them, all except for one. There's one that you'll completely forget about as if it never happened! That's the one where I said your arm is becoming lighter and moving up and up. You'll forget all about that and when you try to think about it, it will slip even further away from your mind. You will forget completely that I told you that your arm was becoming lighter. This is the one test that you cannot remember! You will remember that I said your arm was heavy and all the other tests will be perfectly clear but the harder you try to remember that I told you your arm was rising the more difficult it will become. You will not remember until I give you permission by saying, 'Now you can remember' and then, and only then, you will remember that I said your arm was rising!"

"Open your eyes, the experiment is over."

The 'posthypnotic-like' response item is scored at this point. E presents the auditory stimulus.

The following eight items were presented to the subject immediately upon completing the BSS. The subject was instructed to answer the questions as honestly as she could by placing a check in the box to the left of the most appropriate response.
1. When it was suggested that your right arm was heavy and was moving down, the arm felt:

[ ] not heavy [ ] slightly heavy [ ] heavy [ ] very heavy

2. When it was suggested that your left arm was light and moving up, the arm felt:

[ ] not heavy [ ] slightly heavy [ ] heavy [ ] very heavy

3. When it was suggested that your hands were stuck together and you couldn't take them apart, the hands felt:

[ ] not stuck [ ] slightly stuck [ ] stuck [ ] very stuck

4. When it was suggested that you were thirsty, you felt:

[ ] not thirsty [ ] slightly thirsty [ ] very thirsty

5. When it was suggested that your throat was stuck and you couldn't speak, your throat felt:

[ ] not stuck [ ] slightly stuck [ ] stuck [ ] very stuck

6. When it was suggested that you were stuck in the chair, you felt:

[ ] not stuck [ ] slightly stuck [ ] stuck [ ] very stuck

7. When the experiment was over and the experimenter clicked, you felt:

[ ] not like coughing [ ] slightly like coughing [ ] like coughing [ ] very much like coughing
8. When the experiment was over and you were recalling the tests, you felt that you remembered the test about the arm rising:

- [ ] with no difficulty
- [ ] with slight difficulty
- [ ] with great difficulty
- [ ] (or did not remember at all)

The BSS was scored by assigning values of 0 to 3 to each of the points on the scale for each item. Thus, the range of scores was from 0 (low suggestible) to 24 (high suggestible).
APPENDIX E

Experimental Session Scripts (1-6)
The independent variables in this study: duration of hypnotic induction, motivating instructions, and level of suggestibility required the use of six experimental treatments. These treatments were administered the subjects via tape recording and consist of the content noted below. The portion of the treatment noted represents that part of Treatments 2 through 6 differing from Treatment 1.

**TREATMENT 1 - No Hypnotic Induction/No Motivating Instructions**

This study is investigating human thinking and responses processes. There are no personality or intelligence tests involved in this study. Your name will not be associated with the data or published study findings in any manner. You are in a group that will not be hypnotized.

You have in front of you some equipment and an envelope containing some tests and a questionnaire. All you have to do is listen to this tape and follow the directions carefully. You have been instructed on how to start and stop the tape playback device. If you wish further instructions, have any questions, or wish to withdraw from the study as a subject, signal the monitor by raising your hand now. (PAUSE 5 SEC.)

Remove the tests from the envelope in front of you and select test number one - the Digit Symbol Test. (PAUSE 10 SEC.) Let's read over the general directions for the Digit Symbol Test together. Check again to see if you have the Digit Symbol Test. If you do not, raise your
hand and the monitor will help you. (PAUSE 5 SEC.) READ DIRECTIONS FOR THE DIGIT SYMBOL TEST.

Test 1: Digit Symbol Test. This is a test to determine how well you can substitute symbols for digits. Look at the divided boxes below. Notice that each has a numeral in the upper part and a little mark in the lower part. Notice also that every numeral has a different mark under it. Now look at the second set of divided boxes below. Notice that these boxes have only numerals and all but two of the squares underneath are empty. The first two boxes have been filled in to demonstrate your task. You should place in each empty square the symbol corresponding to the numeral in the square above. The next empty square is below the numeral "3"; therefore you should fill the empty square with the symbol "1 1". You may use the numeral-symbol chart to help you.

ALLOW 15 SEC. TO COMPLETE PRACTICE EXERCISE.

Now check your responses with the key provided with these directions. (PAUSE 10 SEC.) When the test begins, you are to fill in as many squares as you can WITHOUT SKIPPING any before you are told to stop. Your score on this test will be the number of squares correctly filled in. You will have two minutes for this test. I will tell you when your time is up. You may turn the page and begin.

AFTER TWO MINUTES SAY: Stop, even if you have not finished, stop. Place the Digit Symbol Test in the envelope (PAUSE 10 SEC.)
Locate test number two, the Series Completion Test. (PAUSE 10 SEC.)

Let's read over the general directions for the Series Completion Test together. Check again to see if you have the Series Completion Test. If you do not, raise your hand and the monitor will help you. (PAUSE 5 SEC.)

READ DIRECTIONS TO THE SERIES COMPLETION TEST.

Test 2: Series Completion Test. This is a test of your ability to complete an incomplete series. You will be given a list of words, numerals, syllables, or initials that is incomplete. Your task is to discover the rule used in the series and supply the next word, numeral, syllable, or initial in the series. Remember to read each series statement carefully before making a response. Now try the practice incomplete series below. In the first example (a), the series is composed of five numerals each of which is two greater than the previous numeral. Following that rule the next digit in the series would be "24". You complete the rest of the series listed.

ALLOW 30 SEC. TO COMPLETE THE PRACTICE EXERCISE.

Now check your responses with the key provided with these directions. (PAUSE 10SEC.) Your score on this test will be the number of series completed correctly. You will have one and one-half minutes (90 seconds) for this test. I will tell you when your time is up. You may turn the page and begin.
AFTER 90 SEC. SAY: Stop, even though you have not finished, stop.
Place the Series Completion Test in the envelope. (PAUSE 10 SEC.)

Locate test number three, the Addition Test. (PAUSE 10 SEC.) Let's read over the general directions for the Addition Test together. Check again to see if you have the Addition Test. If you do not, raise your hand and the monitor will help you. (PAUSE 5 SEC.)

READ DIRECTIONS TO THE ADDITION TEST.

Test 3: Addition Test. This is a test to see how quickly and accurately you can add. It is not expected that you will finish all the problems in the time allowed. You are to write your answer in the boxes below the problems. Several practice problems are given below with the first one correctly worked. Practice for speed on the others. This practice may help your score.

ALLOW 30 SEC. TO COMPLETE THE PRACTICE EXERCISE.

Now check your responses with the key provided with these directions. (PAUSE FOR 10 SEC.) Your score on this test will be the number of problems that are added correctly. Work as rapidly as you can without sacrificing accuracy. You will have two minutes for this test. I will tell you when your time is up. You may turn the page and begin.

AFTER TWO MINUTES SAY: Stop, even though you have not finished, stop.
Place the Addition Test in the envelope. (PAUSE 5 SEC.)
Locate test number four, the Object Number Test. (PAUSE 10 SEC.)

Let's read over the general directions for the Object Number Test together. Check again to see if you have the Object Number Test. If you do not, raise your hand and the monitor will help you. (PAUSE 5 SEC.)

READ DIRECTIONS TO THE OBJECT NUMBER TEST.

Test 4: Object-Number Test. This is a test of your ability to learn combinations of words and numbers. In each part of the test you will study a page showing 15 object names with numbers. After studying the page showing both objects and numbers you will turn to a page showing both objects and numbers in a different order. You will be asked to write down the numbers that go with them. Here is a practice list. Study it until you are asked to turn to the practice test page. You will have one minute.

AFTER ONE MINUTE SAY: Turn to the practice test page.

Practice Test Page. For the first object below, the correct number has been written. Write all of the other numbers that you can remember.

ALLOW 30 SEC. TO COMPLETE THE PRACTICE EXERCISE.

Now check your responses with the key provided with these directions. (PAUSE 10 SEC.) Your score will be the number marked correctly. Even if you are not sure of the correct answer to a question, it will be to your advantage to guess. There are two pages in this test. The first
of these is a memory page which you are to study for two minutes. The second is a test page on which you are to write the numbers that go with the objects. You will have 90 seconds to write. I will tell you when your time is up. You may turn the page and begin.

AFTER TWO MINUTES SAY: Stop studying the memory page. Turn to the test page and write the number that belongs with each of the objects.

AFTER 90 SECONDS SAY: Stop, even though you have not finished, stop. Place the Object Number Test in the envelope. (PAUSE 5 SEC.)

You will now have a 16 minute break. You may do anything you wish for these 16 minutes except leave the room. I will tell you when the 16 minutes are up.

AFTER 16 MINUTES SAY: The 16 minute break is over. Please stop what you are doing and give me your attention. (PAUSE 10 SEC.)

Remove the tests from the envelope in front of you and select test number three, the Addition Test. (PAUSE 10 SEC.) Check again to see if you have the Addition Test. If you do not, raise your hand and the monitor will help you. (PAUSE 5 SEC.)

You are familiar with the general directions so we will not read them together, but I will give you time to complete the practice problems. You may work the practice problems.

ALLOW 30 SEC. FOR COMPLETION OF PRACTICE EXERCISES.
Now check your responses with the key provided with these directions.
(PAUSE 10 SEC.)

READ TEST INFORMATION FOLLOWING PRACTICE EXERCISE.

Your score on this test will be the number of problems that are added correctly. Work as rapidly as you can without sacrificing accuracy. You will have two minutes for this test. I will tell you when your time is up. You may turn the page and begin.

AFTER TWO MINUTES SAY: Stop, even though you have not finished, stop. Place the Addition Test in the envelope. (PAUSE 5 SEC.) Locate test number one -- the Digit Symbol Test. (PAUSE 10 SEC.) Check again to see if you have the Digit Symbol Test. If you do not, raise your hand and the monitor will help you. (PAUSE 5 SEC.) You are familiar with the general directions so we will not read them together but I will give you time to complete the sample. You may now complete the sample.

ALLOW 15 SEC. FOR COMPLETION OF THE SAMPLE.

Now check your responses with the key provided with these directions.
(PAUSE 10 SEC.)

READ TEST INFORMATION FOLLOWING PRACTICE EXERCISE.

When the test begins, you are to fill in as many squares as you can WITHOUT SKIPPING any before you are told to stop. Your score on this
test will be the number of squares correctly filled in. You will have **two minutes** for this test.

**AFTER TWO MINUTES SAY:** Stop, even though you have not finished, stop.
Place the Digit Symbol Test in the envelope. (*PAUSE 5 SEC.*)

Locate test number four — the Object Number Test. (*PAUSE 10 SEC.*)
Check again to see if you have the Object Number Test. If you do not, raise your hand and the monitor will help you. (*PAUSE 5 SEC.*) You are familiar with the general directions so we will not read them together but I will give you time to complete the practice exercise. Here is a practice list. Study it until you are asked to turn to the practice test page. You will have **one minute**.

**AFTER ONE MINUTE SAY:** Turn to the practice test page and write all of the numbers for the objects you can remember.

**ALLOW 30 SEC. FOR COMPLETION OF THE PRACTICE EXERCISES.**

Now check your responses with the key provided with these directions. (*PAUSE 10 SEC.*)

**READ TEST INFORMATION FOLLOWING PRACTICE EXERCISES.**

Your score will be the number marked correctly. Even if you are not sure of the correct answer to a question, it will be to your advantage to guess. There are two pages in this test: The first of these is a memory page which you are to study for two minutes. The second is a test page on which you are to write the numbers that go with the objects.
You will have 90 seconds to write. I will tell you when your time is up. You may turn the page and begin.

AFTER TWO MINUTES SAY: Stop studying the memory page. Turn to the test page and write the number that belongs with each of the objects.

AFTER 90 SEC. SAY: Stop, even though you have not finished, stop. Place the Object Number Test in the envelope. (PAUSE 5 SEC.)

Locate test number two -- the Series Completion Test. (PAUSE 10 SEC.) Check again to see if you have the Series Completion Test. If you do not, raise your hand and the monitor will help you. (PAUSE 5 SEC.) You are familiar with the general directions so we will not read them together, but I will give you time to complete the practice incomplete series. You may now complete the practice incomplete series.

ALLOW 15 SEC. FOR COMPLETION OF THE PRACTICE EXERCISES.

Now check your responses with the key provided with these directions. (PAUSE 10 SEC.)

READ TEST INFORMATION FOLLOWING PRACTICE EXERCISE.

Your score on this test is the number of series completed correctly. You will have one and one-halp minutes (90 seconds) for this test. I will tell you when your time is up. You may turn the page and begin.

AFTER 90 SEC. SAY: Stop, even though you have not finished, stop. Place the Series Completion Test in the envelope. (PAUSE 5 SEC.)
You should have all materials placed in the envelope except the Subject Post-Experiment Questionnaire. Let's read over the general directions for the questionnaire together. Check again to see if you have the Subject Post-Experiment Questionnaire. If you do not, raise your hand and the monitor will help you. You will have two minutes for this task. If you finish before the specified time, give your questionnaire to the monitor.

READ DIRECTIONS FOR THE QUESTIONNAIRE.

You may begin.

AFTER TWO MINUTES SAY: Stop, even though you have not finished, stop. If you need more time, raise your hand and the monitor will help you. You will have two minutes for this task. If you finish before the specified time, give your questionnaire to the monitor.

READ DIRECTIONS FOR THE QUESTIONNAIRE.

You may begin.

AFTER TWO MINUTES SAY: Stop, even though you have not finished, stop. If you need more time, raise your hand and the monitor will give you special instructions. (PAUSE 5 SECONDS)

Thank you very much for participating in this study. You have made a very real contribution toward the understanding of a very important area of human behavior. We would appreciate it if you would not discuss
your experiences with any of your friends and colleagues who are to participate in this study. Thank you again.

TREATMENT 2 - No Hypnotic Induction/Motivating Instructions

The only changes between this script and the script for Treatment 1 is the reduction of the interpolated activity to 15 minutes and the inclusion of the motivating instructions.

Interpolated Activity:
You will now have a 15 minute break. You may do anything you wish for these 15 minutes except leave the room. I will tell you when the 15 minutes are up.

AFTER 15 MINUTES SAY: The 15 minute break is over. Please stop what you are doing and give me your attention. (PAUSE 10 SEC.)

Motivating Instructions:
READ THE FOLLOWING IN ONE (1) MINUTE:

In this experiment I am testing your ability to perform better on equivalent forms of the four tasks you have already completed. How well you do depends entirely on your willingness to try. If you try real hard, you will do better. Everyone who had tried harder on these tests has done better the second time, and I am sure you can too. You'll be surprised how well you can really do, if you really try hard. I want you to score as high as you possibly can because we are measuring the maximum ability of people who have really tried. I am asking for your
cooperation in this experiment to try to the best of your ability. If you don't try, the experiment will be worthless, I'll feel disappointed, and it will have been a waste of your time and mine. On the other hand, if you really try hard, to the very best of your ability, you can and will do much better. Are you ready? Now try to do the very best you can, try real hard, really hard.

TREATMENT 3 - Minimal Hypnotic Induction/No Motivating Instructions

There are three changes in Script 3 from Script 1. First, the subjects are told they are in a group that will be hypnotized; second, the interpolated activity has been reduced to 15½ minutes; and third, minimal hypnotic induction procedures are included.

Hypnotized Group:
This study is investigating human thinking and response processes. There are no personality or intelligence tests involved in this study. Your name will not be associated with the data or published study findings in any manner. You are in a group that will be hypnotized.

Interpolated Activity:
You will not have a 15½ minute break. You may do anything you wish for these 15½ minutes except leave the room. I will tell you when the 15½ minutes are up.

AFTER 15½ MINUTES SAY: The 15½ minute break is over. Please stop what you are doing and give me your attention. (PAUSE 10 SEC.)
Minimal Hypnotic Induction:

TURN ON METRONOME. (PAUSE 10 SEC.)

READ THE FOLLOWING IN 15 SECONDS:

Keep your eyes on the little light and listen carefully to what I say. Now relax and make yourself entirely comfortable. Keep your eyes on the little light. Your eyes are tired from staring. The strain in your eyes is getting greater and greater, greater and greater. You would like to close your eyes. Your eyes are closing, closing. They're closed. Close your eyes.

TURN OFF THE METRONOME. METRONOME ON TAPE. SYNCHRONIZE UNDERLINED WORDS WITH THE TOCK OF THE METRONOME.

Listen to the metronome that goes tock. tock. tock. As you drift deeper and deeper each tock will sound like the word sleep and you will hear sleep. sleep. sleep. sleep. For awhile now you will not hear my voice, only the tock of the metronome which is saying sleep. sleep. When you hear my voice again you will be in the deepest trance of all. Now listen.

PAUSE 10 SEC. READ THE FOLLOWING IN 5 SECONDS:

Good. You are now in a deeper trance. Remain like this while I give you the following instructions. In a minute I am going to ask you to open your eyes but you will remain in a trance. You will not awaken until you hear me say -- THE EXPERIMENT IS OVER -- then you will be wide
awake, refreshed, and in a good mood. NOW OPEN YOUR EYES.

**TREATMENT 4 - Minimal Hypnotic Induction/Motivating Instructions**

Here there are four changes between the script for Treatment 4 and that for Treatment 1. Changes occur in the following areas: subjects are told they are to be in a group that will be hypnotized, interpolated activity has been reduced from 16 to 14½ minutes, minimal hypnotic induction procedures are included, and motivating instructions are used.

**Hypnotized Group:**
See Treatment 3.

**Interpolated Activity:**
You will now have a 14½ minute break. You may do anything you wish for these 14½ minutes except leave the room. I will tell you when the 14½ minutes are up.

AFTER 14½ MINUTES SAY: The 14½ minute break is over. Please stop what you are doing and give me your attention.

**Minimal Hypnotic Induction:**
See Treatment 3.

**Motivating Instructions:**
See Treatment 2.
TREATMENT 5 - Extended Hypnotic Induction/No Motivating Instructions

Changes in this treatment were in the same areas as in Treatment 3 except for extended hypnotic induction rather than minimal hypnotic induction. The script for Treatment 5 differed from that of Treatment 1 concerning informing subjects that they will be hypnotized, altering the interpolated activity and hypnotic induction including the extended hypnotic induction procedure.

Hypnotized Group:
See Treatment 3.

Interpolated Activity:
You will now have a one minute break. You may do anything you wish for one minute except leave the room. I will tell you when the one minute is up.

AFTER ONE MINUTE SAY: The one minute break is over. Please stop what you are doing and give me your attention. (PAUSE 5 SEC.)

Extended Hypnotic Induction:
TURN ON METRONOME. (PAUSE 10 SEC.)

READ THE FOLLOWING IN 15 MINUTES.

Keep your eyes on the little light and listen carefully to what I say. Your ability to be hypnotized depends entirely on your willingness to cooperate. It has nothing to do with your intelligence. As for your
will power -- if you want to, you can pay no attention to me and remain awake all the time. In that case, you might make me seem silly, but you are only wasting time. On the other hand, if you pay close attention to what I say, and follow what I tell you, you can easily learn to fall into hypnotic sleep. In that case you will be helping this experiment and not wasting any time. Hypnosis is nothing fearful or mysterious. It is merely a state of strong interest in some particular thing. In a sense you are hypnotized whenever you see a good show and forget you are part of the audience, but instead feel part of the story. Your cooperation, your interest, is what I ask for. Your ability to be hypnotized is a measure of your willingness to cooperate. Nothing will be done that will in any way cause you the least embarrassment.

Now relax and make yourself entirely comfortable. Keep your eyes on that little light. Keep staring at it all the time. Keep staring as hard as you can, as long as you can.


Your legs feel heavy and limp, heavy and limp. Your arms are heavy, heavy, heavy as lead. Your whole body feels heavy, heavier and heavier. You feel tired and sleepy, tired and sleepy. You feel drowsy and sleepy, drowsy and sleepy. Your breathing is slow and regular, slow and regular.
Your eyes are tired from staring. Your eyes are wet from straining. The strain in your eyes is getting greater and greater, greater and greater. You would like to close your eyes and relax completely (but keep your eyes open just a little longer, just a little longer. You will soon reach your limit.) The strain will be so great, your eyes will be so tired, your lids will become so heavy, your eyes will close themselves.

And then you will be completely relaxed, completely relaxed. Warm and comfortable, warm and comfortable, so warm and comfortable. Tired and drowsy. Tired and sleepy. Sleepy. Sleepy. Sleepy. You are concentrating on the sound of my voice.

Your eyes are closing, closing. They're closed. Close your eyes.

TURN METRONOME OFF.

You feel pleasantly drowsy and sleepy as you continue to listen to my voice. Just keep your thoughts on what I am saying. You are going to be much more drowsy and sleepy. Soon you will be in a deep sleep but you will have no trouble hearing me. You will not wake up until I tell you to. Remember that the dangers of hypnosis are a myth. Nothing will be done that is in any way harmful to you.

I shall now begin to count. At each count you will feel yourself going down, down, down, into a deep, comfortable, restful sleep. A sleep in which you will be able to do all sorts of things I ask you to. One...
You are going to go deeply asleep...Two...down, down, into a deep, sound sleep...Three...Four...more and more, more and more asleep...
Five...Six...Seven...you are sinking, sinking, into a deep, deep sleep. Nothing will disturb you. Pay attention only to my voice and the things I tell you...Eight...Nine...Ten...Eleven...Twelve...deeper and deeper, always deeper sleep...Thirteen...Fourteen...Fifteen.
You will always hear me clearly no matter how deeply asleep you may be...Sixteen...Seventeen...deep asleep, fast asleep. Nothing will disturb you. You are going to experience many things that I will tell you to experience...Nineteen...Twenty. Deep asleep! You will not awaken until I tell you to do so. You will wish to sleep and have the experience I shall presently describe. You are feeling comfortable, relaxed, thinking of nothing, nothing but what I say, your eyes are closed, comfortably closed, you are thinking of nothing, nothing but what I say, your arms and legs feel heavy, your arms and legs feel heavy and you are relaxed, relaxed, your whole body feels relaxed, your whole body feels relaxed, the muscles of your face, arms, and legs are relaxed, your whole body is relaxed. Drift deeper! It feels as though you are going backward into the darkness, backward into the darkness and as you go backward into the darkness you are more and more relaxed, more and more comfortable, you are going backward, backward and backward into the darkness and as you go backward you feel more and more comfortable, more and more relaxed, you are listening only to my voice, only to my voice, thinking of nothing, absolutely nothing, concentrating only on my voice, listening only to what I say, listening only to my voice, you are feeling
comfortable and relaxed, comfortable and relaxed, comfortable and relaxed, and as you go backward and backward into the darkness you feel drowsy, very drowsy, and you are thinking of nothing, nothing but the sound of my voice, you feel comfortable and relaxed, comfortable and relaxed, breathing regularly and deeply, regularly and deeply, regularly and deeply, thinking of nothing but the sound of my voice, breathing regularly and deeply, regularly and deeply, regularly and deeply and you are in a sleep, a deep, sound, comfortable sleep, breathing regularly and deeply, regularly and deeply, regularly and deeply, your sleep is getting deeper, deeper, deeper, as you go backward into the darkness your sleep is getting deeper and deeper, deeper and deeper, deeper and deeper, you feel comfortable and relaxed, listening only to my voice, breathing regularly and deeply, regularly and deeply, regularly and deeply in a deep, sound sleep, deep sound sleep, and your sleep is getting deeper and deeper, deeper and deeper, you are in a deep sound sleep, deep sound sleep, deep sound sleep, breathing regularly and deeply, regularly and deeply, regularly and deeply and you are in a deep sound sleep, a deep sound sleep, sleep, sleep, sleep, sleep.

METRONOME ON TAPE. SYNCHRONIZE UNDERLINED WORDS WITH TOCK OF METRONOME.

You can no longer see the winking light of the metronome which goes on and off, on and off in cadence to the tock...tock...tock because your eyes are closed, but as you dfft deeper and deeper each tock will sound like the word sleep, and you will hear sleep...sleep...sleep.
With every tock...tock...tock...sleep...sleep...sleep. With every tock ...tock...tock...sleep...sleep...sleep. You will drift deeper and deeper. For a minute now you won't hear my voice, only the tock of the metronome which is saying sleep...sleep. With each beat you will drift deeper and deeper, deeper and deeper. When you hear my voice again you will be in the deepest trance of all -- you will be deeply asleep but able to concentrate on my voice. Now listen.

PAUSE 30 SEC. METRONOME NOT ON TAPE.

Good, you are deeper now than ever before. I'm going to ask you to count with me from 10 to 1 and with each count you will drift deeper and deeper asleep. With each count you will also be more prepared to experience the many interesting things I tell you to experience, none of which will be embarrassing or unpleasant. Now count from 10 to 1 with me and at the count of 1 you will be deeply asleep and fully prepared to have the experiences I describe to you. Let's count.

ONE NUMBER EVERY 5 SECONDS.

Good. Now remain like this while I give you the following instructions. In a minute I am going to ask you to open your eyes but you will remain in hypnosis. You will have your eyes open and be able to do the things I ask you to do. You will remain in hypnosis until the experiment is over. You will not awaken until you hear me say, THE EXPERIMENT IS OVER. Then you will be wide awake, refreshed and in a good mood. Remember, when I tell you to open your eyes, open them but remain in hypnosis until I
say, THE EXPERIMENT IS OVER. Now open your eyes.

**TREATMENT 6 - Extended Hypnotic Induction/Motivating Instructions**

Treatment 6 differs the most from Treatment 1. Three areas of change (hypnotized group, hypnotic induction, and motivating instructions) are represented to their maximum degree. Interpolated activity is missing as hypnotic induction and motivating instructions utilize the entire 16 minutes usually available for such activity.

**Hypnotized Group:**
See Treatment 3.

**Hypnotic Induction:**
See Treatment 5.

**Motivating Instructions:**
See Treatment 2.
APPENDIX F

Post Experiment Questionnaire
The purpose of the post-experiment questionnaire was threefold:
1) to obtain perceptions of subjects as to the degree to which they perceived themselves hypnotized, 2) an estimation as to how interesting the subjects found the experiment, and 3) the subjects ranking of the four cognitive performance tasks as to difficulty.

All items were scored except the third concerning task difficulty. Here the relative rankings of the cognitive performance tasks were merely tallied. Item two, interest, had values from 0 to 4 assigned: zero to "definitely not interesting" and four to "definitely interesting." The degree of hypnosis item, i, multiplied each category by an assigned value from 0 t 3 and summed values. For example:

a. not hypnotized 
   \[0 \times 0 = 0\]
b. lightly hypnotized 
   \[25 \times 1 = 25\]
c. moderately hypnotized 
   \[65 \times 2 = 130\]
d. deeply hypnotized 
   \[10 \times 3 = 30\]

TOTAL 100 185

Item one therefore had a range from 0 to 300

SUBJECT POST-EXPERIMENT QUESTIONNAIRE

Subject's Name _________________________ # ______________ Date __________

GENERAL DIRECTIONS: This questionnaire is to allow you to express some of your feelings concerning the experiment and your participation in the experiment. Please respond to the following as honestly as you can. The task is a difficult one but others have done it successfully and so can you.
You are being asked to estimate the percentage of time and extent to which you were hypnotized during the experiment as well as your opinion as to how interesting you found the experiment and how difficult you found the four cognitive tasks.

1. As well as I can remember, during the experiment, I was:
   a. not hypnotized % of the time
   b. lightly hypnotized % of the time
   c. moderately hypnotized % of the time
   d. deeply hypnotized % of the time

100%

NOTE: the sum of the % should total 100

2. As far as I am concerned, I found the experiment: (Check only ONE of the five below)
   a. Definitely interesting, I am sorry it was over.
   b. Interesting, I was happy to participate.
   c. Quite neutral, nothing more or less than an experience.
   d. Not interesting, could have better spent my time.
   e. Definitely not interesting at all, the whole thing was a drag.

NOTE: Check only ONE of the five boxes

From your experience with the four tests in this experiment, how would you rank them in terms of their difficulty? Rank the easiest test number 1, and the most difficult test, number 4. The other two tests that fall between the extremes should receive the rank of 2 and 3. Circle the numeral (1, 2, 3, or 4) to the right of the title of the
test that best expresses your opinion of the test.

<table>
<thead>
<tr>
<th>Test</th>
<th>Least Difficult</th>
<th>Most Difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addition Test</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Digit Symbol Test</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Series Completion Test</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Object-Number Test</td>
<td>1</td>
<td>3</td>
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