

POST-HYPNOTIC SUGGESTION IN RELATION
TO COLLEGE GRADES

By

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Bachelor of Science

Oklahoma Agricultural and Mechanical College

Stillwater, Oklahoma

1953

Submitted to the faculty of the Graduate School of
the Oklahoma Agricultural and Mechanical College
in Partial Fulfillment of the requirements
for the Degree of
MASTER OF SCIENCE
August, 1954

Thesis
1954
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ACKNOWLEDGMENTS

The writer wishes to express his gratitude to the members of the Department of Psychology of Oklahoma A. and M. College who gave advice and assistance during the investigation. The writer is indebted to Dr. Harry Brobst, Dr. Roy Sommerfeld, Dr. Roy Gladstone, Mr. Ted Stevens, and Mrs. Pairlee Stinson.

The writer is further indebted to Mr. B. J. Tillman who aided immeasurably in the role of hypnotist. To Miss Rilla Carlisle, Miss Doris Wuestenberg, Mr. Warren McClintock, and Mr. Sam Wood, the author wishes to express his gratitude for their support and assistance in the writing of this paper.

Dr. Alexis M. Anikeeff, Dr. Levarl Gustafson, and Dr. S. L. Reed, members of the thesis committee, were of tremendous help through their suggestions and counsel. The guidance, advice, and moral support of these faculty members made possible the completion of this study.

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CHAPTER I

THE PROBLEM

The problem of increasing a grade point average occurs to most students in college. The obvious question is how this can be accomplished. Studies show that interest and enjoyment in a subject matter add considerably to the effort put forth by the individual student. Serene, in a study of under-achievement in school, notes some causes of under-achievement of students. The factor most often found was that of lack of study. The fourth and fifth items on his list were lack of scholastic consciousness and dislike of the school subject.¹ These results indicate that grades a student receives can be improved by motivational factors so long as the student has not reached the ultimate of his ability.

Leslie F. Malpass, in writing on the problem of under-achievement of students in schools, stresses that schools and administrators must consider the attitude and feelings of the students about the school. The unconscious motivation of the individual is also important in the school

¹Michael F. Serene, "An Experiment in Motivational Counseling," Personnel and Guidance Journal, XXXI (February, 1953), 319-324.

situation. In looking for the causes of under-achievement, among other factors one must look for the lack of motivation in the learning process.²

Motivation, then, is an extremely important factor in school work. Young believes that if a student is enrolled in a course in which he has no interest, he develops a negative attitude toward it.

The attention of the student is easily distracted; he neglects his work; he becomes certain that the whole of school is of no great consequence.³

If lack of motivation is a cause of under-achievement, can it be used to improve the achievement of students in their scholastic standing?

George E. Schlessler conducted a study in which he attempted to motivate students in order to improve their scholastic achievement. In the results of the study he reported some definite improvement when there was a high motivational influence provided for the students.⁴

²Leslie F. Malpass, "Some Comments on the Student Centered Frame of Reference," Progressive Education, XXX (October, 1952), 23-24.

³Paul Young, Motivation of Behavior (New York, 1930), p. 2.

⁴George Schlessler, "Gains in Scholastic Aptitude Under Highly Motivated Conditions," Journal of Educational Psychology, XXXXI (April, 1950), 237-242.

To employ a method of motivation, one must understand what motivation is and what is needed to determine a way to motivate. In defining how to motivate there is the frequently encountered difficulty of selecting one definition from the many which exist. It is not the purpose of this study to engage in the controversy over the definition; rather, a basic assumption will be used to answer the purpose of the definition. For the purpose of this study it shall be assumed that by arousing interest in the subject matter, by increasing the enjoyment of the course work, and by establishing the awareness of the need for application to the work, one motivates the student and thereby increases his achievement. Further, this study is not intended to distinguish the influence of each of these factors of motivation.

Statement of the Problem

The problem of this study is to determine whether a post-hypnotic suggestion affects course work as measured by course grades. The measure to be used will be that of grade improvement in the course.

Limitations of the Study

The study is limited to a relatively small segment of the students enrolled in Oklahoma A. and M. College. In addition, it is restricted to those who were taking a course in social science and courses in psychology. The small

number of subjects involved sets a limitation on the interpretation of the results.

Some aspects of the design of this experiment and the controls involved place limitations on the interpretation of results. As the students for the study were selected from various courses, no attempt was made to establish uniformity of the difficulty of material taught. Grading was not standardized but was left entirely to the discretion of the instructors. They were not informed, however, of the students who were taking part in the experiment.

The experimental period covered only one-half of one semester. It began at mid-semester of the spring session, 1954, and continued to the end of that session. The duration is not long enough to provide conclusive results. The subjects received the post-hypnotic suggestion at different times, and the periods of reinforcement were not rigidly controlled. This lack of rigid control may not be of serious consequences as the factor of chance may cancel out the effects of reinforcement and the effects of lack of reinforcement.

Tests were made to ascertain the significance of differences between the groups as statistical controls of this factor.

Clarification of Terms

The field of hypnosis, as so many other areas of science, has its own terminology. Due to the newness of

hypnosis as a science, the terminology has not been clearly defined. In the discussion of this study it will be necessary to clarify some of the terminology. The following is a list of terms defined as used in this study.

1. Hypnosis is

...an artificially induced state, usually (though not always) resembling sleep, but physiologically distinct from it, which is characterized by heightened suggestibility, as a result of which certain sensory, motor, and memory abnormalities may be induced more readily than in the normal state.⁵

2. Hypnotic state is that state of heightened suggestibility which usually (though not always) resembles sleep, which is induced by suggestion.

3. Hypnotic trance is synonymous with the hypnotic state.

4. Mesmerism is used synonymously with hypnotism.

5. Post-hypnotic suggestion is the suggestion given to a person in the hypnotic trance for an action to be performed after waking.

6. "Suggestibility is the willing suspension of conscious volition and the acceptance of a suggestion from another individual."⁶

7. Suggestion is the process of acceptance of a proposition for belief in absence of critical thought.

⁵Howard C. Warren, Dictionary of Psychology (Cambridge, 1934), p. 128.

⁶C. L. Barnhart, The American College Dictionary (New York, 1943), p. 1210.

CHAPTER II

REVIEW OF THE LITERATURE

Historical Background of Hypnosis

Hypnosis is as old as recorded history. Evidences of hypnosis have been found in the ancient Egyptian temples. Greek engravings show unmistakable poses of the hypnotic trance. From the written word and from the art of these early civilizations comes the knowledge that hypnotism was practiced in some form.¹

The hypnosis of this time was closely allied to mysticism. There were many aspects of the hypnotic phenomena that the early doctors used. Greek and Roman physicians were aware of the power of suggestion, and they made use of this power in the treatment of their patients. Although suggestion was used, the physicians were unaware of the nature of the power they had over their patients. They attributed the miracle cures effected in this way usually to God but sometimes to the Devil.²

Attention was drawn to hypnosis by Frederick Anton Mesmer who produced the hypnotic phenomena under the name of

¹Bernard C. Grindes, M.D., New Concepts of Hypnosis (New York, 1951), p. 12-15.

²Ibid.

"animal magnetism." In 1773, Mesmer, a physician in Vienna, presented his thesis to the Faculty of Medicine of the University of Vienna. The paper was concerned with the influence of the stars and planets on the human body. Mesmer believed that these heavenly bodies had curative powers on the body through an invisible fluid called animal magnetism.

Some time later while practicing medicine Mesmer met a Jesuit priest named Father Hell, who performed marvelous cures through the use of metal magnets. Experimenting together, Mesmer and Father Hell produced many stirring accounts of success with apparently hopeless cases.

Mesmer abandoned the use of metal magnets in 1776. He adopted the view that the same results could be achieved by the use of the human touch. During this time he held to his theory that there was animal magnetism in various elements which cured.

The increasing number of cures he achieved prompted Mesmer to send reports to the various academies of science. In most cases the reports were totally ignored; however, he received one most unfavorable reply. Opposition had existed in Vienna, and it grew as Mesmer's popularity grew with the people. Because of this opposition Mesmer moved to Paris where he took up his work again.

It was in Paris that he built his famous baquet. This was an oak chest, filled with chemicals, fitted with iron, and supposedly magnetized by Mesmer. His haven became a

show-place of sensationalism. It was an extravaganza of quackery.

Paris, too, rejected his work. In giving Mesmer a last chance to prove himself, The Academy of Science appointed a committee to investigate the claims he made. The committee was composed of three scientists who were Bailly, Lavoisier, and Benjamin Franklin. After dipping their hands into Mesmer's magnetized bath and experiencing no hysteria, convulsions, or fits, they reported that Mesmer was a fraud. This ended the career of Mesmer.

Mesmer began the era of hypnotism and his practice almost destroyed it. For a number of years it was abandoned; however, one of Mesmer's pupils took up the practice after his retirement.³ This pupil was the Marquis De Puysegur. The main contribution of the Marquis was his demonstration of artificial somnambulism for the first time. De Puysegur induced calm, peaceful sleep instead of the fits characteristic of Mesmer's treatment.⁴ Unlike Mesmer, De Puysegur was not interested in sensationalism. Although the work of De Puysegur was of importance to science it was weakened by some ideas which he injected, i.e., thought transference and clairvoyance.

³Lowell S. Selling, Men Against Madness (New York, 1940), p. 236-237.

⁴Clark L. Hull, Hypnosis and Suggestibility (New York, 1933), p. 8.

About the same time a Jesuit priest, Father Gasnor, practiced hypnotism in Southern Germany. With much show he practiced his hypnotic art as a curer of disease and as a miracle maker.

Science finally came to test hypnosis with an experiment by James Braid, a surgeon. Braid insisted that hypnotism was a sleep induced by physical agents. He coined the word hypnotism from the Greek word hypnos, meaning sleep.⁵ Braid won the interest of a Professor Azam of Bordeaux through a series of articles he published. Azam reproduced the experiment and reported that it was possible to perform surgical operations on patients under hypnosis. The results were that the patients did not feel the normal amount of pain, or they felt no pain at all.⁶

Baird was ignored in England but recognized in France. Azam, on the other hand, was recognized in England and ignored in France. These men had an effect on the medical profession. Hypnosis was still looked upon as some form of magic, but there were a few who really investigated and turned to support the technique as an anesthetic.⁷

John Elliotson, a professor of medicine at the University College of London, helped to establish the University

⁵Gindes, p. 15.

⁶J. Milne Bramwell, Hypnotism (London, 1930), p. 23.

⁷Ibid., p. 27.

College Hospital for research and demonstration. In 1837 he saw a demonstration of mesmerism by Dupotet. He saw the possibilities involved in the use of hypnotism in surgery and practiced it on his patients. The hospital ordered him to cease his mesmerism, and he resigned. Elliotson became a prominent figure in the advancement of the use of hypnotism.

The sympathizers of Elliotson began publication of a journal, Zoist. This journal reviewed cases and put forth the views of Elliotson and others.

One of the greatest contributions made in the use of hypnotic anesthesia was that of Esdaile, an English physician who practiced in India. After reading of the successful use of hypnotism by some physicians, he began to use hypnosis on the patients in his clinic. He reported many remarkable results. Esdaile's cases added much weight to the ever-growing science, despite constant attack on his work.

Both Elliotson and Esdaile weathered the storm of their profession. They were criticized and their reputations were under fire, yet they had begun the more objective and scientifically oriented use of hypnotism.

Charcot fared somewhat better when in 1878 he and his pupils at the Academy of Science in Paris began research upon hypnosis. This was the first trial at a scientific classification of the hypnotic phenomena. The reputation

of Charcot added greatly to the scientific acceptance of hypnosis.⁸

The development of ether and other drugs for anaesthetics, put some limitation on the use of hypnotism. It was still, however, used in the treatment of mental disorders.

The Nancy School of Paris, undoubtedly, long will be remembered as a place where hypnosis was practiced, taught, and studied without pomp or show.

Dr. A. A. Liebeault settled at Nancy where he lived quietly on the income from his practice and used hypnosis gratuitously among the poor people of Nancy. Dr. Bernheim learned of the practice of Liebeault and became a pupil and friend. Bernheim did much in making the work of his teacher known and in influencing acceptance of his work. He also began experimenting with hypnosis under the watchful eyes of Professor Beaunis and Professor Liegeois. After the retirement of Liebeault, Bernheim took over the work at Nancy, and hypnotism was on the road to becoming an object of true scientific investigation.

Sigmund Freud studied medicine in Vienna where he specialized in the physiology of the nervous system. When he began his medical practice he associated himself with Dr. Josef Breuer. Freud and Breuer began to study neurotic disorders.

⁸Hull, p. 13-14.

In 1885 Freud traveled to Paris to study under Charcot who was Europe's authority on neurotic disorders. Charcot was interested in hysteria patients and treated them with hypnosis. Charcot believed that hypnosis was related to hysteria and could only be induced in hysteria patients. Largely due to the reputation of Charcot, hypnosis was accepted as the proper treatment of hysteria.⁹ Freud also spent some time at Nancy studying hypnosis.

When Freud returned to Vienna he resumed his work with Breuer. They utilized hypnotism in their practice and found that, although it was successful in removing the symptoms of nervous disorders, hypnotism did not effect a cure. Freud regarded hypnotism as a superficial method inadequate for digging down into the roots of the emotional problems of his patients.

Freud and Breuer began an extensive investigation of a new method invented by Breuer which he called the talking out method. By using both hypnosis and their new talking out, or free association, method the work was improved. Later hypnosis was dropped and it was completely replaced with the new method.

⁹William Wesley Cook, Practical Lessons in Hypnotism (New York, 1950), p. 19.

Freud did admit that he owed much to hypnotism. Many of the early psychoanalytic foundations were drawn from his experience with hypnotism.¹⁰

A notable event in the history of hypnotism was the publication of a book by J. Milne Bramwell.¹¹ Bramwell stressed a scientific approach to hypnotism and presented a number of theories of the hypnotic phenomena.

Weitzenhoffer¹² believed that the book published by C. L. Hull was the first important landmark in the history of hypnotism. This book, Hypnosis and Suggestibility; an Experimental Approach, was an integration of the data derived from experiments. The book has helped to define many of the studies which were to follow.

Modern hypnosis has been limited to a very small number of investigators. Most of the research that has been carried out was done by individuals; however, some universities now allow the use of laboratories for studies in hypnosis.

World War II brought many psychologists to the field to investigate use of hypnosis in treating battle fatigue.¹³

¹⁰C. G. Jung, Psychology of the Unconscious (New York, 1937), p. xii.

¹¹Bramwell, p. 23.

¹²Andre M. Weitzenhoffer, Hypnotism: An Objective Study in Suggestibility (New York, 1953), p. vii.

¹³Leslie M. LeCron, Experimental Hypnosis (New York, 1952), p. viii.

There have been some advancements in the use of hypnosis in an experimental setting. Five different scientific associations have been organized to promote the use of hypnosis. Three of these groups are dental societies. The other two are within the medical profession and within the areas of clinical and experimental psychology. The latter is called The Society for Clinical and Experimental Hypnosis. This society was formed in 1949 to bring together into one organization those professional workers using hypnosis.¹⁴

The literature of today concerning hypnosis is growing rapidly. Hypnosis has been investigated by the scientific method, and the results of work are being published in the professional journals. This seems to indicate a brighter future for hypnosis.

Hypnosis in the Learning Situation

Prior to the publication of the book, Hypnosis and Suggestibility: an Experimental Approach, by Hull, Young made two studies which were related to the area of learning. He tested memory for digit span, adjective-noun associates, and nonsense material. His subject first learned the material and later attempted recall in the waking state and in the trance state.¹⁵ Young also compared the ability to

¹⁴Ibid., p. ix.

¹⁵Paul C. Young, "An Experimental Study of Mental and Physical Functions in the Normal and Hypnotic State," American Journal of Psychology, XXXVI (April, 1925), 214-232.

recall casual observations, such as the furnishings of the waiting room and remote childhood experiences.¹⁶

Young reported very slight differences in favor of hypnotic recall. He did note that the hypnotic trance was related to a considerable improvement in the subject's recall of childhood experiences.

Hull reasoned that hypnosis should produce a lowering of ability to recall more recent memories. That it did not, he considered paradoxical.¹⁷

These studies of Hull and Young set the problem for the following experimenters. The object was to determine in what areas hypnosis aided recall. Huse had her subjects learn paired-associates consisting of a nonsense figure presented with a nonsense syllable which was spoken by the experimenter at the time of initial presentation. Her results indicated that hypnosis was of no benefit in the recall of nonsense syllables after a 24 hour period had elapsed.¹⁸

Gray reported an experiment on the learning of spelling words while under hypnosis. His subjects were weak in spelling at the beginning of the experiment. They were required to learn the correct spelling while hypnotized or

¹⁶Ibid., XXXVII, 345-356.

¹⁷Hull, p. 125.

¹⁸Betty Huse, "Does the Hypnotic Trance Favor the Recall of Faint Memories?", Journal of Experimental Psychology, XXIII (December, 1930), 519-529.

while awake. He tested recall by the number of the words correctly reproduced. The results indicated no difference in learning while hypnotized or while awake. He also reported that learning does take place more readily under hypnosis. The study has been criticized in respect to the question concerning the selection of weak spellers as subjects and whether or not this factor may have influenced his results.¹⁹

Stalnaker and Riddles studied the ability of twelve hypnotized subjects to recall meaningful material which was learned in the waking state a year or more before the investigation. They received the suggestion that the recall of this material would be easy. The control was the recall in a similar manner without the use of hypnosis. Stalnaker and Riddles reported that they observed an improvement in the hypnotic state over the waking state of 53.7 per cent more material recalled.²⁰

Mitchell reported a study similar to that of Huse. Using three place numbers, Mitchell had his subjects learn the numbers; then they were placed in the hypnotic trance.

¹⁹W. H. Gray, "The Effect of Hypnosis on Learning to Spell," Journal of Educational Psychology, XXV (September, 1934), 471-473.

²⁰J. M. Stalnaker, and E. E. Riddles, "The Effect of Hypnosis on Long Delayed Recall," Journal of General Psychology, VI (December, 1932), 429-440.

Seven minutes after learning the recall test was made. He found that the trance was not of benefit in recall.²¹

White published a report of an experiment in 1935 on recall of material learned under hypnosis. He hypnotized twenty-one subjects and had them learn a series of affectively toned words with paired numbers. These words had been selected in a survey conducted previous to the study. He measured the reaction time to the numbers and compared it with the time of normal subjects. White reported that the difference between reaction time to pleasant and unpleasant material was shortened.²²

Levin conducted experiments using an eleven year old boy as the subject. The conditioned reflex was studied under hypnosis, and he found that the normal conditioned reflexes were obtained in the hypnotic state. However, no stable conditioned inhibition could be established. He also found that previously used conditioned stimuli failed to establish reflexes while stimuli used for the first time produced positive conditioned responses.²³

²¹M. B. Mitchell, "Retroactive Inhibition in Hypnosis," Journal of General Psychology, VII (December, 1932), 343-458.

²²M. M. White, "Evidence From Hypnosis of Inhibition as a Factor in Recall," Psychology Bulletin, XXXII (November, 1935), 689-690.

²³S. L. Levin, "Peculiarities of the Conditioned Reflex Activity During Hypnosis in Children," Biological Abstracts, XI (May, 1937), 1261.

Eysenck made a study of memory span for nonsense syllables, digits, and recognition of playing cards. He reported no difference between trance and waking state.²⁴

Up to this time there was little evidence to support the view that hypnosis facilitates learning. It appeared that there was no real difference between the waking state and the hypnotic trance.

White, Fox, and Harris were the first to clear up the confusion of the effect of hypnosis in learning. Their study indicates that hypnotic hypermnesia does not occur for recently learned nonsense material, yet with the same subjects and similar conditions there is substantial hypermnesia when the material is meaningful. Further, they suggest that a light trance is more favorable for hypermnesia than deep hypnosis.²⁵

Rosenthal studied the effect of anxiety and non-anxiety producing conditions on hypnotic recall. His subjects learned material under the stressful and non-stressful conditions and were then hypnotized for the recall.²⁶ He

²⁴H. J. Eysenck, "An Experimental Study of the Improvement of Mental and Physical Functions in the Hypnotic State," British Journal of Medical Psychology, XVIII (October, 1941), 304-316.

²⁵R. W. White, George F. Fox, and W. W. Harris, "Hypnotic Hypermnesia for Recently Learned Material," Journal of Abnormal and Social Psychology, XXXVIII (January, 1940), 88-103.

²⁶B. G. Rosenthal, "Hypnotic Recall of Material Learned Under Anxiety and Nonanxiety Producing Conditions," Journal of Experimental Psychology, XXXIV (October, 1941), 369-389.

reports that subjects learning meaningful connected material show hypnotic hypermnesia while subjects learning single innocuous words not in an organized meaningful context do not show waking or hypnotic hypermnesia. The stress situation gave hypnotic hypermnesia for failing items of meaningful words in nonsense syllable list. Stress affected no other deviation from the non-stressful situation.

A study using nonsense syllables as the material to be learned in states of normal tension and in states of induced relaxation was made by Pascal in 1949. The results of this study indicate that there is a statistically significant difference in favor of the relaxed condition for learning.²⁷

Two studies were made in 1952 which give further indication of hypnotic effect on learning.

One of these studies was made by Cooper and his associates. His study was composed of three parts. Cooper and Erickson reported that the hallucinated experience of practicing the violin had the same effect as actual practice.²⁸ Cooper and Rodgin reported that learning of nonsense syllables was much faster in hypnotic trance.²⁹ Cooper and Tuthill found that hallucinated training of handwriting was

²⁷G. R. Pascal, "The Effect of Relaxation upon Recall," American Journal of Psychology, LXII (January, 1949), 32-47.

²⁸LeCron, pp. 229-235.

²⁹L. F. Cooper and David Rodgin, "Suggestion Helps Learning," Science News Letter, LXI (May, 1952), 293.

superior to actual performance.³⁰ In each of these a factor of time distortion was used. The purpose was to show that the mental abilities were actually speeded up and the time consumed for performing was reduced. This was explained by Cooper as an effect of reducing the stimuli which interfere in the normal state.

Because of the nature of this research it is difficult to draw conclusions concerning learning since the effect of the time distortion may make it appear that learning takes place faster or better.

The second study made as late as 1952 was one conducted by Hammer. Hammer's study is perhaps the most pertinent to be considered as it deals with the use of a post-hypnotic suggestion to improve students' application and efficiency in performance tests of tapping, dotting, canceling of letters, drawer finding, card sorting, digit span, counting by 3's, writing the alphabet backwards, adding, simultaneous adding and subtracting, learning nonsense syllables, digit symbol substitution, time drawing judgment, time judgment, number series completion, verbal analogies, and speed of reading comprehension.

³⁰L. F. Cooper and C. E. Tuthill, "Time Distortion in Hypnosis," Journal of Psychology, XXXIV (March, 1952), 67-76.

Hammer used nine subjects, each of whom acted as his own control. His conclusions were as follows:³¹

1. Post-hypnotic suggestion can increase span and duration of attention.
2. Post-hypnotic suggestion can increase psychomotor speed and decrease physical fatigue.
3. Post-hypnotic suggestion can increase speed of learning.
4. Post-hypnotic suggestion can increase speed of association, mental alertness, and efficiency in general.
5. Post-hypnotic suggestion can heighten accuracy of perception.
6. Post-hypnotic suggestion can improve application of abstract abilities.
7. Post-hypnotic suggestion can improve speed of reading comprehension.

Hammer made other conclusions although they were not direct results of his experiment. They were as follows:

1. Heightened enjoyment of performance can readily be achieved and made to operate during the post-hypnotic period.

³¹Emanuel F. Hammer, "The Effect of Post-Hypnotic Suggestion on some Aspects of Learning, Performance, and Certain Other Intellectual and Psychomotor Tasks," Dissertation Abstracts, XII (1952), 161-162.

2. Post-hypnotic suggestion can be of aid in college students' work.
3. Post-hypnotic suggestion can have a strong motivational influence on human subjects.³²

Summary of Literature

The literature indicates that hypnosis can be utilized to improve the learning of meaningful material. It is questionable whether hypnosis can improve abilities, but it seems that it can improve performance. Nonsense material, on the other hand, is not learned or retained more readily by hypnosis.

Apparently, post-hypnotic suggestion can be used to motivate, and it improves enjoyment of a task. The results of Hammer's experiment seem to indicate that the use of the post-hypnotic suggestion can be beneficial in college work.

³²Ibid.

CHAPTER III

METHOD AND PROCEDURE

Subjects

The subjects for this study were selected from volunteer students enrolled in a second semester Social Science course and courses in the field of Psychology. The subjects were selected from those who volunteered on the basis of their hypnotizability to the fifth degree. Cook describes the fifth stage of hypnosis as one wherein all of the senses of the subject are under the control of the experimenter. In this stage the subject can be made to experience any sensation. He indicates that this is the stage in which the post-hypnotic phenomenon occurs.¹ Age, sex, and college classification were not a part of the criteria for selection.

These subjects were divided into two groups. A card was made for each subject. The cards were divided into two stacks after being thoroughly shuffled. One stack was assigned the number "one" and the other was assigned the number "two." Each card was marked with the number of the

¹William Wesley Cook, Practical Lessons in Hypnotism (New York, 1950), p. 94.

stack into which it fell to indicate the control group. Stack one comprised the experimental group subjects who were to receive the post-hypnotic suggestion. Stack two comprised the first control group. These subjects were then hypnotized, but they were not given the post-hypnotic suggestion. As the number of subjects increased each group was treated in the same manner.

Most of the second control group subjects were chosen by instructors of the Social Science course and the courses in Psychology. The instructors were asked to select this group in a "random manner." A part of the second control group was selected by the experimenter using a list of the total enrollment in a psychology course. This was done by drawing the names from a hat. The second control group took no part in the experiment although they were aware of the experiment.

In each of the groups the number of subjects used was twenty-six.

Recording the Data

Each subject who volunteered for the experiment was asked to place his name, age, address, telephone number, and the course from which he had volunteered on a three inch by five inch card. These cards were used as the basis for recording the data.

On each card a notation was made of the hypnotizability of the subject as well as the date each received his first

post-hypnotic suggestion, or the date on which the subject was hypnotized without suggestion in the case of the first control group. Records were kept of reinforcements given each subject in the experimental group. For Control Group I a notation was made each time a subject reported for reinforcement.

Mid-semester grades and final grades were recorded on each card from the departmental postings. The grades were then verified by the instructor of the course.

Orientation for the Subjects

Group meetings were held for each group of the volunteering students. The purpose of these meetings was to give the subjects some general information concerning the nature of hypnotism, as well as to acquaint them with the hypnotist.

The hypnotist, Mr. B. J. Tillman, took charge of the initial meeting. He began by introducing himself. He told the group that hypnotism should not be practiced by just anyone, even though the technique does not take much skill. The students were informed that the hypnotist for the study had studied hypnotism while working on his master's degree at Peabody College.

The hypnotist emphasized the importance of being thoroughly schooled in procedures and theories and asked the pledge of each volunteer not to attempt hypnotism until he had learned much more about it.

By way of introducing the subjects to hypnosis, the hypnotist pointed out that the power of suggestion alone induced the hypnotic trance and that the subject was not under the power of the hypnotist.

In illustrating the power of suggestion each volunteer took part in an experiment designed to test suggestibility of the subject. In the experiment the students were standing with eyes closed. They were asked to relax and imagine that a white rope of about one-fourth inch in diameter was tied around their foreheads, slightly above the eyes. The loose end of the rope was held by the hypnotist. When the subject responded that he had a mental picture of this, the hypnotist began repeating the words, "pulling harder," until he was shouting. Most of the subjects reported that they felt the pull of the rope. Those who did not were assured that the experiment did not always discriminate between those who could be hypnotized and those who could not be hypnotized.

The hypnotist, in concluding the orientation, demonstrated hypnosis. The students were then permitted to ask any questions they wished. When the questions had been answered, the students made appointments with the hypnotist.

Technique of Hypnosis

The selection of a technique for inducing the hypnotic trance was left to the discretion of the hypnotist. It was pointed out that it would be necessary to utilize a

technique capable of inducing a trance deep enough for post-hypnotic suggestions, but the technique should not consume much time. More specifically, not more than fifteen minutes would be given to a subject at one session.

In the technique used the subject stood facing the hypnotist at a distance of about two feet. The hypnotist instructed the subject to relax as much as possible. The experimenter and the hypnotist noted carefully any physical signs of tension such as nervous tics, restless movements, and irregular breathing. If any sign of tension appeared, the hypnotist instructed the subject to breath deeply, flex the muscles in his arms and legs, and to allow his head to slump forward. This procedure was designed to divert the attention of the subject from the situation to some other object, namely, his muscles. It was hoped that it would help the subject to be more at ease.

The subject was told that it was natural for him to rock very slightly forward and then backward with the hypnotist in a relaxed position. The hypnotist began to rock very slightly. He then raised his left hand with the palm toward the subject. He asked the subject to fix his attention on the gold ring on his finger and to continue to watch the ring. The subject was reminded to relax as he rocked.

The hypnotist continued with suggestions of relaxation, heaviness of the limbs and eyelids, and finally deep restful sleep.

When the subject appeared to be in a state of sleep, the hypnotist administered a test for the depth of hypnosis. The subject was instructed to place his finger tips together. He was told that his fingers were growing together, that they seemed to be welded or cemented, and that he could not pull them apart regardless of how hard he tried. This suggestion was repeated and the subject was asked to try as hard as he could to pull his fingers apart. If the subject did not succeed he was accepted for the study.

Post-hypnotic Suggestion

Those subjects who were in the experimental group were given the suggestion for study immediately after the test for hypnosis. The subject was asked if he wanted to improve his grade. He was reminded that it was necessary to spend more time and effort in the course work in order to improve his grade. The subject also received that suggestion to increase interest. He was told that he would have a strong desire to study the course material. It was suggested that he would listen more attentively and take part in the course discussions because he would enjoy doing so. He was told that he would have more interest in the course than before.

Those subjects who were not to receive that post-hypnotic suggestion were engaged in conversation for a short period and then they were awakened. These subjects did not receive that suggestion described above. Reinforcements were given each week.

At the reinforcement period the same procedure was followed. At no time was the subject told that he was to benefit from the suggestion. It was stated that the evidence indicated that such might be the case. It was the purpose of the study to determine if the post-hypnotic suggestion had any effect on grades.

Grading

When the mid-semester and final grades were given by the instructors, they were not aware of the group in which each subject had been placed.

Most instructors gave letter grades which the experimenter transferred to the college system of grading.² The college prescribes that the grade of "A" is for the range of 93 to 100, "B" is for the range of 85 to 92, "C" is for the range of 77 to 83, "D" is for the range of 70 to 76, and "F" represents the range of 0 to 70.

The mid-point of each range was used to represent the grade. In the cases where the mid-point was not a whole number, it was rounded off. As a result the grade of "A" represented the numerical score of 96. Grade "B" represented 88, "C" represented 80, "D" represented 73, and "F" was assigned to score of 66.

²Oklahoma Agricultural and Mechanical College, Gateways to Careers (Stillwater, 1953), p. 37.

CHAPTER IV

RESULTS

The first step in the treatment of the data was that of the analysis of the means for the mid-semester grades. The means of the mid-semester grades were computed for Group I, the experimental group; II, the first control group; and III, the second control group. These means are given in Table I.

TABLE I

MEANS AND STANDARD ERROR OF THE MEANS
OF THE MID-SEMESTER SCORES FROM
GROUPS I, II, AND III

Group I AM	N = 26 SEm	Group II AM	N = 26 SEm	Group III AM	N = 26 SEm
81.19	1.40	82.42	1.44	82.35	2.05

The standard error of the difference between the means was computed in order to determine if the means differed significantly. These are illustrated in Table II.

Table II is a comparison of the mid-semester means of Group I with Group II, Group I with III, and Group II with III. This is to determine any differences due to sampling.

TABLE II

STANDARD ERROR OF THE DIFFERENCE BETWEEN THE MEANS
AND THE t VALUES OF THE MID-SEMESTER SCORES
FROM GROUPS I, II, AND III

Groups I and II		Groups I and III		Groups II and III	
SE _{dm}	t	SE _{dm}	t	SE _{dm}	t
2.00	1.61				0.83

This table indicates that there was no significant difference between the means of any of the comparisons. This establishes a base of comparability for further analysis. The fact that there was no difference when each group was compared with another indicates that the groups did not differ prior to the application of the experimental procedure. This would appear to indicate that any difference observed at the conclusion of the experiment would be due to the independent variable employed.

The next step in the analysis of the mean scores was that of determining the differences, or shifts, within each group. In order to establish any shift it was necessary to compute the means and the standard error of the means for the final grades. The results of this step are listed in Table III.

The standard error of the difference between the mean scores of the mid-semester and final grades was computed for each group. As the mid-semester and final grades were made by the same individual, a coefficient of correlation was

computed. This will be discussed in the last section of this chapter. The statistical method used for the determination of the standard error of the difference between the means within each group was one which took into consideration the coefficient of correlation.¹

TABLE III

MEANS AND STANDARD ERROR OF THE MEANS OF THE FINAL SCORES FROM GROUPS I, II, AND III

<u>Group</u> I AM	N = <u>26</u> SEm	<u>Group</u> II AM	N = <u>26</u> SEm	<u>Group</u> III AM	N = <u>26</u> SEm
85.85	1.05	79.81	1.55	82.19	

The standard error of the difference between the means and the t values are listed in Table IV.

TABLE IV

STANDARD ERROR OF THE DIFFERENCE BETWEEN THE MEANS AND THE t VALUES OF THE MID-SEMESTER AND FINAL SCORES FROM GROUPS I, II, AND III

<u>Group</u> I SEdm	N = <u>26</u> t	<u>Group</u> II SEdm	N = <u>26</u>	<u>Group</u> III SEdm	N = <u>26</u>
1.01	4.60	1.29	2.59	0.29	0.54

¹J. P. Guilford, Fundamental Statistics in Psychology and Education (New York, 1942), 137-145.

The t value for Group I is significant at the one per cent level. From an examination of the means found in Tables I and III, it is obvious that there was an increase which, in 99 cases out of 100, may be due to some factor other than chance.

Group II has a t value which is significant at the five per cent level. That is to say that in 95 cases out of 100 some factor other than chance would cause a difference of this magnitude. In examining the means for Group II, one discovered that this is a decrease in the grade average.

The t value in Group III is not statistically significant. This would seem to indicate that a shift of this amount may be due to the chance factor.

A further analysis of the means is the comparison of the standard error of the difference between the means of the final grades. In this the mean of the final grades in Group I is compared with the mean of Group II, then with the mean of Group III. In the same manner Group II is compared with Group III. The data for this comparison is not correlated. Therefore, the traditional statistical device is used. The results of these comparisons are given in Table V.

When Group I was compared with Group II for difference between the final grades, the t value was significant at the one per cent level. This indicates that those students in Group I had an average score which was significantly higher than those students in Group II. The same results were

noted in the comparison of Group I and Group III. Again those students in Group I had an average score which was significantly higher than those of Group III.

TABLE V

STANDARD ERROR OF THE DIFFERENCE BETWEEN THE MEANS
AND THE t VALUES OF THE FINAL SCORES FROM
GROUPS I AND II, GROUPS I AND III,
AND GROUPS II AND III

<u>Groups I and II</u>		<u>Groups I and III</u>		<u>Groups II and III</u>	
<u>SEdm</u>	<u>t</u>	<u>SEdm</u>	<u>t</u>	<u>SEdm</u>	<u>t</u>
1.87	3.23	1.65	2.21	2.29	1.00

The comparison between Group II and Group III indicates no significant difference. The base or mid-semester scores were not significantly different. This was illustrated in Table I. The final scores do differ when Group I is compared with Groups II and III.

It was discovered that there were, within each major group, two subgroups. One group was composed of students who had entered the experiment after the other group. These students were primarily from courses in Psychology and the other group of students were from the Social Science course. An examination of the individual students within each group indicated that the subgroup from Psychology had entered some time between the fourth and fifth week of the experimental period, while those of the Social Science course had entered between the first and third week. It should be emphasized

that no distinction is made between the Psychology students and the Social Science students; rather, the distinction is made on the basis of length of time in the study. For the sake of convenience, the groups will be called the Social Science Subgroup and Psychology Subgroup.

A statistical analysis was made on the means of these subgroups in the same manner as those of the larger groups.

The means and standard error of the means were determined for both the mid-semester and final scores for each group. These are given in Tables VI and VII.

TABLE VI

MEANS AND STANDARD ERROR OF THE MEANS OF THE MID-SEMESTER AND FINAL SCORES FROM THE SOCIAL SCIENCE SUBGROUPS I, II, AND III

	Group I AM	N = 21 SEm	Group II AM	N = 14 SEm	Group III AM	N = 13 SEm
Mid-Sem.	81.43	1.66	83.14	2.21	80.62	2.72
Final	86.86	1.14	78.78	2.23	80.44	2.02

TABLE VII

MEANS AND STANDARD ERROR OF THE MEANS OF THE MID-SEMESTER AND FINAL SCORES FROM THE PSYCHOLOGY SUBGROUPS I, II, AND III

	Group I AM	N = 5 SEm	Group II AM	N = 12 SEm	Group III AM	N = 12 SEm
Mid-Sem.	81.80	2.84	80.92	1.73	84.30	3.09
Final	83.20	1.93	80.33	2.09	84.20	2.89

Table VIII indicates the standard error of the difference between the mean scores from the Social Science subgroups. Groups I, II, and III are compared in the table.

TABLE VIII

STANDARD ERROR OF THE DIFFERENCE BETWEEN THE MEANS
AND t VALUES OF THE MID-SEMESTER SCORES FROM
SOCIAL SCIENCE SUBGROUPS I, II, AND III

<u>Groups I and II</u>		<u>Groups I and III</u>		<u>Groups II and III</u>	
<u>SE_{dm}</u>	<u>t</u>	<u>SE_{dm}</u>	<u>t</u>	<u>SE_{dm}</u>	<u>t</u>
	0.62	3.18	0.25	3.22	0.78

This table indicates that there was no significant difference between the means of any of the comparisons. This establishes a base of comparability for further analysis. The fact that there was no difference when each group was compared with another indicates that the groups did not differ prior to the application of the experimental procedure. This would appear to indicate that any difference observed at the conclusion of the experiment would be due to the independent variable employed.

The next analysis made on the subgroups of the Social Science group was that of comparing the mean for the mid-semester grades with the mean for the final grades in Groups I, II, and III. This comparison is presented in Table IX.

TABLE IX

STANDARD ERROR OF THE DIFFERENCE BETWEEN THE MEANS
AND THE t VALUES OF THE MID-SEMESTER AND FINAL
SCORES FROM THE SOCIAL SCIENCE
SUBGROUPS I, II, AND III

Group I		Group II		Group III	
SEdm	t	SEdm	t	SEdm	t
1.46	3.71	1.33	3.27	1.35	0.14

The t value of Group I indicates that there has been a shift which is significant at the one per cent level. A glance at the means in Table VI indicates that this is a gain. These results are comparable to those in the major groups.

The t value of Group II is also significant at the one per cent level. The means in Table VI show that there is a decrease in this shift.

Group III, however, had no significant shift. This also is comparable to the result in the major group.

Taking the analysis further, the standard error of the differences between final scores for the Social Science Subgroups I, II, and III was computed. This, along with the t value, is shown in Table X.

The t value in Group I indicates a shift which is significant at the one per cent level. This is in accord with the shift found in the major groups. The shift in Group II is also significant, but it is at the five per cent level.

TABLE X

STANDARD ERROR OF THE DIFFERENCE BETWEEN THE MEANS
AND THE t VALUES OF THE FINAL SCORES FROM THE
SOCIAL SCIENCE SUBGROUPS I AND II,
I AND III, II AND III

Groups I and II		Groups I and III		Groups II and III	
SEdm	t	SEdm	t	SEdm	t
2.40	3.36	2.32	2.76	3.01	0.55

Again the results correspond with those of the major group as does the lack of significance for the shift in the comparison between Groups II and III.

In the analysis of the means for the Psychology Subgroup, the same procedure was followed. The standard error of the differences between the mid-semester scores of the Psychology Subgroups are listed in Table XI.

TABLE XI

STANDARD ERROR OF THE DIFFERENCE BETWEEN THE MEANS
AND THE t VALUES OF MID-SEMESTER SCORES FROM
PSYCHOLOGY SUBGROUPS I AND II,
I AND III, AND II AND III

Groups I and II		Groups I and III		Groups II and III	
SEdm	t	SEdm	t	SEdm	t
3.32	0.27	4.19	0.60	2.46	1.37

For the Psychology Subgroups there appear to be no significant differences between the means of the mid-semester

scores. This is in line with the results noted in the previous analyses.

Next, the differences between the mid-semester scores and the final scores were determined. These are illustrated in Table XII.

TABLE XII

STANDARD ERROR OF THE DIFFERENCE BETWEEN THE MEANS
AND THE t VALUES OF THE MID-SEMESTER AND
FINAL SCORES FROM THE PSYCHOLOGY
SUBGROUPS I, II, AND III

Group I		Group II		Group III	
SEdm	t	SEdm	t	SEdm	t
1.37	1.02	1.66	0.35	1.14	0.01

Contrary to the findings in the previous analyses of the means, there were no significant differences between the mid-semester and final scores for the Psychology Subgroups.

As a further check of these results, the analysis of the differences between the final scores for all three groups was made. This analysis is shown in Table XIII.

TABLE XIII

STANDARD ERROR OF THE DIFFERENCE BETWEEN THE FINAL
SCORES AND t VALUES FOR THE PSYCHOLOGY SUBGROUPS

Groups I and II		Groups I and III		Groups II and III	
SEdm	t	SEdm	t	SEdm	t
2.85	1.01	3.57	1.08	3.48	0.29

In this comparison there were no significant t scores, whereas in the other comparisons some significant changes were noticed. The important aspect of this comparison is the number of cases involved. Subgroup I was composed of five subjects; Subgroup II, twelve; and Subgroup III, ten.

As a final analysis of the means, a comparison was made between the Social Science Subgroups and the Psychology Subgroups. This analysis did not include the Psychology Subgroup from Group I since the number of subjects in this group was too small. Group III was also omitted from this comparison as it can not be divided along the lines of the time the subjects entered the experiment.

When the Social Science Subgroup from Group I was compared with the Psychology Subgroup from Group II for the mid-semester grades, it was found that no significant differences existed. The comparison of the final grades did reveal a difference which was significant at the one per cent level. This data is presented in Table XIV.

The inter-comparison of both subgroups of Group II for both mid-semester grades and final grades yielded no significant differences. This data is presented in Table XIV.

In the analysis of the means, the writer has not been concerned with the factors of variability. This will be considered in the next section.

TABLE XIV

STANDARD ERROR OF THE DIFFERENCE BETWEEN THE MEANS
AND THE t VALUES OF MID-SEMESTER SCORES AND OF
FINAL SCORES FROM THE SOCIAL SCIENCE SUB-
GROUP I AND PSYCHOLOGY SUBGROUP II, AND
FROM SOCIAL SCIENCE SUBGROUP II
AND PSYCHOLOGY SUBGROUP II

	Social Science Subgroup I and Psychology Subgroup II		Social Science Subgroup II and Psychology Subgroup II	
	SEdm	t	SEdm	t
Mid- Semester	2.76	0.62	2.80	0.79
Final	2.40	3.36	3.06	0.51

Analysis of Variability

Variability is another statistical device of aid in answering the question asked by the problem. Variability is measured in terms of the standard deviations. The first step in the analysis of variability is the computation of the standard deviation for each of the three major groups. This is done for both the mid-semester scores and the final scores in Table XV.

After obtaining the standard deviation and the standard error of the standard deviation, the problem was to determine if there were any significant shifts in the variability of the students, within the groups and between the groups. In the comparison within the group, the formula used was for

correlated data. For the analysis of the uncorrelated data the Burr Ratio was used.²

TABLE XV

STANDARD DEVIATIONS AND THE STANDARD ERROR OF THE STANDARD DEVIATIONS FROM GROUPS I, II, AND III

	<u>Group I</u>	<u>N = 26</u>	<u>Group II</u>	<u>N = 26</u>	<u>Group III</u>	<u>N = 26</u>
	<u>SD</u>	<u>SEsd</u>	<u>SD</u>	<u>SEsd</u>	<u>SD</u>	<u>SEsd</u>
Mid-Sem.	6.99	0.97	7.18	1.00	10.27	1.42
Final	5.23	0.73	7.76	1.08	8.45	1.17

The first step in the determination of the shift of variability is that of computing the standard error of the difference between the standard deviations. The t test was made to determine if the differences were significant. This data was computed between the mid-semester and final scores in each of the major groups. The results are shown in Table XVI.

The data indicate that a significant shift was made in Group I but not in Groups II and III. The shift in Group I is significant at the one per cent level. Table XV indicates that this was a decrease in the variability.

²I. W. Burr, Tables for Determining Significance Between Small Sample Standard Deviation (Unpublished data).

TABLE XVI

STANDARD ERROR OF THE DIFFERENCE BETWEEN THE STANDARD DEVIATIONS AND THE t VALUES OF THE MID-SEMESTER AND FINAL SCORES FROM GROUPS I, II, AND III

Group I	N = 26	Group II	N = 26	Group III	N = 26
SEsd	t	SEsd	t	SEsd	t
0.28	4.75	0.30	1.93	0.85	2.15

The next step was to determine whether or not there was any significant difference of variability between the mid-semester scores of each group. Also, it was necessary to determine if differences existed between the variability of the final scores of each group. These comparisons are given in Table XVII.

TABLE XVII

BURR RATIOS FOR MID-SEMESTER SCORES AND FOR FINAL SCORES OF GROUPS I AND II, I AND III, AND II AND III

	Groups I and II	Groups I and III	Groups II and III
Mid-Sem.	1.03	1.47	1.43
Final	1.48	1.62	1.09

A Burr Ratio of 1.40 is an indicator of a shift in variability which is significant at the five per cent level. A ratio of 1.62 indicates a shift which is significant at the one per cent level.

The mid-semester comparison is not significant when Group I is compared with Group II. Group I, when compared with Group III, does indicate a significant difference between the variability. This difference is significant at the five per cent level. The comparison between Groups II and III at mid-semester also indicates a significant difference at the five per cent level.

The comparison of the variability on the final grades indicates a significant difference between Groups I and II. This is significant at the five per cent level while the difference between Groups I and III is significant at the one per cent level. The comparison of the variability of final grades for Groups II and III produced no significant difference.

The results of these comparisons demonstrate that at mid-semester Group III was more variable than Group I or Group II. In the case of Group I the variability decreased on the final scores, and the variability of Group II appears to be the same. Although Table XV would seem to indicate a decrease in variability in Group III, Table XVI demonstrates that changes in Group II and Group III could be a matter of chance; therefore, they are not measurably affected.

The variability of the subgroups was next measured in an attempt to determine some causes of the shifts in variability. Table XVIII and Table XIX contain the standard deviations and the standard error of the standard deviations for the subgroups.

TABLE XVIII

STANDARD DEVIATIONS AND STANDARD ERROR OF THE
STANDARD DEVIATIONS FROM THE SOCIAL SCIENCE
SUBGROUPS I, II, AND III

	Group I N = 21	Group II N = 14	Group III N = 16			
	SD	SEsd	SD	SEsd	SD	SEsd
Mid-Sem.	7.40	1.14	7.97	1.56	10.52	1.86
Final	5.11	1.27	8.03	1.57	7.84	1.39

TABLE XIX

STANDARD DEVIATIONS AND STANDARD ERROR OF THE
STANDARD DEVIATIONS FROM THE PSYCHOLOGY
SUBGROUPS I, II, AND III

	Group I N = 5	Group II N = 12	Group III N = 10			
	SD	SEsd	SD	SEsd	SD	SEsd
Mid-Sem.	5.67	1.79	5.72	1.22	9.26	2.07
Final	3.87	1.22	6.94	1.71	8.68	1.94

The standard error of the standard deviations were next computed for the Social Science Subgroups. As this data was also correlated, the device used was that for correlated data. The results are given in Table XX.

Table XX shows a shift of sufficient magnitude in Group I of the Social Science Subgroups to be significant at the one per cent level. The variability in this group decreased. Subgroup II evidences no significant shift while Subgroup III

does. A decrease in variability was observed in Subgroup III which was significant at the five per cent level.

TABLE XX

STANDARD ERROR OF THE DIFFERENCES BETWEEN THE STANDARD DEVIATIONS AND THE t VALUES OF THE MID-SEMESTER AND FINAL SCORES FROM THE SOCIAL SCIENCE SUBGROUPS

Group I N = 21		Group II N = 14		Group III N = 16	
SEsd	t	SEsd	t	SEsd	t
0.55	4.17	1.28	0.01	1.18	2.26

A further check made on the Social Science Subgroups was that of determining the significant difference between the mid-semester scores of each group, as well as the final scores in each group. This step is illustrated in Table XXI.

TABLE XXI

BURR RATIOS FOR THE MID-SEMESTER SCORES AND FOR THE FINAL SCORES OF THE SOCIAL SCIENCE SUBGROUPS I AND II, I AND III, II AND III

	Groups I and II	Groups I and III	Groups II and III
Mid-Sem.	1.08	1.42	1.32
Final	1.57	1.53	1.02

From the comparisons of the mid-semester scores, one group only is significant at the five per cent level. This is the comparison of Groups I and II of the Social Science students. Referring back to Table XV, it is found that Group III is the most variable; that is, this group has the largest standard deviation. When compared with the major groups, the results are similar with the exception that the comparison of Groups II and III gave a significant difference while the comparison of the Social Science Subgroups II and III did not.

When comparing the final scores it is found that the differences between the final scores in Subgroups I and II, as well as Subgroups I and III were significant at the five per cent level. Comparisons between Subgroups II and III yielded no significant difference.

The same steps were followed for the Psychology Subgroups which may be seen in Tables XXII and XXIII.

TABLE XXII

STANDARD ERROR OF THE DIFFERENCE BETWEEN THE
STANDARD DEVIATIONS AND THE t VALUES
OF THE MID-SEMESTER AND FINAL SCORES
FROM THE PSYCHOLOGY SUBGROUPS

Group I N = 5		Group II N = 12		Group III N = 10	
SEsd	t	SEsd	t	SEsd	t
1.06	1.70	1.53	0.32	1.04	0.56

TABLE XXIII

BURR RATIOS FOR THE MID-SEMESTER SCORES AND FOR
THE FINAL SCORES OF THE PSYCHOLOGY SUBGROUPS
I AND II, I AND III, II AND III

	Groups I and II	Groups I and III	Groups II and III
Mid-Sem.	1.01	1.63	1.62
Final	1.80	2.24	1.25

Table XXII indicates that no significant change occurred in the variability within each subgroup; that is, no shifts were observed between the mid-semester and the final score which could not be attributed to chance.

Table XXIII shows that there were significant differences of variability in the mid-semester scores from Subgroups I and III and Subgroups II and III. No significant differences were reported in the analysis of Subgroups I and II.

This table also shows that there were significant differences of variability at the one per cent level between the final scores in Subgroups I and II, as well as Subgroups I and III. This was not true of the Subgroups II and III, which showed no significant difference in variability.

These results compare well with those in Table XVII for the major groups, and they differ only slightly from the results in Table XXI for the Social Science Subgroups.

Analysis of the Relationship

The last analysis of the data was that of the relationship between the groups. The statistical device for this analysis is the coefficient of correlation. Since that data for the mid-semester and final grades for each group were made by the same individual the Pearson Product-Moment Coefficient of Correlation was used. This particular device was used because of the small sample involved and because of the fact that the data consisted of two continuous variables.

The coefficient of correlation, which is referred to as r , was determined for each of the major groups. When the mid-semester scores were correlated with the final scores in Group I the r was .69. The r for Group II was .77 and the r for Group III was .89.

To determine the significance for the Product-Moment Correlation, an estimate of the probable error was made. This was done by first computing the standard error of r . Next, since the r 's were above .67, the r 's were converted to Fisher's z function. This device makes the correction to achieve a more normal distribution.³

The next step in the analysis of relationship was that of determining the significance of difference between the z 's. This data is given in Table XXV.

³John G. Peatman, Descriptive and Sampling Statistics (New York, 1947), p. 386.

TABLE XXIV
 PRODUCT-MOMENT COEFFICIENT OF CORRELATION (r),
 THE STANDARD ERROR OF THE r 's, AND
 THE FISHER z FUNCTION FOR
 GROUPS I, II, AND III

Groups	r	SE r	z
I	0.69	0.10	0.85
II	0.77	0.08	1.01
III	0.89	0.04	1.46

TABLE XXV
 THE t VALUES FOR FISHER'S z FUNCTION BETWEEN
 GROUPS I AND II, GROUPS I AND III,
 AND GROUPS II AND III

Groups	t Value
I and II	0.54
I and III	2.07
II and III	1.53

The t value for the comparison of the z 's of Groups I and III is large enough to be significant at the five per cent level. The difference between the z 's in each of the other comparisons is not significant. These differences may be ascribed to chance.

The analysis was made for the subgroups in the same manner as was described for the major groups. The Product-Moment Coefficient of Correlation, the standard error of

this coefficient, and the Fisher z's were computed for each of the Social Science Subgroups and for the Psychology Subgroups. This data will be presented in the next table.

TABLE XXVI

PRODUCT-MOMENT COEFFICIENT OF CORRELATION (r), THE STANDARD ERROR OF r 's, THE FISHER z FUNCTION FOR SOCIAL SCIENCE SUBGROUPS AND PSYCHOLOGY SUBGROUPS

Group	Social Science Subgroups			Psychology Subgroups		
	r	SE r	Z	r	SE r	z
I	0.71	0.05	0.90	0.90	0.09	1.47
II	0.81	0.07	1.15	0.73	0.05	0.93
III	0.87	0.06	1.33	0.93	0.04	1.66

TABLE XXVII

THE t VALUES OF THE FISHER z FUNCTION FOR SOCIAL SCIENCE SUBGROUPS AND PSYCHOLOGY SUBGROUPS

Social Science Subgroups	t	Psychology Subgroups	t
I and II	0.66	I and II	0.69
I and III	0.36	I and III	1.33
II and III	0.44	II and III	1.45

The t values given in Table XXVII did not prove significant in any instance. The differences were not great enough to be statistically significant.

In this section the problem of determining relationship has been discussed. In the analysis of the major groups it was found that there was one significant t value. This represented the difference between the correlations of Group I and Group III. Group III had the higher r. This was the only significant difference in relationship.

CHAPTER V

DISCUSSION AND CONCLUSIONS

At the beginning of this section it seems wise to look once again at those limitations which place restrictions and the interpretation of the results. The first limitation is that of the narrow scope of the study. This study must be restricted to those small areas of the college population from which the sample was drawn. The small number of subjects makes it impossible to draw any clear, definite, far-reaching conclusions. However, it is possible to cite the significant results of those subjects used.

Discussion of the Results

In the analysis of the means it was discovered that the major groups as well as the Social Science subgroups gave an indication of a significant difference toward improvement by those who received the post-hypnotic suggestion. The Psychology Subgroups did not give this indication. It must be kept in mind, while discussing the Psychology Subgroups, that only five subjects comprised the experimental group. Group II, that group which went through the experimental procedure but did not receive the post-hypnotic suggestion, indicated a tendency toward a lower mean which was significant. It may be postulated that this could be due to the

students' beliefs that the post-hypnotic suggestion would by itself improve their grades, and the students relaxed their efforts in the course. Although this is not substantiated by the data, it was reported to be the attitude of some of the students in this control group.

The analysis of the means of the Social Science Subgroup II tended to substantiate the results of the major group. The Psychology Subgroups indicated no significant difference. It has been suggested that this subgroup was not in the study long enough to derive the benefit from the post-hypnotic suggestion and reinforcements. The evidence would seem to support this view.

Group III, that control group which did not take part in the experimental procedure, gave no indication of significant differences or trends which were significant. Any flux in this group could be attributed to the chance factor. Both of the subgroups also failed to give significant differences.

The analysis of the variability gave a further indication of improvement when a significant difference of the standard deviations was obtained in the experimental group. This indicated that the experimental group became more homogeneous. The standard deviations of Group II remained relatively stable, while Group III also indicated a trend to become more homogeneous.

In the analysis of the relationship it was found that the r for Group I was smallest and the r for Group III was the highest. However, the differences between the r 's were not significant.

Conclusions

Although no definite universal conclusions can be made, the data does seem to indicate a definite shift toward a higher mean score in the experimental group, or Group I, and the Social Science Subgroup I. There was a definite shift toward less variability in the same groups. These conclusions tend to support the view of Hammer who believed that the post-hypnotic suggestion could help college students in their school work.¹

Studies made with hypnosis as an aid to learning have not been concerned with the post-hypnotic suggestion in the school situation. The results of this type of study can only help one to understand some of the features of the hypnotic trance and its effect on the individual in the learning situation. It has been suggested that the function of hypnosis in learning improves concentration and application by eliminating many of the competing distractions.

¹Emanuel F. Hammer, "The Effect of Post-Hypnotic Suggestion on Some Aspects of Learning Performance and Certain Other Intellectual and Psychomotor Tasks," Dissertation Abstracts, XII (1952), 162.

Hammer has suggested that the post-hypnotic suggestion acts as a motivating influence as well as improving those features of learning.²

It would be desirable to have a study in which a large number of subjects were used from a broader population and more stringent controls were employed. In such a study a better indication of the post-hypnotic suggestion in relation to school grades could be achieved.

²Ibid., p. 162.

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