

ACUPRESSURE FOR REDUCTION OF ANTICIPATORY  
ANXIETY AMONG NURSING STUDENTS

---

A THESIS  
SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF MASTER OF SCIENCE  
IN THE GRADUATE SCHOOL OF THE  
TEXAS WOMAN'S UNIVERSITY

COLLEGE OF NURSING

BY  
MARY K. PRUETT GARCIA, B.S., R.N.

---

DENTON, TEXAS

MAY 1982

The Graduate School  
Texas Woman's University  
Denton, Texas

June 26, 1981

We hereby recommend that the thesis prepared under  
our supervision by Mary K. Pruett Garcia

entitled Acupressure for Reduction of Anticipatory  
Anxiety Among Nursing Students

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Dissertation/Theses signature page is here.

To protect individuals we have covered their signatures.

Thesis

T1982

G216a

C.2

Would not the true way of infusing the art of preserving its own health into the human race be to teach the female part of it in schools and hospitals, both by practical teaching and by experiments, in as far as these illustrate what may be called the theory of it?

Florence Nightingale

"Notes on Nursing"

## DEDICATION

To my mother whose favorite word was accomplishment;  
to Rudy, my husband, for his love, patience, and under-  
standing; and to Anita and James without whose hospitality  
this study may have never been conducted.



## ACKNOWLEDGMENTS

It is with deep appreciation that I express my gratitude to the following:

Dr. Lois Hough, committee chairman, for her support and guidance throughout the research process.

Margaret McElroy, committee member, for her special efforts during data collection.

Jane Dawson, committee member, for teaching me about nursing leadership.

## TABLE OF CONTENTS

	Page
DEDICATION . . . . .	iv
ACKNOWLEDGMENTS. . . . .	v
TABLE OF CONTENTS. . . . .	vi
LIST OF TABLES . . . . .	viii
LIST OF FIGURES. . . . .	ix

### Chapter

1.	INTRODUCTION. . . . .	1
	Problem of Study . . . . .	2
	Justification of Problem . . . . .	2
	Conceptual Framework . . . . .	4
	Assumptions. . . . .	6
	Hypothesis . . . . .	7
	Definition of Terms. . . . .	7
	Limitations. . . . .	8
	Summary. . . . .	8
2.	REVIEW OF LITERATURE. . . . .	11
	History. . . . .	11
	Endorphin Research . . . . .	14
	Fear of Failure at School Tasks. . . . .	17
	Summary. . . . .	20
3.	PROCEDURE FOR COLLECTION AND TREATMENT OF DATA . . . . .	22
	Setting. . . . .	23
	Population and Sample. . . . .	23
	Protection of Human Subjects . . . . .	24
	Instrument . . . . .	26
	Normative Data . . . . .	27

	Page
Validity . . . . .	27
Reliability . . . . .	30
Data Collection . . . . .	31
Treatment . . . . .	32
Treatment of Data . . . . .	36
 4. ANALYSIS OF DATA . . . . .	 37
Description of Sample . . . . .	37
Findings . . . . .	37
Summary of Findings . . . . .	42
 5. SUMMARY OF STUDY . . . . .	 43
Summary . . . . .	43
Discussion of Findings . . . . .	43
Conclusions and Implications . . . . .	44
Recommendations . . . . .	45
 APPENDIX A . . . . .	 47
APPENDIX B . . . . .	50
APPENDIX C . . . . .	52
APPENDIX D . . . . .	55
APPENDIX E . . . . .	57
REFERENCE NOTES . . . . .	59
REFERENCES . . . . .	60

## LIST OF TABLES

Table	Page
1. Individual Raw Scores on Pretest and Posttest of Group A and Group B . . . . .	39
2. Mean Scores and Standard Deviations of Pretest and Posttests for Group A and Group B . . . . .	40
3. Significance of Differences Between Group Means . . . . .	41

# LIST OF FIGURES

Figure		Page
1.	An-mien . . . . .	32
2.	Chin-so-na. . . . .	33
3.	Shen-man. . . . .	33
4.	Nei-kuan. . . . .	34
5.	Polyhidrosis. . . . .	34
6.	Ho-ku . . . . .	35
7.	Feng-chih . . . . .	35

## CHAPTER 1

### INTRODUCTION

Test-taking anxiety among college students is a well-known and wide spread phenomenon. The effects of high anxiety levels on learning has been the subject of considerable experimentation. Spielberger (1962) demonstrated that students of high academic ability make much the same grades regardless of whether or not they seem to experience anxiety. This is also found to be true of students with particularly low academic ability. Those of in-between rankings, however--where the majority of students fall--obtain better grades in testing situations when relatively free of high anxiety levels.

Many means of coping with fears related to test-taking have been identified. Some include the use of various relaxation and breathing techniques, group counseling, bio-feedback, and medications. Another possibility is the use of acupressure. Although not yet widely practiced in the United States, this method of self-help has proven successful for centuries in the Orient (Cerney, 1979).

### Problem of Study

The problem of this study was to investigate whether or not there is a difference in the amount of anxiety before and after an acupressure session administered to senior nursing students who are anticipating test-taking.

### Justification of Problem

Peplau (1963) gave working definitions for four levels of anxiety. The levels included mild, moderate, severe, and panic. In mild anxiety, the person becomes alert and more consciously aware of stimuli in the environment. Objects not previously seen or sounds previously undetected suddenly become apparent. The understanding of a situation may become more complete as details are accurately identified. In general, perceptive abilities and learning are enhanced and the individual can utilize cognitive skills to improve problem-solving abilities.

In moderate anxiety, perceptual field decreases, but it is still possible to direct attention toward the situation or environment. The person may experience physiological responses such as muscle tension, perspiration, "butterflies," or headache. Learning ability is lessened, but appropriate interventions can reduce anxiety back to a mild level and learning capacity thus enhanced (Peplau,

1963). According to Spielberger (1962), anxiety related to test-taking is frequently of moderate degree.

When a person experiences severe anxiety or panic, perceptual abilities are further decreased. Attention may be focused only on specific details within the situation or on many scattered aspects of the environment. The person is unable to connect thoughts into a unified problem-solving approach. Physiological complaints are heightened. Headache, nausea, trembling, or dizziness are often present, and the person may feel emotional dread, awe, or horror (Peplau, 1963).

Acupressure is a safe, inexpensive, and noninvasive technique which has proven extremely effective in reducing manifestations of stress, tension, and nervousness (Cerney, 1979). Since it is sometimes used in conjunction with conventional therapy, a medical background is helpful. Nurses, therefore, are in an ideal position to perform the techniques safely and accurately. Chow states that acupressure has gained favor for treating pain and compulsive disorders because "it works, it is easy to use, and it can help patients without the harmful side-effects of drugs" (cited in Chan, 1977, p. 11).

Medical schools are now offering courses in acupuncture therapy, and various medical organizations have



offered symposia on acupuncture to physicians for continuing medical education credit (Wensel, 1980). In many instances, more and more finger acupressure is being used instead of needles because it has been found to be just as effective and piercing the skin is avoided (Chan, 1977).

A study such as this one can be beneficial for several reasons. First of all, nurses can acquire the ability to apply the techniques safely. Secondly, acupressure has been used effectively in treating nervousness and anxiety and thus could help to enhance learning ability among nursing students who suffer from test-taking anxiety. Finally, this study could serve as a precursor to other studies involving the use of acupressure for pain relief as well as anxiety reduction.

### Conceptual Framework

Although theories such as gate-control can be used to explain how acupressure works for pain relief, it is difficult to establish why it is effective in reducing anxiety. One approach involving the release of endorphins from acupressure stimulation has a great deal of validity according to Wensel (1980).

In 1975, endorphins with morphine-like activity were isolated from the hypothalamus (Pasternak, Goodman, &

Snyder, 1975). Also, dopamine, norepinephrine, serotonin, and acetylcholine have been found in nerve terminals of the hypothalamus (Moore, 1970). The complexity of these chemical transmitters may explain the different sources of control and influence on the neurons in this region.

Neurons in the amygdala and the hippocampus receive inhibitory nerve terminals using serotonin as the chemical transmitter as well as excitatory inputs using catecholamines as the transmitters. The excitatory terminals have cell bodies in the reticular formation of the midbrain, and their axons travel primarily in the medial forebrain bundles (Wensel, 1980). Moruzzi and Magoun (1949) demonstrated that activity of the reticular formation of the brainstem is essential for consciousness.

The amygdala and the hippocampus are sensitive to a wide variety of afferent inflow and control the connections between the temporal neocortex and subcortical limbic systems. The most effective stimuli of these areas are touch and sciatic nerve stimulation (Smythies, 1970).

For the concept of acupressure, interconnections between receptors of the skin and the autonomic nervous system are known as meridians. Kim of the University of Pyongyang in North Korea reported that these pathways are not merely imaginary lines, but are actually composed of a

type of histological tissue (cited in Chang, 1976). These channels are 20-50 millimicrons in diameter, bilaterally symmetrical, and exist beneath the surface of the skin. They have a thin membranous wall and are filled with a colorless transparent liquid. Each of the main meridians forms a series of branches and the places at which they reach the skin surface are designated as the points on an acupuncture chart (Chang, 1976). According to Chan (1980a), better results are obtained if firm finger massage and/or pressure is applied bilaterally and simultaneously. Treatment is usually applied for periods of time ranging from a few seconds to a full minute for each point (Chan, 1980a).

Acupressure stimulation of nerve fibers conducting touch and proprioceptive sensations may alter the activities of the amygdala and hippocampus via the meridian system. This enhances the normal defense mechanisms against disease and may be helpful in reducing anxiety (Wensel, 1980).

### Assumptions

For this study, the following assumptions were made:

1. Limbic systems among participants are intact and are without lesions that would interfere with chemical control mechanisms.

2. Participants will be able to locate and stimulate key acupuncture points which activate the meridian system.

3. Acupressure stimulates the release of endorphins via the meridian system.

4. Endorphins are effective in reducing levels of anxiety.

### Hypothesis

A single directional hypothesis was identified for this study which stated:

The posttest scores on the A-State scale of the State-Trait Anxiety Inventory will be lower for senior nursing students anticipating test-taking who have been treated with a single acupressure session than for senior nursing students anticipating test-taking who have not been treated with the acupressure session.

### Definition of Terms

For the purposes of this study, the following definitions were provided:

1. Acupressure--finger massage and/or pressure over standard acupuncture points. Specific pressure areas and techniques for this study are presented under Treatment.

2. Anxiety--a transitory emotional state caused by the anticipation of test-taking as measured by scores on the A-state scale of the State-Trait Anxiety Inventory.

### Limitations

Limitations identified were as follows:

1. Participants had only one treatment period.
2. Variations in responses may be present since treatments were self-administered by the participants.
3. All participants were female nursing students from the same university.
4. Participants may have been influenced by anxiety-producing factors other than anticipation of test-taking.
5. No measures were available for determining each participant's predisposition to various relaxation techniques.
6. The time period between administration of pretests and posttests was approximately 45 minutes and some participants may have had a tendency to give similar responses on each administration.

### Summary

The problem of this study was to investigate whether or not there is a difference in the amount of anxiety before and after an acupressure session administered to

senior nursing students who are anticipating test-taking. Acupressure is a safe, inexpensive, and noninvasive technique which has proven extremely effective in reducing manifestations of stress, tension, and nervousness (Cerney, 1979). Chow (cited in Chan, 1977) stated that acupressure has gained favor for treating pain and compulsive disorders because "it works, it is easy to use, and it can help patients without the harmful side-effects of drugs" (p. 11).

Acupressure is believed to stimulate the release of endorphins via the meridian system. This enhances normal defense mechanisms against disease and may help to reduce anxiety (Wensel, 1980).

The hypothesis for the study stated that the posttest scores on the A-State scale of the State-Trait Anxiety Inventory will be lower for senior nursing students anticipating test-taking who have been treated with a single acupressure session than for senior nursing students anticipating test-taking who have not been treated with the acupressure session.

Various assumptions and limitations have been stated and important terms defined. Acupressure was defined as finger massage and/or pressure over standard acupuncture points. Anxiety was defined as a transitory emotional

state caused by the anticipation of test-taking as measured by scores on the A-State scale of the State-Trait Anxiety Inventory. Specific pressure areas and techniques are presented under Treatment.

## CHAPTER 2

### REVIEW OF LITERATURE

Since published research on the use of acupressure for the relief of anxiety is virtually nonexistent, the following literature review consists of a brief history of acupuncture and acupressure therapy. Also, research findings involving the stimulation of endorphin release through the use of acupuncture/acupressure will be discussed as well as research conducted which explores the fear of failure at school tasks.

#### History

Chang (1976) described the following factors which have influenced the development of this ancient science. Chang (1976) stated that acupressure and acupuncture therapies have been present since the dawn of history when stones and arrows were the only implements of war. Many soldiers wounded on battlefields reported that symptoms of disease which plagued them for years suddenly disappeared. After many years of meticulous observation, it was concluded that certain illnesses could actually be cured by striking or piercing specific points on the surface of the body. The instruments of healing were eventually modified



from stones and arrows to fish bones, bamboo slips, and finally to needles made of gold, copper, and steel.

Also, according to Chang (1976), the Nei Chin or The Yellow Emperor's Classic of Internal Medicine is the oldest known text on acupuncture and is believed to have been written from 2697 to 2596 B.C. during the reign of Emperor Huang Ti. The Nei Chin (cited in Chang, 1976) outlines a systematic method of therapy and provides a foundation for later developments.

Chang (1976) stated that during the seventeenth century, Jesuit missionaries gave unbelievable accounts of Chinese physicians curing illnesses by inserting needles into the surface of the skin. This marked the introduction of acupuncture to the West and although Western physicians were anxious to learn more about this unusual method of therapy, they could only theorize as to the underlying causes for the spectacular results (Chang 1976). In 1928, due to the arduous labors of Morant, the French Consul in China who translated Chinese manuscripts into French, Western physicians were finally provided with a sound basis for applying the knowledge they had gained (Chang, 1976).

In 1884, the practice of acupuncture and/or acupresure was confined to the common people due to an imperial

decree by Emperor Tao-Kuang prohibiting any physician to touch the body of a member of the royal family (Chang, 1976). Chang (1976) stated it was not until 1934 when Tung's army was living and fighting under strenuous conditions that acupuncture and acupressure once again became an essential element in China's medical system. It was used almost exclusively in lieu of any other forms of treatment, and the health of the army was maintained with serious illnesses and epidemics being avoided because of its use (Chang, 1976).

According to Chang (1976), Japan established faculties of Western medicine at the university level during the latter part of the nineteenth century. Acupuncture/acupressure had been practiced there since the sixth century but was abandoned at the same time it was proscribed in China by Emperor Tao-Kuang. Its efficacy in the treatment of disease kept it alive, however, until the present when it has once again become the subject of much interest in hospitals, medical centers, and universities (Chang, 1976).

Acupuncture/acupressure is presently practiced in France, Italy, Britain, West Germany, Argentina, and several of the Socialist nations (Chang, 1976). It is also becoming the focus of growing interest in the United

States (Wensel, 1980). Wensel (1980) stated that former president Richard M. Nixon's 1972 trip to China introduced millions of Americans to the possibilities of acupuncture/acupressure through its television coverage and other publicity. A few months after his return, the first center opened in Washington, D.C. and was followed by the establishment of centers in many other localities (Wensel, 1980). Chang (1976) stated:

If the last 40 years are any indication of the future, it may someday be said that the latter part of the twentieth century saw the birth of the "Golden Age" of acupuncture. (p. 16)

### Endorphin Research

Recent research studies in the area of brain chemistry involve a group of naturally occurring compounds known as endorphins. Wilson and Elmassian (1981) described endorphins as endogenous compounds with opiate-like properties which are believed to influence pain perception, mood, respiration, and the release of pituitary hormones. Endorphins have been found in the pituitary gland, gastrointestinal tract, and throughout the central nervous system (Wilson & Elmassian, 1981).

Goldstein (Note 1) stated that the exploration of endogenous opioids began in earnest around 1970. The starting point was a search for receptor sites in the body

which were utilized by exogenous drugs. During the middle of the nineteenth century, Bernard (cited in Goldstein, Note 1) was successful at localizing the site of action for curare and studied the body's response to the drug. Now, more than 100 years later, attempts were being made to follow Bernard's example in the search for opiate receptors (Goldstein, Note 1).

Studies conducted at Stanford University pinpointed receptors along the principal routes of pain stimuli as well as in areas associated with emotional responses and hormone control (Goldstein, Note 1). Goldstein (Note 1) stated concentrations were noted in the amygdala and hippocampus--areas of the limbic system thought to be involved in reward systems and memory.

Opiate receptor sites have been found in all vertebrates but not in invertebrates (Goldstein, Note 1). Such a finding indicates that opiate receptors are not a vestigial holdover, but rather this intricate system was evolved in order to interact with endogenous ligands (Goldstein, Note 1). A search for the endogenous ligands proceeded simultaneously by a number of investigators. Simon and Synder, Kosterlitz and Hughes in Aberdeen, and Terenius in Stockholm were all equally active (cited in Goldstein, Note 1).

In 1975, studies conducted at Stanford University found opioid activity in a rather large peptide in the pituitary (Goldstein, Note 1). In Aberdeen, the researchers Hughes, Smith, Morgan, and Fothergill (1975) reported marked opioid characteristics in a brain pentapeptide. These endogenous ligands--the larger peptide (endorphin) and the smaller one (enkephalin)--were found to act on opiate receptors along the spinal cord, in the pituitary, brain, and intestines precisely as morphine does (Goldstein, Note 1).

It was initially believed that endorphin was produced in the pituitary and then passed into the brain. One study conducted at Stanford demonstrated that this is not the case. Investigators removed the pituitary from laboratory animals, waited a month, and then found as much endorphin present in the brain as had been previously noted (Goldstein, Note 2).

It is not completely understood why these morphine-like biochemicals are found in places which are not necessarily associated with the transmission of pain signals. Numerous laboratory experiments have shown that pain without anxiety generally does not cause endorphin release. Pain in the presence of anxiety, therefore, may be the triggering mechanism (Goldstein, Note 2). Also, the more

subtle aspects of endorphin action may play a direct role in reward mechanisms (Goldstein, Note 2). According to Goldstein (Note 2), animals have the ability to self-administer the morphine-like biochemical.

Pomeranz at the University of Toronto (cited in Goldstein, Note 2) found that acupuncture lost all effect when the pituitary was removed in experimental mice. It was concluded that acupuncture/acupressure may trigger a message which travels to the hypothalamus and then into the pituitary where it releases a pituitary endorphin, or it may trigger the release of endorphins elsewhere in the body which require the interaction of a pituitary factor (Goldstein, Note 2).

Goldstein (Note 3) stated that endorphin combats the effects of stress just as morphine does although the endogenous form has more potent and longer lasting effects. As more is known about these chemicals and their effects on the body, newer and better ways of managing pain and anxiety may become apparent (Wilson & Elmassian, 1981). Nurses, therefore, will be better able to intervene in positive and beneficial ways (Wilson & Elmassian, 1981).

#### Fear of Failure at School Tasks

Much of the research conducted on test-taking anxiety has involved the use of scales designed to measure the fear

of failure at school tasks (Kagan & Havemann, 1972). One such study conducted by Ganzer (1968) demonstrated that people who experience high test anxiety perform worse at learning tasks when someone is watching them. In this project, college women were divided into two groups, those who scored highest on a scale of test anxiety and those who scored lowest. The women were then asked to learn a list of nonsense syllables--some while they thought no one was watching and the others as they were aware that an observer was looking on from behind a one-way mirror. The results showed that subjects low in anxiety actually performed better when they had an observer while those high in anxiety did rather badly when they knew an observer was present (Ganzer, 1968).

Spielberger (1962) also explored the effects of anxiety on college performance. Two groups of male students were selected, those with relatively high anxiety and those with relatively low anxiety. College Board scores were then examined along with actual grades in college. It was demonstrated that students who were relatively free from anxiety made significantly better grades than did the anxious students (Spielberger, 1962).

In a follow-up study conducted by Spielberger, Denny, and Weitz (1962), freshmen students with high anxiety

scores who were in danger of failing college work were divided into two groups. One group took part in an active counseling program which would presumably reduce their anxiety about the college situation. The other group, matched as closely as possible for College Board scores, type of high school attended, and other factors influencing performance, did not receive counseling. The counseled group made an average improvement of more than one-half a grade point from midterm to the end of the first semester. The group which was not counseled improved by less than one-tenth of a grade point. Anxiety about the college situation and fear of failure does thus appear to be a frequent--though perhaps correctable--deterrent to college performance (Spielberger et al., 1962).

According to Atkinson (cited in Kagan & Havemann, 1972), students who are found to have low test anxiety tend toward intermediate levels of risk taking. Subjects with high test anxiety, however, tend to either be very conservative or to "go for broke." Similarly, it has been noted that college students with high levels of test anxiety tend to leave examination rooms early--as if to avoid further discomfort by continuing to try according to Atkinson (cited in Kagan & Havemann, 1972).



### Summary

Since published research on the use of acupressure for anxiety reduction is rather scarce, the literature review consisted of a brief history of acupuncture/acupressure therapy, research regarding endorphins, and research involving the fear of failure at school tasks.

The history of acupuncture and acupressure as described by Chang (1976) portrays factors which have influenced the development of this ancient science. Chang (1976) stated that the latter part of the twentieth century may someday be known as the "birth of the 'Golden Age' of acupuncture" (p. 16).

Studies conducted by Goldstein, Kosterlitz and Hughes, Simon and Snyder, Terenius, and Pomeranz involved a group of naturally occurring compounds known as endorphins (cited in Goldstein, Notes 1, 2, & 3). Acupuncture/acupressure may trigger a message which travels to the hypothalamus and then into the pituitary where it releases a pituitary endorphin, or it may trigger the release of endorphins in other areas of the body which require the interaction of a pituitary factor (Goldstein, Note 2). As more is known about these chemicals and how they effect the body, nurses will be better able to intervene in beneficial ways for managing pain and anxiety (Wilson & Elmassian, 1981).

Many studies have been conducted which explore the effects of anxiety on college performance. Numerous investigators have found that people who experience high levels of anxiety perform worse at learning tasks than those with low levels of anxiety (Ganzer, 1968; Kagan & Havemann, 1972; Spielberger, 1962; Spielberger et al., 1962).

## CHAPTER 3

### PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

A descriptive study using quasi-experimental design as described by Polit and Hungler (1978) was utilized in conducting this investigation. Volunteer subjects were placed into two groups by the process of fair sampling. Both the control and treatment groups were given the pre-test. The treatment group was then taught the acupressure procedures and self-administered the techniques after which both groups were posttested. Many members of the control groups were interested in receiving the treatment and were given the opportunity to do so after all data were collected. This was done so they could receive any possible benefits and was the investigator's way of expressing thanks for participating in the study. The independent variable in the study is the single acupressure session, and the dependent variable is the level of anticipatory anxiety as measured by the A-State scale of the State-Trait Anxiety Inventory.

### Setting

The study took place in a branch of a medium-sized state supported university located in a large metropolitan area of a mid-southwestern state. The treatment was given to subjects in a classroom of usual design. Adequate seating and lighting were provided and provisions were made so participants could easily hear the instructions.

### Population and Sample

The sample was drawn from a population of female senior nursing students. In order to be an eligible subject, students had to be in their last semester of coursework and anticipating taking final examinations within one week of data collection. These examinations are a requirement before graduation and a grade of 70% is considered passing.

According to Chan (1980a), sour foods, spicy foods, icy beverages, and meats containing large amounts of saturated fats such as beef and pork have been found to have counter effects on treatment results. Also, alcoholic drinks are particularly unfavorable (Chan, 1980a). Therefore, no one was permitted to participate who had eaten a large meal within the past 2 hours or who had consumed alcoholic beverages within the past 12 hours.

The process of fair sampling was used to divide subjects into two groups. A total of 67 subjects met eligibility requirements and 30 agreed to participate. Each volunteer was asked to draw a number from a "hat." Odd numbers were designated as the control group and even numbers were designated the treatment group.

#### Protection of Human Subjects

Appropriate measures were taken to protect the rights and welfare of participants. Approval to conduct the study was obtained from the Human Research Review Committee at Texas Woman's University (Appendix A) and from the graduate school (Appendix B). Form A, written presentation to subject (Appendix C), was used in gaining informed consent from each subject. It included an explanation of the procedure to be followed which stated that subjects agreed to allow the investigator to administer a questionnaire designed to determine the level of anxiety experienced at the time of its administration and to assign subjects to one of two groups. As a member of Group I, subjects agreed not to receive any treatment during the data collection period. After the posttesting period, however, an offer was made to provide an acupuncture session for interested members of the control group. As a

member of Group II, subjects agreed to be taught specific acupressure techniques and to participate in a session lasting approximately 30 minutes in which the treatment was self-administered under close supervision by the investigator. Participants also agreed to complete a repeat of the questionnaire.

A description of the associated risks, discomforts, and benefits was included on the consent form. Possible risks were improper release of information obtained by the investigator. Subjects were informed that no names were to be placed on the pre or posttests, but that numbers were to be written in the top right-hand corner so paired data could be obtained. The investigator had no way of connecting the names of participants to the numbers on the tool. Possible discomforts included pain or bruising caused by excess pressure applied to the acupressure points. Subjects were informed that pressure should not be hard enough to cause pain or bruising. The potential benefit to participants stated on the consent form was a possible reduction of the present transient level of anticipatory anxiety.

An offer to answer any questions concerning the procedures was stated on the form as well as an instruction that subjects were free to withdraw their participation at any

time. A statement which explained that medical service or compensation would not be provided by the university or the investigator as a result of injury from participation was also included. Approximately 5 minutes were allowed for participants to read the consent form after which important information was reiterated by the investigator. Also, agency permission for conducting the study (Appendix D) was obtained from the nursing school before data were collected.

#### Instrument

The A-State scale of the State-Trait Anxiety Inventory (Appendix E) is the tool of measurement for this study. It consists of 20 statements which require subjects to indicate how they feel at a given moment in time. According to Spielberger, Gorsuch, and Lushene (1970), scores on this instrument increase in response to various kinds of stress and decrease as a result of relaxation training. It is a sensitive indicator of the level of transitory anxiety experienced by individuals and the actual qualities measured involve feelings of tension, nervousness, worry, and apprehension (Spielberger et al., 1970).

The A-State scale is self-administered and requires approximately 6 to 8 minutes for initial completion.

Repeated administrations generally take 5 minutes or less. It should be noted, however, that there are no required time limitations (Spielberger et al., 1970).

The range of possible scores varies from a maximum of 80 to a minimum of 20. Subjects respond to each item by rating themselves on a 4-point scale. The 4 categories include: 1--Not at all; 2--Somewhat; 3--Moderately so; and 4--Very much so. Some of the items are worded in such a manner that a rating of 4 indicates a high level of anxiety while other items are worded so that a high rating indicates low anxiety. For such items, the scoring weights are reversed to 4, 3, 2, and 1 respectively.

#### Normative Data

Normative data for the A-State scale are available for a sample of 231 undergraduate college females from Florida State University. These students were enrolled in an introductory psychology course and were first tested during a regular class period. Normalized  $t$ -scores demonstrated a mean of 50 with a standard deviation of 10 (Spielberger et al., 1970).

#### Validity

Information on the construct validity of the A-State scale was provided by a sample of 977 undergraduate college



students at Florida State University. The subjects were first administered the scale with the standard instructions (NORM condition).<sup>\*</sup> They were then asked to respond according to how they thought they would feel just before taking an examination in an important course (EXAM condition).<sup>\*</sup> The overall mean score for males in the NORM condition was 40.02, and in the EXAM condition, it was 54.99. For females, the mean scores were 39.36 and 60.51 respectively. Critical ratios (C.R.) were reported for the differences between the means and point biserial correlations calculated as well. The overall C.R. was 42.13 with a point biserial correlation of .73. The mean score was considerably higher in the EXAM condition for both males and females. Also, all of the items except one significantly discriminated between these conditions for the males, and all of the items were significantly higher in the EXAM condition for females.

Additional data on validity for the A-State scale were obtained in a study involving 197 undergraduate students at Florida State University. Four different experimental conditions existed under which the subjects completed the scale. The initial administration was before

---

<sup>\*</sup> Author's designation for conditions under which tool was given.

any treatment (NORMAL condition); the second administration followed a 10-minute relaxation training period (RELAX condition); the third administration occurred after subjects worked for 10 minutes on the Terman Concept Mastery Test (EXAM condition) which had been introduced as a reasonably easy IQ test. The final administration occurred after the subjects viewed a stressful movie (MOVIE condition) depicting several accidents in a woodworking shop. Overall mean scores for males for NORM, RELAX, EXAM, and MOVIE conditions were 36.99, 32.70, 43.01, and 50.03 respectively. For females, these scores were 37.24, 29.60, 43.69, and 60.94. Mean scores as well as scores for individual items were lowest in the RELAX condition and highest in the MOVIE condition. Standard deviation scores for males were 9.57, 9.02, 11.23, and 12.48. Calculated alpha reliabilities were .89, .89, .92, and .94. Standard deviation scores for females were 10.27, 6.91, 11.59, and 11.99 with alpha reliabilities of .91, .83, .93, and .93 (Spielberger et al., 1970).

The scores in NORMAL and EXAM conditions were approximately the same for males and females indicating that these conditions had similar impact on both sexes. The MOVIE condition was more upsetting for females and the RELAX condition more effective in reducing their level of

A-State intensity. Such findings suggest females are more emotionally labile than males and/or are more willing to report their feelings. In conclusion, calculated values indicate that the A-State scale is a good and valid instrument (Spielberger et al., 1970).

### Reliability

In the same study involving 197 undergraduate college students at Florida State, test-retest reliabilities for the A-State scale were reported as follows: 1-hour interval, .33 (males) and .16 (females); 20 days, .54 (males) and .27 (females); 104 days, .33 (males) and .31 (females). It is evident that test-retest correlations for the A-State scale are relatively low ranging from .16 to .54. This is felt to be due to the fact that A-State measures are designed to reflect the influence of unique situational factors existing at the time of administration. Considering the transitory nature of anxiety states, measures of internal consistency such as the alpha coefficient provided a more meaningful index of the reliability than test-retest correlations. The alpha reliability coefficients ranged from .83 to .94. Thus, the internal consistency was found to be reasonably good (Spielberger et al., 1970).

### Data Collection

Data were collected 4 days before the subjects were to take their final examination in a community health nursing course. After a regular class period, the investigator introduced herself as a graduate student and asked for volunteers to participate in a study for her master's thesis. The nursing students were informed that the project involved the use of acupressure. Volunteers were asked to return the following morning for data collection, and although a total of 67 met eligibility requirements, only 30 returned the following morning to participate.

After subjects were given an opportunity to read the consent form, the investigator reiterated important points and subjects were asked to sign two copies--one for their records and the other to be returned to the investigator. Next, there was fair selection of the treatment and control groups. The pretest was given to all participants, and instructions on the scale were emphasized so subjects had a clear understanding to report feelings at this moment. After pretests were administered, the control group was asked to leave the classroom for approximately 15 minutes. At this time, the acupressure treatment was taught and self-administered by the experimental group. The control subjects were next asked to return to the room and all

participants were posttested. Finally, members of the control group who were interested were taught the treatment and self-administered it under close supervision by the investigator.

### Treatment

Acupressure is finger massage and/or pressure over standard acupuncture points. Treatment is to be applied to each point for approximately 7-10 seconds. It should not be hard enough to bruise. All points are to be treated bilaterally (Chan, 1980b). Specific acupressure points are described below:

1. An-mien--about 1 inch behind the ear lobe. The index finger is used to press hard (Chan, 1980b) (see Figure 1).

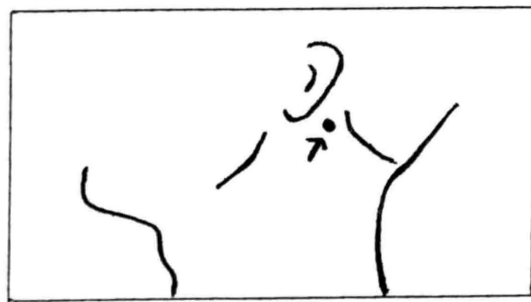


Figure 1.

2. Chin-so-na--compression of skin and muscles on the neck and shoulders. In a seated position, tilt the

head toward one shoulder. On the opposite side, run fingers firmly down the heavy muscle from the base of the skull to the shoulder. Note any small bumps or nodules and massage each. Next, return to the insertion of the muscle at the base of the skull and sink the third finger into the small, somewhat soft, swollen bump found there and massage using a small circular motion radiating from the center (Cerney, 1979) (see Figure 2).

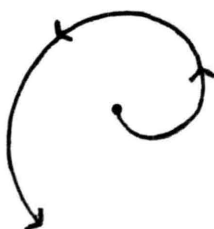


Figure 2.

3. Shen-man--the most distal skin crease of the wrist, on the ulnar side, medial to the tendon. Use the side of the thumbnail on the opposite hand to press hard (Chan, 1980b) (see Figure 3).

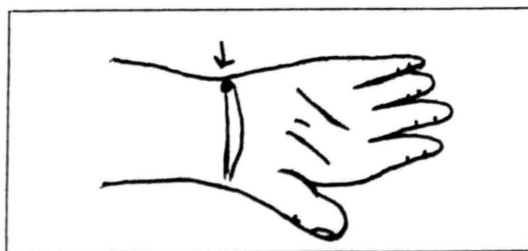


Figure 3.

4. Nei-kuan--about 2 inches above the middle of the palmar wrist crease, between the two tendons. Use the tip of the finger to press down and massage (Chan, 1980b) (see Figure 4).

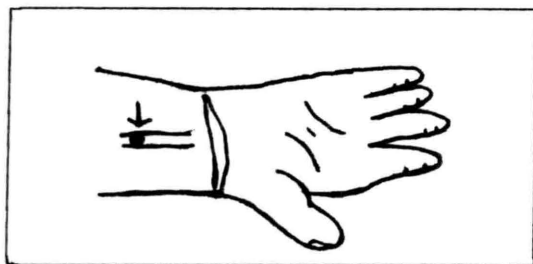


Figure 4.

5. Polyhidrosis--in the middle of the palm. Use the thumbnail of the opposite hand to press hard (Chan, 1980b) (see Figure 5).

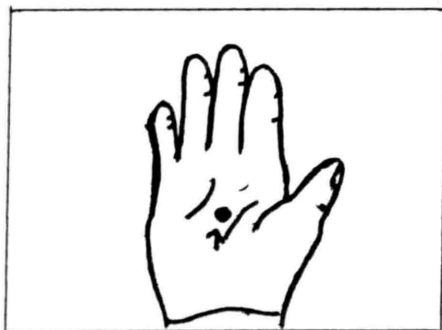


Figure 5.

6. Ho-ku--over the dorsum of the hand, between the first and second metacarpal bones. The thumb is used to

press against the second metacarpal bone (Chan, 1980b)  
(see Figure 6).

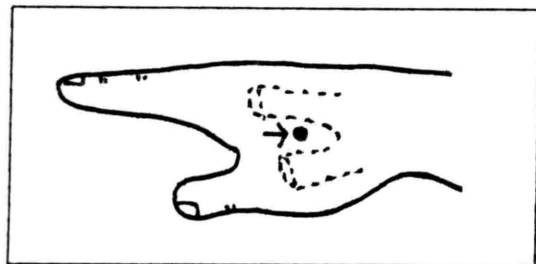


Figure 6.

7. Feng-chih--below the occipital bone, about 1.5 inches lateral to the midline of the head. Sit down and bend the head forward. Use the thumb to massage hard (Chan, 1980b) (see Figure 7).

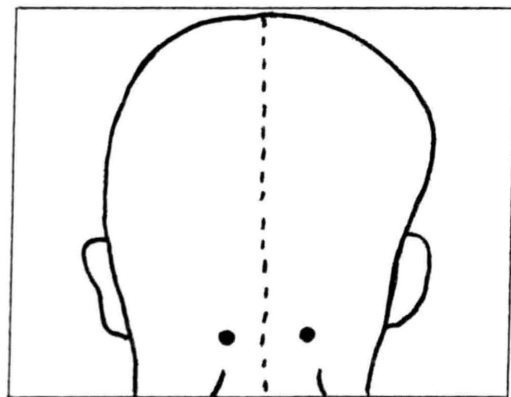


Figure 7.



### Treatment of Data

In order to control for the possibility of extraneous variables between the control and treatment groups, the analysis of covariance was utilized to determine the significance of differences between group means at the .05 level of probability. Pretest scores were used as the covariate, the independent variable was the single acupressure session, and the dependent variable was the level of anticipatory anxiety as measured by the A-State scale.

## CHAPTER 4

### ANALYSIS OF DATA

This investigation was carried out in order to determine whether or not a single acupressure session would produce a reduction in anticipatory anxiety among senior nursing students. A description of the sample and results from the study will be presented in this chapter.

#### Description of Sample

No demographic data were collected for this study. All subjects were senior nursing students from the same university and all were female. A total of 67 subjects met eligibility requirements, but only 30 volunteered to participate in the study. Each group was assigned 15 members by fair sampling.

#### Findings

A single directional hypothesis was tested in this study. It stated that the posttest scores on the A-State scale of the State-Trait Anxiety Inventory will be lower for senior nursing students anticipating test-taking who have been treated with a single acupressure session than

for senior nursing students who have not been treated with the acupressure session. In order to control for any extraneous variables which may have been present between the control and treatment groups, the analysis of covariance was utilized in determining the significance of differences between group means at the .05 level of probability.

The pretest scores of the treatment group ranged from 25 to 75. Posttest scores of the treatment group ranged from 20 to 49. All 15 subjects in this group had lower scores on the posttest than on the pretest.

Pretest scores of the control group ranged from 36 to 65, and posttest scores of this group ranged from 40 to 73. Posttest scores among the control group members fluctuated with 8 having higher scores, 6 having lower scores, and 1 participant scored the same on both the pretest and posttest. Individual raw scores are presented in Table 1.

The pretest mean score for the control group was 52.47 with a standard deviation of 9.75. The posttest mean score for the control group was 55.20 with a standard deviation of 10.47. The pretest mean score for the treatment group was 53.93 with a standard deviation of 11.85, and the posttest mean score for the experimental group was

Table 1  
Individual Raw Scores on Pretest and  
Posttest of Group A and Group B

Control group A		Treatment group B	
Pretest	Posttest	Pretest	Posttest
52	53	50	33
42	40	25	20
46	54	47	31
47	42	60	48
42	52	48	31
49	73	53	39
41	44	63	40
59	54	72	43
62	60	47	39
60	60	59	43
63	57	55	33
65	55	47	34
36	43	57	36
60	69	51	36
63	72	75	49

37.00 with a standard deviation of 7.36. Mean scores and standard deviations for the two groups are summarized in Table 2.

Table 2

Mean Scores and Standard Deviations of Pretest and Posttests for Group A and Group B

Group	Pretest		Posttest	
Control	Mean	52.47	Mean	55.20
Group A	S.D.	9.75	S.D.	10.47
Treatment	Mean	53.93	Mean	37.00
Group B	S.D.	11.85	S.D.	7.36

In Table 3, the sum of the squares of the covariate pretest is 959.49 with 1 degree of freedom, a mean square of 959.49, an  $F$ -ratio of 23.52, and the significance of  $F$  at the 0.001 level. The sum of the squares of the main effects group is 2717.62 with 1 degree of freedom, a mean square of 2717.62, an  $F$ -ratio of 66.61, and the significance of  $F$  at the 0.001 level. The sum of squares of the residual is 1101.59 with 27 degrees of freedom and a mean square of 40.80. The total sum of squares is 4778.70 with 29 degrees of freedom and a total mean square of 164.78.

Table 3  
Significance of Differences Between Group Means

Source of Variation	Sum of Squares	<u>df</u>	Mean Square	<u>F</u>	Significance of <u>F</u>
Covariates pretest	959.49	1	959.49	23.52	0.001
Main effects group	2717.62	1	2717.62	66.61	0.001
Residual	1101.59	27	40.80		
Total	4778.70	29	164.78		

The significance of  $F$  was found to be 0.001. This is less than the 0.05 level of probability. Therefore, the results are significant and the hypothesis is accepted as stated.

#### Summary of Findings

Individual raw scores for the control group ranged from 36 to 65 (pretest) and 40 to 73 (posttest). Individual raw scores for the treatment group ranged from 25 to 75 (pretest) and 20 to 49 (posttest). The analysis of covariance was used to test the significance of differences between group means. Mean scores for the control group were 52.47 (pretest) and 55.20 (posttest). Mean scores for the experimental group were 53.93 (pretest) and 37.00 (posttest). Results demonstrated that there is a significant difference at the 0.001 level of probability. The hypothesis has therefore been accepted as stated.

## CHAPTER 5

### SUMMARY OF STUDY

The following chapter is a summary of how the study was conducted. It includes a discussion of the meanings extrapolated from the results as well as conclusions and implications based upon the findings. Suggestions for further research will also be provided.

#### Summary

The problem of this study was to investigate whether or not there is a difference in the amount of anxiety before and after an acupressure session administered to senior nursing students who are anticipating test-taking. The hypothesis stated that there would indeed be a reduction in the amount of anticipatory anxiety experienced by senior nursing students after the single acupressure session as compared to a group of senior nursing students anticipating test-taking who had not had the treatment. The hypothesis is based on evidence that acupressure stimulates the release of endorphins via the meridian system and that endorphins have a sedative-like effect which reduces one's level of anxiety.



A quasi-experimental design was utilized in conducting this investigation. Both the control group and the treatment group were pretested. The treatment group was then taught the acupressure procedures and self-administered the techniques after which both groups were posttested.

The sample was drawn from a population of senior nursing students who were anticipating taking final examinations within 4 days of data collection. Volunteer subjects were screened for eligibility before they were permitted to participate. The process of fair sampling was used to divide subjects into the two groups. There was a total of 30 participants--15 in each group.

The analysis of covariance was used to determine the significance of differences between group means at the 0.05 level of probability. Pretest scores were the covariate, the independent variable was the single acupressure session, and the dependent variable was the level of anticipatory anxiety as measured by the A-State scale.

#### Discussion of Findings

Results showed that there was a significant difference in mean scores between the groups. The pretest mean for both groups and the posttest mean for the control group were approximately the same and were comparable to values

found in the normative data for undergraduate college females as stated by Spielberger et al. (1970). The posttest mean score for the treatment group dropped significantly, however, indicating that there was a reduction in the level of anticipatory anxiety experienced by those individuals.

It is evident from the individual raw scores that many variables which influence anxiety other than anticipation of test-taking may have been present. The transitory nature of state-anxiety is apparent through the fluctuations of pretest and posttest scores of both groups. In addition, scores may represent Hawthorne effects. The procedures required in obtaining informed consent made it impossible to collect data without subjects knowing why the treatment was being given.

### Conclusions and Implications

Based upon the findings of this study, the following conclusions are made:

1. In a group of female senior nursing students anticipating test-taking, a single acupressure session was shown to reduce levels of anticipatory anxiety within a relatively short period of time.

2. Adequate results can be obtained by self-administration of the acupressure techniques.

3. The A-State scale of the State-Trait Anxiety Inventory is an appropriate tool for measuring anticipatory anxiety among female senior nursing students.

It has been documented that excessive anxiety interferes with the learning process (Peplau, 1963) and with performance in regards to test-taking (Spielberger, 1962). These data imply that acupressure could be considered for inclusion within nursing curriculums, and it should be utilized as a nursing intervention for use with oneself or with clients.

#### Recommendations

The following recommendations for further research are made:

1. Duplication of this study with inclusion of male participants.
2. Duplication of this study with posttesting at timed intervals in order to determine how long the effects of acupressure for anxiety reduction last.
3. Replication of the study with means for determining the exact cause of the operant anxiety.

## APPENDIX A

TEXAS WOMAN'S UNIVERSITY  
Box 23717, TWU Station  
Denton, Texas 76204

1810 Inwood Road  
Dallas Inwood Campus

HUMAN SUBJECTS REVIEW COMMITTEE

Name of Investigator: Mary K. Garcia Center: Dallas  
Address: 201 S. Rosemont Date: 4/20/81  
Dallas, Texas 75208

Dear Mrs. Garcia:

Your study entitled Acupressure for Reduction of Anticipatory

Anxiety Among Nursing Students

has been reviewed by a committee of the Human Subjects Review Committee and it appears to meet our requirements in regard to protection of the individual's rights.

Please be reminded that both the University and the Department of Health, Education, and Welfare regulations typically require that signatures indicating informed consent be obtained from all human subjects in your studies. These are to be filed with the Human Subjects Review Committee. Any exception to this requirement is noted below. Furthermore, according to DHEW regulations, another review by the Committee is required if your project changes.

Any special provisions pertaining to your study are noted below:

Add to informed consent form: No medical service or compensation is provided to subjects by the University as a result of injury from participation in research.

Add to informed consent form: I UNDERSTAND THAT THE RETURN OF MY QUESTIONNAIRE CONSTITUTES MY INFORMED CONSENT TO ACT AS A SUBJECT IN THIS RESEARCH.

The filing of signatures of subjects with the Human Subjects  
Review Committee is not required.

       Other:

  X   No special provisions apply.

Sincerely,

*Estelle D. Kurtz*

Chairman, Human Subjects  
Review Committee

at           Dallas          

PK/sml/3/7/80

## APPENDIX B

## TEXAS WOMAN'S UNIVERSITY

DENTON, TEXAS 76204

THE GRADUATE SCHOOL


June 4, 1981

Mrs. Mary K. Garcia  
201 S. Rosemont  
Dallas, Texas 75208

Dear Mrs. Garcia:

I have received and approved the Prospectus for your research project. Best wishes to you in the research and writing of your project.

Sincerely yours,

  
Robert S. Pawlowski  
Provost

RP:dl

cc Dr. Lois Hough  
Dr. Anne Gudmundsen  
Graduate Office



## APPENDIX C

Consent Form  
Texas Woman's University  
College of Nursing

(Form A -- Written presentation to subject)

Consent to Act as a Subject for Research and Investigation:

The following information is to be read to or read by the subject. One copy of this form, signed and witnessed, must be given to each subject. A second copy must be retained by the investigator for filing with the Chairman of the Human Subjects Review Committee. A third copy may be made for the investigator's files.

1. I hereby authorize Mary K. Garcia  
(Name of person(s) who will perform  
procedure(s) or investigation(s))

to perform the following procedure(s) or investigation(s):  
(Describe in detail)

a. To administer a questionnaire designed to determine the level of anxiety I am experiencing at the time of its administration. I understand the questionnaire takes approximately 6-8 minutes to complete.

b. To assign me to one of two groups in order to investigate whether or not acupressure is effective in reducing transient states of anxiety.

Group I: As a member of Group I, I understand that I will not receive any treatment during the data collection period. However, after the post-testing period, Mrs. Garcia will offer a session for interested members of the control group to learn the acupressure techniques, and I may participate if so desired.

Group II: As a member of Group II, I agree to be taught specific acupressure techniques and to participate in a session lasting approximately 30 minutes in which the procedures will be self-administered.

c. To administer a repeat of the questionnaire.

(Form A - Continuation)

2. The procedure or investigation listed in Paragraph 1 has been explained to me by Mary K. Garcia.  
(Name)
3. (a) I understand that the procedures or investigations described in Paragraph 1 involve the following possible risks or discomforts: (Describe in detail)
- 1) Improper release of information obtained by the investigator: No names will be placed on pre or post-tests. Each participant will draw a number from a "hat", and will be asked to place it in the top right-hand corner of the questionnaire. The investigator will have no way of knowing which questionnaire belongs to a particular subject.
- 2) Discomfort or bruising caused by excess pressure applied to the acupressure points: Treatments are to be self-administered under close supervision of the investigator. I understand that pressure should not be hard enough to cause excess discomfort or bruising.
- (b) I understand that the procedures and investigations described in Paragraph 1 have the following potential benefits to myself and/or others:
- 1) Possible reduction of my present transient level of anticipatory anxiety.
- (c) I understand that - No medical service or compensation is provided to subjects by the university or investigator as a result of injury from participation in research.
4. An offer to answer all of my questions regarding the study has been made. If alternative procedures are more advantageous to me, they have been explained. I understand that I may terminate my participation in the study at any time.

\_\_\_\_\_  
Subject's Signature

\_\_\_\_\_  
Date

## APPENDIX D

TEXAS WOMAN'S UNIVERSITY  
COLLEGE OF NURSING

AGENCY PERMISSION FOR CONDUCTING STUDY\*

THE

GRANTS TO Mary K. Garcia  
a student enrolled in a program of nursing leading to a  
Master's Degree at Texas Woman's University, the privilege  
of its facilities in order to study the following problem.

# Acupressure for Reduction of Anticipatory Anxiety Among Nursing Students

The conditions mutually agreed upon are as follows:

1. The agency (~~may~~) (may not) be identified in the final report.
2. The names of consultative or administrative personnel in the agency (~~may~~) (may not) be identified in the final report.
3. The agency (~~wants~~) (does not want) a conference with the student when the report is completed.
4. The agency is (willing) (~~unwilling~~) to allow the completed report to be circulated through interlibrary loan.
5. Other

Date: 4-30-81

Signature of Agency Personnel

Kay Garcia  
Signature of Student

Lois Dough  
Signature of Faculty Advisor

\*Fill out & sign three copies to be distributed as follows:  
Original - Student; First copy - Agency; Second copy - TWU  
College of Nursing.

## APPENDIX E

Copies of the A-State scale of the State-Trait Anxiety  
Inventory may be obtained by contacting the following:

Consulting Psychologists Press

577 College Avenue

Palo Alto, California 94306

#### REFERENCE NOTES

1. Goldstein, A. The endorphins: Their discovery and significance. In J. Bonica (Chair), Proceedings: Current concepts in postoperative pain. Symposium presented at the meeting of the American Society of Anesthesiologists, New Orleans, 1977.
2. Goldstein, A. The endorphins and pain: What we have learned. In J. Bonica (Chair), Proceedings: Current concepts in postoperative pain. Symposium presented at the meeting of the American Society of Anesthesiologists, New Orleans, 1977.
3. Goldstein, A. The endorphins: Their physiologic and pathologic potentials. In J. Bonica (Chair), Proceedings: Current concepts in postoperative pain. Symposium presented at the meeting of the American Society of Anesthesiologists, New Orleans, 1977.



## REFERENCES

- Cerney, J. V. Acupressure: Acupuncture without needles. New York: Cornerstone Library, 1979.
- Chan, P. Ear acupressure. Monterey Park, Calif.: Chan's Corporation, 1977.
- Chan, P. Essentials of acupressure therapy. Monterey Park, Calif.: Chinese Total Health Center, 1980. (a)
- Chan, P. Finger acupressure. Los Angeles, Calif.: Price/Stern/Sloan, 1980. (b)
- Chang, S. T. The complete book of acupuncture. Millbrae, Calif.: Celestial Arts, 1976.
- Ganzer, V. J. Effects of audience presence and test anxiety on learning and retention in a serial learning situation. Journal of Personality and Social Psychology, 1968, 8, 194-199.
- Hughes, J., Smith, T., Morgan, B., & Fothergill, L. Purification and properties of enkephalin: The possible endogenous ligand for the morphine receptor. Life Sciences, 1975, 16(12), 1753-1758.
- Kagan, J., & Havemann, E. Psychology: An introduction (2nd ed.). New York: Harcourt Brace Jovanovich, 1972.
- Moore, R. Y. Brain lesions and amine metabolism. International Review of Neurobiology, 1970, 13, 67-91.
- Moruzzi, G., & Magoun, H. H. Electroencephalography. Clinical Neuro-physiology, 1949, 1, 455-473.
- Pasternak, G. W., Goodman, R., & Snyder, S. N. An endogenous morphine-like factor in mammalian brain. Life Sciences, 1975, 16(12), 1765-1769.
- Peplau, H. A working definition of anxiety. In S. F. Burd & M. A. Marshall (Eds.), Some clinical approaches to psychiatric nursing. New York: Macmillan Company, 1963.

- Polit, D., & Hungler, B. Nursing research: Principles and methods. Philadelphia: J. B. Lippincott, 1978.
- Smythies, J. R. Brain mechanisms and behavior (2nd ed.). New York: Academic Press, 1970.
- Spielberger, C. D. The effects of manifest anxiety on the academic achievement of college students. Mental Hygiene, 1962, 46, 420-426.
- Spielberger, C. D., Denny, J. P., & Weitz, H. The effects of group counseling on the academic performance of anxious college freshmen. Journal of Counseling Psychology, 1962, 9, 195-204.
- Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. STAI manual for the State-Trait Anxiety Inventory ("Self-Evaluation Questionnaire"). Palo Alto, Calif.: Consulting Psychologists Press, 1970.
- Wensel, L. O. Acupuncture in medical practice. Reston, Va.: Reston Publishing, 1980.
- Wilson, R. W., & Elmassian, B. J. Endorphins. American Journal of Nursing, 1981, 81(4), 722-725.