THE EFFECTS OF JAPANESE ZEN BREATHING MEDITATION
AND PROGRESSIVE RELAXATION ON MEMORIZATION

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Presented in Partial Fulfillment of the Requirements
for the Degree Master of Arts

by
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The Ohio State University
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Approved by

[Signature]
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgements</td>
<td>11</td>
</tr>
<tr>
<td>List of Tables</td>
<td></td>
</tr>
<tr>
<td>I \ INTRODUCTION AND STATEMENT OF THE PROBLEM</td>
<td>1</td>
</tr>
<tr>
<td>Purpose of the Study</td>
<td>6</td>
</tr>
<tr>
<td>II \ REVIEW OF LITERATURE</td>
<td>8</td>
</tr>
<tr>
<td>Learning and Memory Theories</td>
<td>8</td>
</tr>
<tr>
<td>State of Consciousness and Methods of Altering Consciousness</td>
<td>14</td>
</tr>
<tr>
<td>III \ METHODOLOGY</td>
<td>19</td>
</tr>
<tr>
<td>Population and Setting</td>
<td>19</td>
</tr>
<tr>
<td>Procedures</td>
<td>20</td>
</tr>
<tr>
<td>Definitions</td>
<td>20</td>
</tr>
<tr>
<td>Group 1</td>
<td>24</td>
</tr>
<tr>
<td>Group 2</td>
<td>25</td>
</tr>
<tr>
<td>Group 3</td>
<td>25</td>
</tr>
<tr>
<td>Group 4</td>
<td>26</td>
</tr>
<tr>
<td>Statistical Analysis</td>
<td>18</td>
</tr>
<tr>
<td>IV \ RESULTS AND DISCUSSION</td>
<td>29</td>
</tr>
<tr>
<td>V \ SUMMARY, CONCLUSIONS, LIMITATIONS AND IMPLICATIONS</td>
<td>35</td>
</tr>
<tr>
<td>Summary</td>
<td>35</td>
</tr>
<tr>
<td>Limitations of the Research</td>
<td>37</td>
</tr>
<tr>
<td>Conclusions and Speculations</td>
<td>39</td>
</tr>
<tr>
<td>Implications and Suggestions for Future Research</td>
<td>40</td>
</tr>
<tr>
<td>Appendixes</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>43</td>
</tr>
<tr>
<td>B</td>
<td>44</td>
</tr>
</tbody>
</table>

iv
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Descriptive Data</td>
<td>23</td>
</tr>
<tr>
<td>2. Means and Standard Variations</td>
<td>31</td>
</tr>
<tr>
<td>3. Analysis of Variance</td>
<td>32</td>
</tr>
<tr>
<td>4. Separate Variance Estimate</td>
<td>32</td>
</tr>
</tbody>
</table>
CHAPTER I
INTRODUCTION AND STATEMENT OF THE PROBLEM

College counseling centers offer a wide variety of services to their student clients. Some services focus on cognitive dimensions, for example, study skills and speed reading groups. Other services deal with social and interpersonal skills such as assertiveness training or career and life planning seminars. Still others focus on the affective dimension (emotional awareness, expression, and control), through personal growth and counseling groups.

This study will focus on the cognitive dimension and one kind of educational experience designed to assist students with cognitive learning. Specifically it will investigate a specific study skills program which uses Japanese Zen Breathing Meditation and cue directed relaxation to induce altered consciousness as an aid in the memorization of cognitive materials.

Japanese Zen Breathing Meditation (JZBM) and cue directed relaxation are two techniques from a family of methods used to alter states of consciousness. An altered state of consciousness (ASC) is one in which the subject (S) feels "a qualitative shift in his pattern of mental functioning (During this shift) mental functions do not operate at all ordinarily, perceptual qualities appear that have no normal counterparts . . ." (Tart, 1972, pp. 1-2). These changes can be verified
through subjective reports or through physiological measurements recorded by biofeedback equipment. JERM produces an altered state of consciousness through the diminished awareness of active thoughts by conscious focusing on counting rhythmic breaths. Cue directed relaxation operates through focusing on various muscle groups which then relax. The former directly influences the mind while the latter indirectly induces a similar state.

ASC are related to the learning of cognitive materials in that the states of arousal seem to affect ability to memorize. Obrist (1962), for example, has measured internal responses (level of arousal) through biofeedback. His studies have determined that memory performance can be plotted in the shape of an inverted U. This means that an optimal amount of retention occurs during an intermediate level of arousal. High arousal produces a consolidative neural process which interferes with short term retention and with difficult tasks. This extra "drive", however, facilitates performance on an easy task. Generally speaking, performance is at an optimal level when arousal fluctuates from low to intermediate, or from high to intermediate levels. One can learn to control this arousal level through techniques such as autogenic training, biofeedback, or JERM. In this study, JERM will be used to control levels of arousal or states of consciousness.

There are two learning theories which relate to the design of this study. These are consolidation and interference theory. Both theories are based on the assumption that materials are not learned if one or more steps in the learning process are not completed. These steps are
discussed by Borne (1973). First, new materials are encountered and the person becomes aware that the materials to be learned will have an effect. The material is then stored in the memory system. Retention of the information occurs through holding the items in initial storage for eventual recall. One retrieves the information by extracting the items for use on some task. A memory failure can be traced to an incompletion of one of these processes.

Memory failure can be explained through concepts in consolidation theory and/or interference theory. The first theory defines consolidation as the process by which a trace of electrical circuit is formed in the brain, that is, the material is stored. The circuit codes the experience (or puts the information into a system through modification of the information) for relevance to that particular system. According to this theory, we forget what was recently learned (or was short term memory) if a distraction (e.g., electrical shock) is administered soon after the information was received. The distraction often, however, will not disrupt long term memory (Borne, 1976).

The second theory, interference theory, examines problems with the retrieval process caused by proactive inhibition or retroactive inhibition. Proactive inhibition is caused by distractions created by previous learnings. To eliminate memory failure one would be made ready to receive new materials by not having competing thoughts. Then, given enough time to study, and undivided attention, one would be able to recall the new materials.

Retroactive inhibition occurs when interpolated learning or activity interferes with the previously learned materials. When a person
receives new information, a retention interval or time period is needed during which there are no competing thought or feelings. This condition is necessary for the recall of the original learning. One method of avoiding interfering thoughts, for example, is sleeping or meditating immediately after learning materials.

To sum up, learning appears to be facilitated if distractions are eliminated during learning, if competitive thoughts are eliminated prior and during learning, and if the retention interval after learning contains no competing thoughts or feelings. In this study progressive relaxation techniques and JZBM will be used to achieve these characteristics and levels of arousal at the appropriate times. Relaxation will be used to eliminate competing thoughts prior to learning, and JZBM will be used to eliminate competing thoughts or feelings and control arousal level during the retention interval.

Another important issue discussed by Silverman (1977) in his book "The Human Subject in the Psychological Laboratory" is often ignored by those who design psychological research. The issue is the difference in Ss' behavior in a laboratory and a real setting. "The psychological laboratory is a very special place for the people we bring there as subjects and, accordingly, they act in very special ways that bear little relationship to their behaviors in the real situations to which we seek to generalize our findings." (Preface) If one wants to eliminate these "reactive behaviors", then one must allow subjects to be ignorant of the fact that s/he is participating in an experiment. In this study a field setting (an academic development course similar to those sponsored by counseling centers) rather than a psychological laboratory was used to
conduct the interventions. The course "Learning to Learn" was offered as a regular accredited course, through normal registration procedures. The course which took place in a comfortable setting and offered didactic and experimental components in its design. The subjects would not know they were participating in an experiment.

Finally, psychological studies of interventions often neglect to control for the placebo effect. A placebo is an inactive substance used as a control in an experiment (Morris, 1973). Often when the effect of a drug is being tested, an inert substance is given to a control group. The placebo helps the researcher evaluate whether the drug or the expectations of change is actually bringing about the desired effects. If the subjects believe that certain changes will come about, those changes often become a reality. The placebo attempts to control for this effect.

The placebo effect is an important consideration in ASC research. According to Tart (1978), Ss in ASC or other research often give the researcher not only what they themselves think should happen, but also what they think the researcher expects. There also are instances when the Ss do not try to do very well in research. According to Tart, this "destructive" phenomenon occurs when the S does not like the researcher for some reason or when the Ss perceive that they have been assigned to a control group.

The desired goal, therefore, in designing a treatment and a placebo is to make the Ss feel that they are participating in a workshop rather than in a research project and for both groups to believe they are receiving the desired treatment. In this study the suggestion that the
treatment offered will improve memory will be offered in each group and therefore, hopefully each group will believe they are participating in the desired treatment. This is a method of having the same expectation variables presented to each group, and it should permit a valid evaluation of the treatments.

In this study the placebo effect was controlled by the following: The experimenter delivered the same altered states of consciousness introduction to each of the four groups, being blind as to which group, not knowing which script was the placebo.

Purpose of the Study

This study examined selected aspects of the relationship between ASC as induced by JZRM and cue directed relaxation, and the short term ability to memorize and recall information. The following questions were examined:

1) Does the use of JZRM during the time period between learning and recall aid the recall process?

2) Does a five week exposure to cue directed relaxation techniques and then using that technique prior to learning, coupled with a placebo aid memorization?

3) Does a combination of relaxation before learning coupled with JZRM in the time period between learning and recall aid the memorization process?

These questions were investigated through the following hypotheses:

HYPOTHESIS I Subjects participating in the relaxation-placebo treatment will achieve higher memorization scores on the paired associates test than Ss who receive no treatment.
HYPOTHESIS II  Subjects participating in JABM after learning and prior to recall, will achieve higher scores on the paired associates memorization test than Ss who receive no treatment.

HYPOTHESIS III  Subjects participating in a combination JZBM and progressive relaxation will achieve higher scores on the paired associates memorization test than Ss who receive no treatment.

HYPOTHESIS IV  Subjects who participate in relaxation-placebo will score lower than those Ss who participate in the JZBM treatment on the paired associates memorization test.

HYPOTHESIS V  Subjects who participate in JZBM will score higher than Ss who participate in a combination progressive relaxation and JABM on the paired associates memorization test.

HYPOTHESIS VI  Subjects who participate in placebo-relaxation will score lower than Ss who receive a combination progressive relaxation and JZBM on the paired memorization test.
CHAPTER II

REVIEW OF LITERATURE

Since learning and memory theory research underlie the use of JARM as used in this study, this review will begin by analyzing some of the basic theoretical propositions and research in these areas.

Learning and Memory Theories

Learning is defined as a change in the organism that occurs at a particular time as a function of experience. This change cannot itself be observed directly and therefore some indirect performance test is used to infer that learning has taken place (Crowder, 1976).

Bugelski's principles of learning (Smelbecker, 1974) state that four criteria need to be present to have learning take place. The first is attention. One must pay attention to selected stimuli in order to learn about them. An optimal amount of time also is needed. Time intervals for learning are different for individuals. The amount of time needed for acquisition defines the capacity an individual can learn. The person also needs internal regulation through a "thermostat like" internal device in order to learn. This regulation allows arousal to have an energizing effect on the individual (Berlyne, 1960). The arousal level can be changed by "stimuli: rewards, punishments, knowledge of results, and other types of cognitive feedback which regulates behavior, particularly at more advanced stages of learning" (p. 442).
The last criterion is knowledge of the results of learning the materials. A person needs to have a realistic expectation of the learning experience and the benefits of the results of learning the materials. In summary, learning requires attention to stimuli, adequate time for acquisition, a proper arousal level, and knowledge of the nature and benefits of the learning activities.

Two learning theories which are relevant to this research are consolidation theory and interference theory. Both theories are based on the assumption that materials are not learned if one or more steps in the learning process are not completed. These steps, as indicated previously, are discussed by Borne (1973). First, new materials are encountered and the person becomes aware that the materials to be learned will have an effect. The material is stored in the memory system. Retention of the information occurs through holding the items in initial storage for eventual recall. One retrieves the information by extracting the items for use on some task. A memory failure can be traced to an incompleteness of one of these processes.

Ebbinghaus (1913) plotted a curve of retention for Ss learning paired associates nonsense syllables. Later investigators discovered a similar curve for other materials. Studies have indicated that meaningful materials are retained for a longer period of time than nonsense syllables are retained. Words rather than nonsense syllables will, therefore, be studied in the proposed research in order to create a facsimile to materials memorized in an educational setting.

Four traditional explanations of forgetting are: 1) Passive decay, that is, decay occurs over time because of disuse; 2) One encounters
systematic distortion of the memory trace; 3) A person has motivated forgetting; and 4) Daily thoughts create interference effects. The literature indicates that the decay theory has little evidence supporting it. Distortion is supported and it tends to take place at the time of stimuli reception. Distortion often is due to the person making a connection with something else which leaves more of an impression than the item to be remembered. Motivated forgetting is due to the lack of attention paid to the information to be memorized. The inattention may be motivated by fear that the remembrance will bring forth problems.

This research will focus on interference factors and forgetting. There is considerable research on interference and short term memory (STM) and long term memory (LTM).

Interference theory was first researched by Jenkins and Dallenback (1924) who looked at sleep and its effect on memory. Findings indicate that retention performance after sleep was greatly enhanced. Sleep seemed to facilitate spontaneous recovery of memory. The explanation offered is that through sleep, retroactive inhibition is reduced.

The aforementioned finding was later confirmed by Newman (1939). Newman's results also indicated that interference, while as S was awake, took place more for rote materials than for organized materials. For example, a S who read a story before going to sleep could remember the plot and many of the nonessential details when awakened. If the S remained awake after reading the story, the details were forgotten. Researchers have studied not only how one memorizes but also for how long the materials are available for retrieval.
Broadbent (1957) assumed that STM was limited and LTM was unlimited, that is, he indicates that STM will become unavailable through decay unless rehearsal keeps the information "recirculating", until the time that the information is transferred to LTM. Decay also occurs in STM when the system is subject to overload. Broadbent indicates that although decay does not occur in LTM, retrieval may be difficult due to either incompleteness of the retrieval cue or interference from previous or subsequent items. Decay operates to produce decrement in STM, while interference is primarily responsible for deficits in LTM.

The theory that interference is not a factor in STM has been challenged by Murdock (1961) and by Keppel and Underwood (1962), and these challenges were in turn criticized by Melton (1963). Substantial evidence was obtained by Melton indicating that interference operates in both STM and LTM. Melton conceptualized short term and long term memory as a continuum rather than as a dichotomy. The same laws of interference, however, may not operate at different points along the continuum.

Another way of analyzing STM and LTM is through actual biochemical changes in the brain. Hebb (1949), in his neurophysiological speculation, conceptualized a reverberating "activity" trace of a transient nature and a "structural" trace involving a permanent change in neural connections. Hebb postulated that the reverberating trace carried the memory in STM until a permanent change in the neural connections took place resulting in LTM. Although Hebb (1961) revised his thinking, this was one of the initial attempts to dichotomize the memory system into LTM and STM and to hypothesize about neurophysiological differences between
the two. In order to understand neurophysiological correlations to learning one should understand arousal levels.

Arousal level is often affected by factors inherent in the memory task. These factors are mainly task difficulty and the perceived risk of the consequences if the task is not performed well. The risk factor also is increased by competition. The internal response to these factors is sometimes anxiety.

The anxiety-drive theory is a derivation of Clark Hull's general hypothesis of the relationship between emotionality and reactive potential. Quoting Hull (1943),

Physiological conditions of need through their sensitizing action on the neural mediating structures lying between the receptors and the effectors, appear to combine with the latter to evoke reactions according to a multiplicative principle, i.e., reactive-evocation potentiality is a product of a function of habitat strength multiplied by a function of the strength of drive.

(p. 242)

Summarizing Hull, a person's drive is a function of one's natural psychophysiological state multiplied by task difficulty. A simple task is one defined to have one stimulus and one response to be learned. The anxiety-drive theory predicts that with simple tasks persons with a high degree of anxiety would perform significantly better than those with a low degree of anxiety because reaction potential would be increased due to the higher drive level. This prediction was confirmed in research on eye lid conditioning (Taylor, 1953). However, when there are several possible responses to one stimulus (complex task), an increase in anxiety (drive) serves to strengthen the response tendency with the greatest habit strength. If this response tendency is appropriate to the task,
the performance will improve; an inappropriate response habit will elicit a decline in performance. This prediction has been confirmed in a series of studies employing dominant–correct and dominant–incorrect paired associates (Spence, Taylor, and Katchel, 1956; Spence, Farber and Mc Fann, 1956; Spence, 1958; Standish and Champion, 1960).

Inverse correlation between task performance and anxiety was supported by Korchin and Levine (1957). They tested high anxiety (HA) and low anxiety (LA) college students and compared them to hospitalized anxious mental patients. On simple tasks, little performance difference was found; however, on difficult tasks LA students did the best while the patients did the poorest.

Several researchers manipulated arousal and obtained significant differences in performance on the same task simply by changing the instructions given to the S's (S. Sarason, Mandler and Craighill, 1952; I. Sarason, and Palola, 1960; Nicholson, 1958). They found that ego-involving instructions (e.g., telling S that performance is related to intelligence) resulted in a HA person reacting to the task with more irrelevant responses, causing decreased performance. However neutralizing the ego-involvement through calling the task merely an exercise creates a situation in which HA people do as well as low anxiety persons.

Nicholson (1958) also discovered that high anxiety level subjects had poorer performance on both simple and complex tasks when given ego-involving conditions.

One ego-involving condition is competition. Several researchers have studied the effect of competition on arousal. Evans (1971) interpreted an increase in toxic heart rate during competition to mean that
a competitive situation represents an increased arousal condition. Cherrington (1971) attributed greater output performance during competition to higher amounts of arousal, creating greater motivation. Gurnee (1948) found that according to both subjective reports and quantitative observations, Ss were more tense during competition. Deutsch projected in his theory of competition and cooperation, "a feeling of internal conflict leads to . . . stress and tension beyond a moderate optimum level, and this over-activation, in turn, often leads to an impairment of perceptual and cognitive processes" (Deutsch, 1963, p. 15). Arousal level and cognitive process "can be consciously manipulated by the students themselves" (Deutsch, 1969, p. 15).

States of Consciousness and Methods of Altering Consciousness

Reference has often been made to altered states of consciousness. This may lead one to wonder, altered from what to what? The following discussion will provide basic definitions in this area.

Green (1971) looks at consciousness as a continuum of brain wave rates. These electrical firings correlate with affective states which range from highly aroused (or anxious), to apathetic, to deep sleep. Brain waves are measured in hertz (hz) and in amplitude. A person's predominant frequency recorded at any given time is considered to be the brain wave state of the person. The frequency ranges have been divided into four major categories. These have been labeled with Greek letters for identification purposes. The frequency of 8-13 (hz) was the first to be discovered, hence has been defined as Alpha. In this state many people feel relaxed, non-focused, and artistically or
creatively productive. Beta (13-26 Hz) is an outwardly focused, often tense state which many adults experience most of the awake time. On the rapid end of Beta, tension may lead to disease or mental health problems (Pelletier, 1977). Theta is a slower (4-8 Hz), more internally focused state than the others mentioned. This state allows thoughts and feelings from the subconscious to emerge. These impressions can be in the form of fleeting thoughts or images that many people experience upon drifting off to sleep. Finally, after many years of training, a few people have learned to control Delta (.5-4 Hz). This state usually occurs during deep sleep or when a person is unconscious (Green, 1977).

A variety of methods for changing brain wave frequencies, of states of consciousness, have been identified and investigated. Among them are biofeedback techniques, autogenic training, meditation of various forms, sleep learning, relaxation techniques, and Japanese Zen Breathing Meditation.

Biofeedback training and other techniques of altering consciousness have gradually gained acceptance in college counseling centers. Danskis (1975), who has popularized the use of biofeedback in this setting, defines biofeedback in the following way: "Biofeedback is the use of sensitive detectors (instruments) with visual and/or auditory displays to reveal to an individual minute changes in his internal functions. This training results in the control of the autonomic responses which correlate with psychological states (p. 633)."

Some graphic relationships between brain waves and memory have recently been investigated (Fincher, 1976). One project studied the level of brain electricity produced when perceiving an object in comparison with the potential evoked during the remembrance of that object.
A minute burst of electricity released in the brain when a geometric object was imagined resembled closely the wave shape that presented itself when the actual geometric form was visually perceived (p. 85).

Danakim (1973) investigated waves and learning and memory. He discovered that more effective learning of new materials and better problem solving took place in an Alpha state. Better memory was produced by subjects who displayed the greatest intensity of Alpha while speaking with eyes open. This memory retrieval was scored on a delayed recall test.

Biofeedback has been used to study Autogenic Training (AT), a form of training which focuses on both physiological and psychological awareness. Autogenic training is a "self generated form of self-hypnosis intended to transfer the power of the imagination to the body. For example, imagining feelings of heaviness produces feelings of heaviness, so that after a short time real heaviness of the limbs results" (Lindemann, 1973). Green and Green (1977), at the Menninger Foundation, decided to measure the physiological changes reportedly brought about through use of AT by Schultz (1957). They found that there were changes in almost every parameter used, including brain waves. They also discovered that an ability to remember was correlated with the Alpha state (r = .54, p = .01) (Green, 1977).

Underachievers at Lewis and Clark College were found to experience many differences in conjunction with AT. There were 240 students who needed to improve their academic standings in order to be allowed to enroll at the college were tested. These students were from 18-20 years of age. There were 92% who ultimately were accepted by the college,
and 85% of them received passing grades. A four year follow-up indicated that these students changed towards a more stable personality as measured on nine scales of the MMPI. Study habits on the Wrenn Study Habits Inventory improved by 85%. Ability to concentrate improved from a mean of 33 minutes to a final mean of 83 minutes. A 20% increase in intelligence scores after a nine week period of interpolated activities (not likely due to practice effect) was viewed as reflecting that students were more relaxed and could make better use of their intelligence.

Autogenic training produces a relaxed state similar to that produced by meditation, however it may have drawbacks for use in memorization workshops. These shortcomings have to do with the high specificity in defining problems required by the AT process, and the type of people with whom AT has proven to be effective. So for AT need to believe in the technique and positive self thoughts are an important element for AT's effectiveness. AT works with people who have specific aims upon which they want to work religiously, daily, and over extended time periods. People who are restless, nervous, active, suspicious, and do not have skills in using their imagination have little success with the method (Lindeman, 1973).

Mc Gaugh discovered that the more Theta produced in an EEG, the more that memory took place. He did not believe that Theta was a sign of memory, but rather that Theta recordings indicate that the brain is in the proper state to process and store information during learning (Pines, 1975).

Sexton and Poling did a critical review of research methods used for studying the effects of altering consciousness on memory. They had
noted several weaknesses in the studies examined. Some of these studies will be briefly described.

Abrams (1972) studied people who had been practicing meditation for two or more years. Ss who meditated out performed non-meditators on long-term memory tasks by 17% and on short-term memory by 35%. Sexton and Poling, however, noted that there were flaws in the research. The group being used as a "control" had not been pretested on ability to learn. In addition a control group should have been used to simply relax with eyes closed for twenty minutes, two times a day, as the meditation group did. It is possible that the relaxation, and not the mantra (sound being repeated in the mind) was the cause of the memory improvement.

Hypomnesia or sleep learning was studied in Europe. This type of learning was found to occur when the S was in a borderline Alpha-Theta condition. This state is often achieved through meditation. American researchers failed to duplicate the results, not having taken into account the "sleeper effect". The sleeper effect is a phenomenon in which materials will not be recalled immediately upon arousal (which was the time interval in which the American Ss were tested) but recall will occur 24-48 hours after acquisition.
CHAPTER III

METHODOLOGY

The purpose of this chapter is to describe the population from which the sampling was selected and the setting where the sampling was functioning during the study. This chapter will also describe the procedures for selecting the subject (Ss) and the three procedures used during the treatment periods. This chapter will conclude with a statement of the null hypotheses and describing statistical procedure used to analyze the data.

Population and Setting

The population was taken from a state-supported public university (The Ohio State University). The university has an "open" admission and admits any student who graduates from an accredited high school in Ohio. Some of these students have academic difficulties, and their academic advisors refer them to Psychology 120 (Learning to Learn). The students enrolled in four sections of Psychology 120 for the Spring quarter of 1980 were used as the population for this study. The class makeup in each section was approximately 50% white and 50% non-white. They were primarily sophomores. Their average age was twenty.

The classroom in which the students met was the setting for training and testing. The atmosphere was more casual than many other classes.
at the university. Seats were mobile, allowing for placement in a circle for discussion. The carpeted floor allowed for comfortable reclining during relaxation and meditation.

Procedures

A meeting with the supervisors of the teachers of Psychology 120 was held two months before the study began. At that time the philosophy of the course was discussed. One of the premises of the course was that stress reduction through Transactional Exhale Therapy and through progressive relaxation can reduce a person's arousal level, allowing students to be more receptive to learning.

A cue-directed progressive relaxation was already a part of the course. The IZBM was an easy extension to what would already be practiced in the course. The teachers of the individual sections gave the researcher permission to present training and testing in their classes, and a class period was set aside for this purpose.

Definitions

Prior to describing the treatments used in the four groups of this study, the following terms need to be defined:

1. Learning

Learning for the purpose of this research takes place through a facilitator presenting stimulus and response pair-associate words on a movie screen using a 33 millimeter slide projector. Each pair of words is flashed in three second intervals. The list of paired-associate words is as follows:
<table>
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<tr>
<th>Stimulus</th>
<th>Response</th>
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<tr>
<td>Star</td>
<td>Chair</td>
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<td>Woods</td>
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<td>Earth</td>
<td>Door</td>
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2. **Progressive Relaxation**

Progressive Relaxation is a process designed by Edmund Jacobson. This process involves individual muscle groups being tensed and then released as cue-directed on an audio tape. Generally, the procedure starts with the toes and works up through the body, ending with the scalp. This treatment was practiced weekly in class. The version used in this study was developed by Jacobson and is described by Lindeman (1973).
3. **Placebo**

The placebo used in this study was a verbal presentation from a written script. The content attempts to persuade Ss that they are meditating when, in fact, the cues in the script theoretically should keep one active mentally, in Beta and not in meditation. See Appendix C for a copy of the script.

4. **Japanese Zen Breathing Meditation (JZBM)**

Japanese Zen Breathing Meditation (JZBM) is a mind quieting exercise. Proper breathing is first taught in which the abdomen is filled with air, before the chest expands. The students are told to breathe filling the lower lungs first just as a glass fills with water from the bottom first. The students are told to completely expell all air before letting the next breath gently flow into the lungs. The student then learns the meditation which accompanies the breathing. With each inhalation the student pictures a number. The numbers are progressive from one to ten. If the student finds thoughts interrupting the counting process, the procedure starts at one again. This process is repeated for ten minutes. If the student successfully counts to ten s/he start at the beginning until the ten minutes elapse.
5. Testing

Testing was achieved by projecting only the stimulus word on the screen, holding it for three seconds, then projecting nothing for the next three seconds while the Ss wrote the correct paired-associate response word if possible. Scoring was a counting of the number of correct paired-associates remembered.

All of the teachers had copies of the same relaxation tape which was played for the Ss weekly. The Ss practiced the relaxation between class sessions, reporting to the teacher, in class, the results of the relaxation.

Eight weeks into the quarter, the research intervention took place. Scripts and materials were used which appear in the appendixes (Appendix B, C, and D). Treatments were assigned to sections of the class through random selection. The groups were then numbered in accordance to the treatment assigned and the makeup of the groups is summarized in Table 1. This table includes sex, age range and age means.

<table>
<thead>
<tr>
<th>Group Number</th>
<th>Name</th>
<th>Number of Subjects</th>
<th>Male</th>
<th>Female</th>
<th>Age Range</th>
<th>Age Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LT</td>
<td>9</td>
<td>6</td>
<td>3</td>
<td>18-21</td>
<td>19.2</td>
</tr>
<tr>
<td>2</td>
<td>RLPT</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>18-51</td>
<td>14.1</td>
</tr>
<tr>
<td>3</td>
<td>LMT</td>
<td>9</td>
<td>5</td>
<td>4</td>
<td>18-21</td>
<td>19.2</td>
</tr>
<tr>
<td>4</td>
<td>RLMT</td>
<td>11</td>
<td>6</td>
<td>5</td>
<td>18-25</td>
<td>19.9</td>
</tr>
</tbody>
</table>
The makeup of each group will now be described. Group 1, the learn-test group was comprised of nine students. Six of these were female and three male. The age range was 18-21 and the mean was 19.2. Group 2, relax-learn-placebo-test, was comprised of eight students, four male and four female, with an age range of 18-51 and the mean being 24.1.

Group 3, learn-meditate-test, numbered nine. The breakdown was five females and four males. They ranged in age from 18 to 21 and the mean of the ages was 19.2.

These students were not randomly assigned to groups but they self-selected themselves into class sections in accordance with their schedules. They did not know they were participating in a research project. The instructors were also assigned based on academic schedule and not randomly. The procedure was real for the context of the class. Due to the field based nature of this study and the lack of strict randomized control of subjects and instructors, the results will be generalized only on a basis of the similar field context and regular course selection by subjects.

The treatments offered to each group will now be described.

Group 1

Relaxation training was to begin the second week of the quarter for all sections of Psychology 130, hence, the control group had to receive their treatment prior to the second week. They learned the paired-associate words and were tested during the first week of the quarter. Briefly, the teacher explained that the learning to learn class was going to be offering techniques in relaxation which would aid the memorization process. This class would have the opportunity of trying a memorization
task before learning the technique in order to have a basis of comparison on performance. The students were then given the learning task and were tested as described in the definitions section of this thesis.

Group 2

Group 2 participated in six weeks of taped cue-directed relaxation in class and as daily homework. During the eighth week of the quarter the researcher explained that the relaxation that the class had been practicing could be used as a memorization aid. A brain wave lecture then explained the states of consciousness, what occurs during various brain wave states and how knowledge of how to alter consciousness could be applied to the students' studies. Students were told they would be given the chance to see for themselves the effects relaxation had on their own memorization. The relaxation tape was then played. The learning process took place, and the students were then read the placebo script. Next, the students were tested. After this process the students were told that the researcher would like to use the data just obtained for a masters thesis research project. An information and release form was handed out with the understanding that no identifying information would be used and each student had the option of not signing the form and not being used as data. All students signed.

Group 3

Group 3 participated in six weeks of taped cue-directed relaxation in class and as daily homework. During the eighth week of the quarter the researcher explained that the relaxation that the class had been practicing could be used as a memorization aid. A brain wave lecture
then explained the states of consciousness, what occurs during various brain wave states and how knowledge of how to alter consciousness could be applied to the students' studies. Then, students were told they would be given the chance to see for themselves the effects relaxation had on their own memorization. The students then were told that they would learn different relaxation technique than that learned in class but that had similar effects. The breathing part of the JZEN was taught. The students were told that they would be counting their breaths between memorizing the words and being tested on them. Learning then took place and the instructions for the meditation led the students into twenty minutes of JZEN. This was followed by testing. After this process the students were told that the researcher would like to use the data just obtained for a masters thesis research project. An information and release form was handed out with the understanding that no identifying information would be used and each student had the option of not signing the form and not being used as data. All students signed.

Group 4

Group 4 participated in six weeks of taped cue-directed relaxation in class and as daily homework. During the eighth week of the quarter the researcher explained that the relaxation that the class had been practicing could be used as a memorization aid. A brain wave lecture then explained the states of consciousness, what occurs during various brain wave states and how knowledge of how to alter consciousness could be applied to the students' studies. Then, students were told they would be given the chance to see for themselves the effects relaxation
had on their own memorization. The students were told that they would get to try the relaxation they had been practicing along with another relaxation technique. The breathing part of JZBN was taught, and the students were told that at the appropriate time they would be instructed as to how to meditate by counting their breaths. The students then went through the cue-directed relaxation process, then learning. This was followed by the JZBN and then testing. When release forms were handed out the students indicated that they were feeling drowsy. Their eyelids did not completely open and their movements were slightly slow.

It was expected that producing an ASC through progressive relaxation or JZBN would increase the memorization abilities of Ss compared to Ss who received no treatment or relaxation with placebo. Based on these general hypothesis, the following null hypotheses were formed:

1. There is not a significant difference between the relaxation placebo treatment and the control group when comparing the subjects' ability to memorize on the paired associates test.

2. There is not a significant difference between the meditation treatment and the control group when comparing ability to memorize on the paired associates test.

3. There is not a significant difference between the combination relaxation with meditation and the control group when comparing ability to memorize on the paired associates test.
4. There is not a significant difference between relaxation with placebo and meditation when comparing ability to memorize on the paired associates test.

5. There is not a significant difference between relaxation with placebo and a combination of relaxation with meditation when comparing ability to memorize on the paired associates test.

6. There is not a significant difference between meditation and a combination of relaxation with meditation when comparing ability to memorize on the paired associates test.

**Statistical Analysis**

A one way analysis of variance was performed on the data, using SPSS to investigate the effects of treatment groups on memory as measured by a paired-associates test. The F ratio obtained was significant beyond the .05 Alpha level. An ANOVA Summary table is presented on p. 32. Follow up procedures were conducted to determine which treatment groups were statistically significantly different. The Scheffé post hoc test was chosen to make these pairwise comparisons. The Scheffé is a highly conservative test and the most appropriate post hoc procedure when group n's are unequal and several comparisons are being made. The results of the contrasts between treatment groups showed that the mean score for group 1 (the control group) was significantly lower than all of the other 3 treatment groups. However, no other groups differed significantly. A table of the means and standard deviations for each treatment group are presented in Table 2.
CHAPTER IV

RESULTS AND DISCUSSION

In order to evaluate if participation in the various groups aided memorization, the data on the paired associates recall test were analyzed (1) descriptively; (2) with a one-way analysis of variance; (3) with t-tests; and (4) with the Scheffé post-hoc test. The means of subjects were compared to the average scores of all the tests and to the means of each group to determine their similarity. The analysis of variance tested the effects of no treatment, placebo, meditation, and relaxation with meditation. The Scheffé post-hoc test was utilized to determine the exact nature of the mean differences.

Based on these analyses and with the design limitations of this study, the following null hypotheses were rejected or not rejected:

1. There is not a significant difference between the relaxation placebo treatment and the control group when comparing the subjects' ability to memorize on the paired associates test. (Not rejected)

2. There is not a significant difference between the meditation treatment and the control group when comparing ability to memorize on the paired associates test. (Rejected)
3. There is not a significant difference between the combination relaxation with meditation and the control group when comparing ability to memorize on the paired associates test. (Rejected)

4. There is not a significant difference between relaxation with placebo and meditation when comparing ability to memorize on the paired associates test. (Not rejected)

5. There is not a significant difference between relaxation with placebo and a combination of relaxation with meditation when comparing ability to memorize on the paired associates test. (Not rejected)

6. There is not a significant difference between meditation and a combination of relaxation with meditation when comparing ability to memorize on the paired associates test. (Not rejected)

Table 2 gives the means and standard deviations for each group. The table also shows the 95 percent confidence intervals for each mean and for the total means.

Clearly, the control group (Group 1) had the lowest mean (2.778) of correct associations from the 15 sets of associated words. These were two groups (2, 4) with similar means, 5.750 for Group 2 and 5.545 for Group 4; however, their standard deviations were different (4.1462 for Group 2 and 2.6595 for Group 4). Group 2 had the highest mean (7.556).
Table 2
Means and Standard Variations

<table>
<thead>
<tr>
<th>Group</th>
<th>( N )</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9</td>
<td>2.778</td>
<td>2.5874</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>5.750</td>
<td>4.1662</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>7.356</td>
<td>2.0049</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
<td>5.545</td>
<td>2.6595</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>5.405</td>
<td>3.2614</td>
</tr>
</tbody>
</table>

This data is consistent with Obrist's study (1962); he found an inverted U relationship between verbal learning and arousal level. His biofeedback testing of physiological correlates of arousal with memory indicated an optimal level of performing occurs during an intermediate level of arousal. Too high or too low arousal was viewed as detrimental to the learning process. This might be an explanation as to why meditation alone fared better than a combination of meditation with relaxation if the latter resulted in lower arousal levels.

Table 3 contains the basic data on the one-way analysis of variance. The between group analysis indicated there were significance differences between the various groups or different levels of intervention. The nature of the differences was analyzed using the Scheffé post-hoc test.
Table 3
Analysis of Variance

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>F Ratio</th>
<th>F Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>3</td>
<td>34.9713</td>
<td>4.151</td>
</tr>
<tr>
<td>Within Groups</td>
<td>33</td>
<td>8.4244</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Scheffé post-hoc test indicates that the contrast between Group 1 and 3 was significant at the 0.001 level. (See Table 4.)

Table 4
Separate Variance Estimate

<table>
<thead>
<tr>
<th>S. Error</th>
<th>T Value</th>
<th>D.F.</th>
<th>T. Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0915</td>
<td>-4.377</td>
<td>15.1</td>
<td>0.001*</td>
</tr>
<tr>
<td>1.6178</td>
<td>-1.116</td>
<td>9.8</td>
<td>0.290</td>
</tr>
<tr>
<td>1.0443</td>
<td>1.925</td>
<td>17.9</td>
<td>0.070</td>
</tr>
<tr>
<td>1.7069</td>
<td>-1.741</td>
<td>11.4</td>
<td>0.109</td>
</tr>
<tr>
<td>1.1716</td>
<td>-2.350</td>
<td>17.4</td>
<td>0.031*</td>
</tr>
<tr>
<td>1.6771</td>
<td>0.122</td>
<td>11.1</td>
<td>0.905</td>
</tr>
</tbody>
</table>

*\(t\) less than .05
A contrast of Group 1 with Group 4 also indicates a statistically significance different at the .05 level. No significant differences were found between Groups 1 and 2, 2 and 3, 2 and 4, or 3 and 4. Hence, it would appear that Groups 3 and 4 do not come from the same population as Group 1. The treatments received by Groups 3 and 4 seem to result in significantly increased recall on the paired associates test when compared to control Group 1.

The following graph indicates the distribution of student scores on the paired associates test.

Group 1: No treatment

<table>
<thead>
<tr>
<th>Scores</th>
<th>0</th>
<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>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of People</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Group 2: Relax-Learn-Placebo-Test

<table>
<thead>
<tr>
<th>Scores</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Number of People</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER V
SUMMARY, CONCLUSIONS, LIMITATIONS, AND IMPLICATIONS

Summary
This study was designed to determine whether participation in a meditation or relaxation treatment had some significant effect on the ability to memorize; specifically did the placebo with relaxation, meditation; or relaxation with meditation differ from no treatment or from each other? This was a refinement of research done indicating that meditation improves memory, for this research broke meditation into its three basic components. The components individually are: 1) belief (that meditation has beneficial effects, 2) relaxation of the body, and 3) a relaxed focusing of the mind. The dependent variable was the memory test.

The research took place in a field setting similar to programs sponsored by college counseling centers. The study compared a no treatment control with relaxation coupled with placebo meditation, relaxation coupled with meditation, and with meditation alone on ability to memorize. Specifically, the study tried to examine the question whether 1) participation in non-treatment control, 2) relaxation before learning coupled with placebo meditation between learning and testing, 3) relaxation prior to learning and JARM between learning and recall, or 4) meditation only between learning and testing lead to higher performance on

35
short term paired associates test for memorization. The design attempted
to compare the effects of the three components of meditation’s effects on
memorization. They are: 1) belief that meditation will have beneficial
effects on memorization (each group); 2) relaxation of the body and its
effects on memorization (Group 2); 3) a relaxed focusing of the mind and
its effect on memorization (Group 3); and combining the relaxation of the
body with the relaxed focusing of the mind (Group 4). The placebo used
after the relaxation (Group 2) was designed to induce a relaxed body,
while encouraging the type of thought process which occurs during normal
consciousness, both occurring with the placebo suggestion that the treat-
ment was one of helpful meditation.

A sample of 37 students from four class sections of Psychology 120
participated in the research. The treatments were randomly assigned to
classes. There were nine students in Group 1, eight in Group 2, nine in
Group 3, and eleven in Group 4. The students self-selected class sec-
tions based upon fit within their overall class schedule.

The teachers of the classes were Ph.D. candidates in psychology.
They chose their section of the class according to their time availabil-
ity. For five consecutive weeks prior to research intervention, the
teachers of groups 2, 3, and 4 trained the students in deep muscle relax-
ation using an audio tape and practice outside to class. At the end of
the fifth week, each of these three classes received intervention.
Group 1, the control group, was presented the words to learn and recall
the first week of class, before any training in relaxation ensued.
Group 2 received the relaxation before learning and the placebo before
testing. Group 3 received the JABM treatment between learning the paired associate words and the recall test. Group 4 received a relaxation treatment prior to learning the paired associate words and a JABM treatment between learning and the recall test.

Limitations of the Research

Some of the limitations to this research are as follows:

1. Although there was randomized assignment of treatment to groups, subjects selected class sections based upon fit with their academic schedules. This is the regular class section in procedure; however, the results may or may not be random. This could decrease the rigor of the research design of uneven bias in groups; the motivation of the students selection of the course time offering, could mark an inherent difference in the students willingness to apply themselves.

2. Although the teachers used the same tape with the students, possibly presentation style, of the importance of practicing relaxation altered individuals willingness to practice during the week.

3. Because of unequal group Na and the many comparisons which were sought, the Scheffé post-hoc test utilized. This method is the least sensitive to mean differences of the post-hoc tests. In an effort to control Type I, or Alpha errors, there is a possibility of making Type II error (i.e., rejecting the difference as not significant when the difference is significant).
4. There was almost no response from students who were interested in participating in a long term memory test. Only one in thirty-seven students, presented herself for a voluntary second day workshop in which long term memory would be tested. Therefore, this part of the study was omitted.

5. The combination relaxation with meditation group expressed feelings of having been deceived. The researcher did not tell them in advance that the results would be used in a thesis. The other groups expressed no such feelings. Possibly the difference in initial attitudes affected performance on the test.

6. The no treatment group took the test at the beginning of the quarter, in order not to be influenced by the 5 weeks of relaxation training. Anxiety levels could have been higher due to a shorter time together as a group.

7. The population of students in Psychology 120 usually perform below the norm of academic achievement at The Ohio State University. Their scores on the paired associates test also were lower than average of people who take this particular test (7.0). Therefore results are not necessarily applicable to the general population of university students.
Conclusions and Speculations

The following conclusions and speculations are presented:

1. The combination of relaxation with placebo attempted to study the effects of relaxation alone. The placement of the placebo between learning and recall testing allowed the recall test to occur after the same time interval as the other treatment group. This combination allowed for testing the effects of relaxation but tested in no way the effect of placebo expectation on performance. In addition, it was assumed that the placebo keep the state of consciousness in Beta. Without biofeedback information, this is an assumption rather than a controlled fact.

2. The objective of discovering the effects of using cue-directed relaxation of the body (without directly relaxing the mind) on memorization was addressed in Group 2. The linkage with the placebo script with relaxation confounded the study of the effectiveness of a placebo meditation. The study failed to use a placebo alone.

3. In Group 4 cue directed relaxation was linked with meditation. The use of JZEM coupled with relaxation added a dimension to the research by possibly inducing a state which is more relaxed than either treatment used individually. Physiologically, this group appeared to be in a state near sleep. The Ss in Group 4 also expressed
verbally that they felt a goggy (a sign of Theta). This degree of relaxation was not observed in or expressed by the other groups. Again, however, without biofeedback confirmation, this conclusion is not confirmed. If accurate this allowed the researcher to examine the effect of Theta on memorisation.

4. The use of JZBM (Group 3) between learning and recall seems to result in significantly higher performance on short term memory on the pair associates test than the control group.

5. The use of cue-directed relaxation prior to learning and JZBM between learning and recall testing seems to result in significantly higher performance on short term memory on the paired associates tests than the control group.

Implications and Suggestions for Future Research

As has been previously stated, education is starting a renaissance in which the level of optimum arousal for memorizing and learning, may be taken into account. In addition to disseminating information, educators are becoming aware of holistic approaches to help students assimilate information in an advantageous manner. Within the aforesaid limitations of this study, the results are encouraging. This data suggest that participation in Japanese Zen Breathing Meditation training is useful in augmenting memorisation.
The following research questions are offered as suggestions for future research:

1. Do results on tests given for long term memory indicate a difference, produced by these treatments? Will performance be higher or lower twenty-four hours after memorization? Some studies indicate that performance is higher twenty-four hours after memorization than the scores obtained on the day of training.

2. Does competence in body relaxation also lead to mental relaxation?

3. Do the same treatments affect different populations in different ways? Does the difference between male and female brain structures, slow learners and high achievers, or other populations make a difference in reaction to treatments?

4. This study used previous research to assume that the use of cue-directed muscle relaxation would result in Alpha, and JABM would result in Theta. Future research may need to check this assumption through biofeedback monitoring of consciousness states.

5. A redesigned version of this study is needed. JABM and relaxation need to be separated, each explored with appropriate placebo and control comparisons in field settings.
6. Does a combination of cue directed relaxation and Japanese Zen Breathing Meditation lead to a low frequency Theta and hence to a level of arousal below that optimal for memorization?

Whether or not these suggestions are implemented in future research, it is hoped the question of the effects of altering consciousness to enhance education will be considered. Presently research, and programs being implemented, indicate a promising future for wholistic education.
## APPENDIX A

**Paired-Associate List**

<table>
<thead>
<tr>
<th>Stimulus</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Star</td>
<td>Chair</td>
</tr>
<tr>
<td>Woods</td>
<td>Army</td>
</tr>
<tr>
<td>Bird</td>
<td>Storm</td>
</tr>
<tr>
<td>Horse</td>
<td>Gold</td>
</tr>
<tr>
<td>City</td>
<td>Sugar</td>
</tr>
<tr>
<td>Meat</td>
<td>Stone</td>
</tr>
<tr>
<td>Table</td>
<td>Iron</td>
</tr>
<tr>
<td>Kiss</td>
<td>Plant</td>
</tr>
<tr>
<td>House</td>
<td>Soil</td>
</tr>
<tr>
<td>Ship</td>
<td>Queen</td>
</tr>
<tr>
<td>Camp</td>
<td>Paper</td>
</tr>
<tr>
<td>Grass</td>
<td>Seat</td>
</tr>
<tr>
<td>Child</td>
<td>Hall</td>
</tr>
<tr>
<td>Boob</td>
<td>Ocean</td>
</tr>
<tr>
<td>Earth</td>
<td>Door</td>
</tr>
</tbody>
</table>
Appendix B

Japanese Zen Breathing Meditation Script

Edward Maupin has done much work with meditation and learning. He hypothesized that, "If a specific function such as meditation requires attention, then individuals who are relevantly efficient in concentration will tend to meditate more successfully." His research indicated that there is a relationship between attention and response to meditation. High and low response subjects received higher Digit Span Scores than the moderate response group. The method he used in inducing a meditative state is one which I will use also.

Script for Meditation

"You are now going to do a meditation which is a deep passivity combined with awareness. Get into a comfortable position. Attend to the here and now. Do not prevent thoughts, just let them pass without attachment. Go into a deep physical relaxation by focusing on any tension, and allow it to flow away. Avoid unproductive blank states by patiently returning to the meditation. Don't have a preconceived notion of what a good session is, just be aware of your condition. Breath through your nose and inhale as much as you require, letting the air come in by relaxing the diaphragm. Do not draw it in, rather let the air come to you. Then exhale slowly. Exhale completely, getting all the
air out of your lungs. As you exhale, slowly count "one". Now inhale again. Then exhale slowly to the count of "two". And so on up to "ten". Then repeat...

You will find the counting difficult as your mind will wander from it. However, keep at it, striving to bring your mind back to the process of counting. As you become able to do this with reasonable success, start playing the following game with the counting. As you count "one" and are slowly exhaling, pretend that this "one" is going down into your stomach. Then think of it being down there as you inhale and count "two". Bring the "two" down and place it (in your imagination, one might say) in your stomach beside the "one". Eventually you will find that your mind itself, so to speak, will descend into your stomach.

If asked what is supposed to happen, say, "I can't tell you for I don't know that much about you. It is better not to be distracted by preconceived ideas about it. The important thing is to accept whatever happens. Don't move and keep your attention on your breathing" (Tart, 1972).
APPENDIX C

Placebo Meditation Script

You are about to begin American Awareness Meditation. This meditation, just like Transcendental Meditation has been especially designed for Westerners. You may be surprised how simple and effective meditation is. The steps to this meditation are as follows: 1) Find a comfortable position. 2) Maintain an attitude of open awareness. 3) Thoughts should not be prevented, but should be given attention to. 4) If you have emotions, feelings, or blank states, think about those, also. 5) Don't have a preconceived notion of what a good session is, just be aware of your condition.

Now close your eyes and allow this meditation process to begin. If you at times find this meditation to be difficult, keep at it, striving to bring your mind back to your thoughts. You will then be able to do this with reasonable success.

If the facilitator is asked what is supposed to happen the response is "I can't tell you for I don't know that much about you. What happens will come from within you and it is better not to be distracted by pre-conceived ideas about it. The important thing is to accept whatever happens. Don't move and keep your attention on your thoughts."

At the end of the meditation session the facilitator asks how it went and to what degree was relaxation and concentration maintained.

46
APPENDIX D

Cue Directed Relaxation Script

Relaxation therapy consists of three stages. The first is a breathing exercise, the second is muscle relaxation exercise, and the third is a meditation exercise. During the first stage, it is useful if you inhale through your nose to the count of four and that you exhale through your mouth to the count of eight. So let's begin the breathing exercise and remember the counts of four and eight. So let's begin.

When you are ready, breathe through your mouth down to your chest. Nice and easy, nice and relaxed. Let's take your third breath, paying attention to your breath and gradually let the tension leave your body. Nice and easy. Let's take our fourth deep breath and when you are ready exhale gradually and slowly. Let the tension leave your body. Let's take our fifth deep breath. When you are ready exhale through your mouth, nice and relaxed. Now pay attention to your toes and to the arches of your feet. You may move your toes and feet. Relax. Now pay attention to both of your feet. Relax all of those tiny muscles and allow your attention to wander up through your ankles into your calves and into your knees. Relax and let your attention wander up into your thighs and into the back of your legs. Relax all of those muscles. Just let them go. Now pay attention to the muscles throughout your hips. First notice your left hip. Relax. Notice your right hip. Relax. Notice the area throughout the front. Just let those muscles go.
Notice the muscles in the back. Just let those muscles go. Now pay attention to the muscles throughout the hips. Relax. Let go of all those muscles, and now let your muscles be just a little more loose.

Pay attention to your stomach. Take a deep breath. Expand your stomach and exhale slowly and gently. Relax. Now let your attention wander up to your chest. Notice your lungs as we take a deep breath like before and when you are ready, exhale gradually and pay attention to your chest. Allow yourself to breath smoothly and easily. Now pay attention to the muscles at the base of the neck, both of your shoulders. Let all of those muscles be loose and allow your attention to wander over the curves of your shoulders, down through your biceps, relax, into your elbows. Relax. Down through your forearms, and into your wrists, relax. And into your palms, relax. Notice each of your fingers. Relax all of those tiny muscles, and just let the tension drain from your fingers. Relax. Now notice your spinal chord and all of the muscles throughout your back. Let all of those muscles be loose. Relax. Now notice the muscles throughout the lower back.

Just let those muscles go. Relax. Let your entire body be limp. And now let it be just a bit more limp. Notice the muscles in the back of your neck. Relax. And allow your attention to wander up over the back of your head, over the top of your head, into your forehead. Relax. Notice your eyebrows and all of the tiny muscles surrounding your eyes. Let all of those muscles relax, and be loose. And let your attention wander down to your cheeks, into the area surrounding your lips. Let all of those muscles be loose. Now notice all of the muscles throughout your face. Just let all of those muscles be loose. Relax. Notice
the weight of your body. Notice the heaviness. I'm going to count from
ten down to one, and with each number, allow yourself to achieve a deep-
er state of relaxation. 10, allow all of the muscles throughout your
body to be loose. Nine, let all of your muscles be limp. Eight, relax.
Seven, allow yourself to be peaceful. Six. Five. Five. Four.
Three. Two. One. And now that your body is relaxed, allow your mind
to relax.
APPENDIX E

Consent Form

I give consent to have the data obtained in this group to be used in Lynn Gundersheimer's thesis. I understand that my name and identifying information about me will not be used, and will not be available to any outside source. I understand the nature of my involvement in this research.

SIGNED ____________________________
APPENDIX F

Background Information

Name

Age

Sex

Year in School

Have you had experience with the following?

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<th>Yes</th>
<th>No</th>
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<tr>
<td>Use of alcohol</td>
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<td>Use of Drugs</td>
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<td>Hypnosis</td>
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<td>Alpha Conditioning</td>
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<tr>
<td>Do you consider yourself to be a nervous person?</td>
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</table>

What is your grade point average?  

51
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52


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