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thesis entitled
A COMPARISON OF THE EFFECTS OF EMG BIOFEEDBACK TRAINING
AND COGNITIVE RESTRUCTURING ON TEACHER STRESS
presented by
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has been accepted towards fulfillment
of the requirements for
Ph.D. degree in Counseling Psychology


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NOV 08 82
JAN 23 84
30 R
NOV 2 82
JAN 7 85
6337
EC 5498
JUL 25 83
JAN 15 1985
FEB 06 84 038
JUL 16 88

A COMPARISON OF
THE EFFECTS OF EMG BIOFEEDBACK TRAINING
AND COGNITIVE RESTRUCTURING
ON
TEACHER STRESS

by
Richard C. Day

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY
College of Education
Department of Counseling and Educational Psychology

1980

ABSTRACT

A COMPARISON OF THE EFFECT OF EMG BIOFEEDBACK TRAINING AND COGNITIVE RESTRUCTURING ON TEACHER STRESS

By

Richard C. Day

The purpose of the study was to examine the effect of two training techniques on the reduction of teacher stress. Many studies had revealed that the phenomenon of stress was a realistic concern of teachers. Little research had been done to evaluate models that purport effectiveness in reducing stress with a sample of teachers.

The subjects in the study were 27 volunteer teachers from elementary, middle, and high schools in Lansing, Michigan. These subjects were administered the Life Experiences Survey and blocked on their negative change score as high, medium or low in their current stress level. Through random assignment, all subjects were placed in one of three treatment groups. The first group received training in rational restructuring on a twice weekly for five weeks individualized basis. The second group received EMG biofeedback training on the same basis. The third group received no training and served as a control group.

Before training began, all subjects were pretested for systolic and diastolic blood pressure, the State-Trait Anxiety Inventory (Trait Subscale only), and the Teaching Anxiety Scale. At the completion of the five week period,

all subjects were posttested on each of the dependent measures. This included the State Subscale of the STAI as well as the three previously mentioned measures. A change score was computed for each of the subjects. These change scores, plus the posttest score from the State Subscale, were analyzed to assess differences between the treatment, level, and interaction of treatment and level for the three groups. A Multivariate Analysis of Variance (MANOVA) plus separate Analysis of Variance (ANOVAs) were computed to test the 18 hypotheses. Post hoc comparisons using Dunn's procedure were conducted when differences in treatment were found. In addition, correlations of the dependent measures change scores were computed for all treatments and each of the separate treatment conditions.

The overall MANOVA revealed no significant differences for treatment, level or treatment by level interaction. However, separate ANOVAs did reveal significant differences for treatment on the Teaching Anxiety Scale ($p = .01$) and the Trait Subscale ($p = .02$). No significant differences were found for systolic and diastolic blood pressures nor were any found for the State Subscale. None of the ANOVAs denoted significant differences for levels of stress or interactions of treatments and levels. The post hoc T-tests revealed that the cognitive restructuring had greater reduction in teaching anxiety ($p = .005$) and trait anxiety ($p = .017$) than did the control group. The biofeedback group had a greater reduction in trait anxiety ($p = .013$) than did the

control group. A post hoc T-test also revealed no significant differences between the cognitive restructuring and biofeedback treatment conditions.

This research presents preliminary evidence of the positive effects of biofeedback training and cognitive restructuring on reducing teacher stress. The data suggests that cognitive restructuring may be more effective in that it reduces both general stress and the specific stress related to teaching. It was hoped that the results would provide a small piece in the puzzle of this very important professional concern of teachers.

ACKNOWLEDGMENTS

A dissertation is much more than pages and binding, it represents, in this case, 1 year of ups and downs in my life. This work would not have been completed without the support and help of many individuals. It is with my sincerest appreciation that I acknowledge the following people:

Bob B. Winborn, committee chairperson, who gave me the original idea for the study and the freedom to pursue it in my own way.

Joyce G. Putnam, committee member, who cared and looked out for me for four years and who, through modeling, taught me the joy of being a learner.

Andrew C. Porter, committee member and research consultant, who gave of his time, knowledge and expertise and in the process taught me how to love numbers.

Dozier Thornton, committee member and clinical supervisor whose gentle manner and belief in me was very important.

The 27 Lansing teachers who participated in the study during a busy school year, who gave freely of their time and selves, the city of Lansing is fortunate to have such capable people in its schools.

Pat Lustman and Claudia Sowa, my partners and closest friends. Your friendships will always mean a great deal to

me and are one of the nicest parts of my doctoral experience. May both of your buckets always runneth over.

Deborah Collver, who assisted in the manuscript preparation and did all of the typing, a bright and capable woman who helped me meet all of the deadlines.

Ed and Sally Pankratz, my inlaws, who cared about us and gave financial support when it was critically needed.

Robert and Lucile Day, my parents, who loved me and taught me to believe in myself.

Barbara Day, my wife and friend, who has been my emotional support and has sacrificed much to help me accomplish this goal. Her love is the best thing that ever happened to me.

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CHAPTER I

INTRODUCTION AND REVIEW OF THE LITERATURE

Statement of the Problem

Classroom stress is regarded as one of the most serious problems facing education today, affecting at least ten percent of the nation's 2.2 million elementary and secondary teachers. (Lansing State Journal, 7/20/79)

The effect of stress on teachers is a long standing concern of the teaching profession. In surveys dating from 1939 to 1967, the National Education Association (NEA) has reported a large and growing percentage of teachers stating that they were working under considerable levels of stress. In its 1979 national convention, the NEA made teacher stress the main theme. When this is combined with the impressive amount of research that demonstrates the destructive and harmful effect on emotional and physical well being of prolonged states of stress (Selye, 1976), it is obvious that a serious problem exists.

The demands of teaching have the high stress characteristics of being unpredictable, unavoidable and of an unknown frequency and duration. A teacher is never sure on any given school day if and when a conflict with a student, parent or other school personnel is going to occur. The teacher is aware, however, that an error in handling the conflict can result in problems for him/herself, parents or other school personnel. Hunter (1977) argues for interventions that might

help teachers cope with the high stress characteristics of their job.

We have long acknowledged the variance in student learning needs; it's about time school districts accommodated the variance in the needs of teachers. This can be partially met by programs continuing individualized professional growth, providing constantly accelerating coping and predictive skills that will increase satisfaction and reduce stress in fulfilling the daily demands in teaching.
(p. 125)

Therefore, treatment interventions that have potential for reducing stress and increasing job satisfaction need appraisal within the specific context of the teaching role. Kyriacou and Sutcliffe (1979) report a study conducted with a sample of 218 teachers in 16 comprehensive schools in England. The results indicated that self reported teacher stress was negatively associated with job satisfaction ($r = -.27$; $p < .01$) and positively associated with intention to leave teaching ($r = .18$; $p < .01$). This supports the position that stress in teaching results in negative feeling toward teaching as an occupation.

Purpose

The purpose of this study was to examine the effect of stress reduction on practicing public school teachers. Teachers were taught to reduce stress through either biofeedback training (Brown, 1977) or cognitive restructuring as described by Goldfried, Decenteneo and Weinbert (1974). The study addressed two fundamental questions: (1) Do either of these treatments have a positive effect on reducing teacher stress?, and (2) If they are effective, is one more effective than the other?

The study had the possibility of benefiting not only the sample selected, but also of providing timely and valuable information to a large national population of teachers. The findings should provide a partial answer to the numerous requests for research in specific stress reduction techniques for teachers (Cichon & Koff, 1978; Keavney & Sinclair, 1978; Kyriacou & Sutcliffe, 1978; Hunter, 1977).

The sample selected had the opportunity to benefit from techniques that have been found effective with other populations. Sample teachers were worked with in the environment of the school. They had the possibility of practicing stress reduction in their actual classrooms. A reduction in teacher stress has the potential for increasing teachers' job satisfaction which in turn has possible benefits for the millions of students in their respective classrooms.

Definition of Terms

Stress

Recent research in stress has brought conflict in reaching an agreement on the definition of the word. Until the early 1970's, Selye's definition (1956) of stress as a series of non-specific biological responses, which in turn promoted the "General Adaption Syndrome" (GAS), was widely accepted. Selye (1956) defined the GAS as a three staged physiological adaption system consisting of an alarm reaction, a stage of resistance and a stage of exhaustion, which was put in motion by any noxious stimulus. Selye was careful to point out the distinction

between the stressor agent and the non-specific physiological state of stress. Recent writings in the field have challenged Selye's postulates regarding the importance of non-specificity in the production of illness. Lazarus (1974) and Mason (1971, 1975a & 1975b) have reviewed laboratory studies designed to test the effect on the GAS if psychological factors were minimized.

When special precautions are taken, however to minimize psychological reactions in the study of physical stimuli, such as heat, fasting and moderate exercise, it now appears that the pituitary-adrenal cortical system is not stimulated in non-specific fashion by these stimuli which are generally regarded as "noxious", "demanding", or as appreciably disturbing to homeostatic equilibrium. (Mason, 1975b, p. 24)

This points to the importance of considering psychological conditions in assessing stress states and their relationship to physical well being. Monat and Lazarus (1977) amplify the pragmatic concern of anyone conducting stress related research in 1979.

....the arena that the stress refers to consists of any event in which environmental demands, internal demands or both tax or exceed the adaptive resources of an individual, social system or tissue system. However one chooses to define stress, to avoid confusion, it seems mandatory that the concepts and procedures employed in their study be made explicit; i.e., the antecedent condition used to induce "stress", the response patterns measured as indices of "stress" and finally, the intervening process believed responsible for the nature of the response must be indicated. (p. 3)

Operational Definition of Teacher Stress

For the purpose of this study, teacher stress shall be defined according to the three phased formula given by Monat and Lazarus (1977). Teaching presents a person with unique external and internal demands that have the potential for exceeding the adaptive capabilities of a person's physiological and psychological homeostatis. The internal demands as delineated by Fuller (1974) are predominated by a concern for benefiting pupils in their classrooms. These demands include maintaining an orderly room for six hours a day, five days a week, achieving an appropriate interpersonal relationship with each child in the classroom and producing growth oriented instructional content that engages all the pupils in learning.

Teachers are also faced with numerous external demands caused by their profession. These include requests from school administrators to participate in after school workshops or consultive meetings with special services staff, as well as requests from parents for conferences regarding their children. The building one upon another of these internal and external demands creates a specific type of stressor that results in the wear and tear of stress on the physiological and psychological make-up of the teacher. Studies have indicated that systolic blood pressure is inflated by this process (Wheatley, 1977) and anxiety research has also identified this process as producing a state of anxiety in the person (Cattell, 1966). For the purpose of this study, it shall be assumed that the intervening process has both a cognitive and physiological

nature. The overall process then of unique internal and external teaching demands interacting with a physiologic state and cognitive structures, which in turn produces inflated systolic blood pressure and a state of anxiety, is the operational definition of teacher stress for this study.

REVIEW OF LITERATURE

Overview

In surveying the scientific literature related to stress, it appears that stress research can be organized into three basic areas. These areas have been delineated by Lazarus (1966), Appley and Trumbell (1967), Levine and Scotch (1970), McGrath (1970), and Cox (1978). The first area is a response based definition of stress. In this definition, the person's response to the environment which includes noxious and disturbing events is considered the prime factor in identifying stress. The response can be of either a physiological or psychological nature. Frankenhauser (1975) has pointed to the internal inconsistency of such a definition. She points out that a response can be a stimulus for another response, creating a response-stimulus chain.

A second way of defining stress is through a stimulus based mode. In this model, the stimulus from the external environment is described as stress, which in turn wears and tears on the person. This system borrows from the field of engineering. Man is considered essentially a machine which is capable of a certain amount of stress. If this level is

exceeded, the man (a machine) will break down (Cox, 1978).

The third definition occurs through viewing stress as the lack of "fit" between a person's expectations and capacities. Welford (1973) writes of stress occurring whenever there is a shift from a person's optimal state of demand, which meshes with his performance, to a suboptimal or supraoptimal state of demand. This definition is very similar to Hebb's (1955), in which he discusses the U-shaped relationship between arousal and performance. It should be noted that all three definitions share some common grounds.

For the purpose of this study, we shall consider research on stress under the general rubrics of physiological and psychological. Physiological stress shall include both response and stimulus based definitions. Psychological stress shall also include response and stimulus based definitions as well as "fit" or "coping" definitions. A third area of review shall consist of that research on stress that is specifically concerned with teachers.

Physiological Stress

The most significant figure in studying the physiological response of stress on the organism is Hans Selye. Selye was a student of Walter Cannon, who originated the flight or fight response repertoire to stressful events (Cannon, 1931). In 1936, following the work of Cannon, Selye published "A Syndrome Produced by Diverse Nocuous Agents". He delineated what he believed was a universal and non-specific response to stress in

that it could be provided by a variety of stimuli. The first phase was activated when the organism came in contact with a potentially harmful agent. This activated an alarm reaction in which the organism's defenses rose to deal with the agent. The physiological component of this reaction involved increases in sympathetic-adrenomedullary activity in that epinephrine was pumped into the vascular system. Changes also occurred in adrenocortical activity in response to stressors. Essentially, the adrenal cortex functions by producing three different types of steroid hormones; the mineralocorticoids, the glucocorticoids, and the androgens. The mineralocorticoids effect the kidneys in their removal or retention of sodium from the urine. The adrenal androgens imply a male hormone although they play an important role for both sexes. Little is known about the exact workings of this group. However, they are known to stimulate pubic and axillary hair growth at puberty and also appear to be related to the development of sexual desire. The glucocorticoids have the effect of regulating water excretion by the kidney, the manufacturing of red blood cells and, importantly for this study, the regulation of normal blood pressure. Selye noted that the alarm reaction in severity could result in death.

The second phase of the adaption syndrome is that of resistance. In this stage, the body attempts to make a physiological adjustment to survive in spite of the noxious agent. Many of the diseases of adaption are seen to have resulted from this process. Increased glucocorticoids over a period of time can have the effect of raising the normal level of

blood pressure to a higher and maladaptive level. Although this process is still not a definitive area of scientific research (Wheatley, 1976), it is known that high blood pressure is a direct cause of heart and kidney disease.

The final phase of the adaption syndrome is that of exhaustion. This may occur after prolonged exposure of the system to a particularly destructive stressor. The cost to the system of maintaining the new level of adaption may be too great. The system simply surrenders and is overcome by the stressor. The response of the sympathetic-adrenomedullary activity and the adrenocortical activity is very similar to the alarm reaction. The end result of the exhaustion phase, however, is death. Selye has conducted research in which he identified a triphasic physiologic response pattern that results from the General Adaption Syndrome (GAS). Autopsies on animals revealed an enlargement and dark discoloration of the adrenals; intense shrinkage of the thymus, spleen and lymph nodes; and deep bleeding ulcers of the stomach and upper intestines (Selye, 1956).

Critical to Selye's work was the non-specificity of the triphasic response to a variety of noxious stimuli. He noted certain specific responses to heat and cold such as sweating or shivering, but pointed out the internal physiologic response pattern of certain organs was the same for all stimuli. He likened this response to the general condition of being sick, characterized by loss of appetite, loss of weight and strength, and loss of ambition - no matter what the illness was. In

Selye's case, the triphasic physiological response pattern to various stressors across time in a general adaption syndrome results in an identifiable physiological state which he defined as stress.

Selye's work, until recently, has stood unchallenged as the definitive work on physiological response patterns of stress. Mason has conducted a series of experiments in which he has examined the integration of the endocrine system to the study of stress. Mason (1968) conducted studies with Rhesus monkeys involving avoidance conditioning. The monkeys in the study had to press a bar at a continuous and moderate rate to avoid an electrical shock. He noted a rise in urinary 17-hydroxycorticosteroids, adrenaline noradrenaline, plasma levels of butonal-extractable iodine (which indicates thyroid activity), and growth hormones during the 72 hour experimental period. He also noticed a decline in urinary androgens and estrogen levels as well as plasma insulin levels. This suggests, according to Mason (1968), that the neuroendocrine response system is organized in such a way that those hormones promoting catabolic mobilization of energy resources rise during avoidance and those that promote anabolism decline. In investigating the hormonal activity after the avoidance learning was over, catabolic hormones declined and anabolic hormones rose which is a function of the restorative process.

In many ways, these studies support Selye's position regarding adrenocortical reaction during the alarm phase. This points to a concurrent response of the endocrine system

to stress. It expands the range of systems from the adreno-medullary and adrenocortical systems to also include the pituitary-thyroid, pituitary-gonadal, growth hormone, and insulin systems. Mason (1975a) states the most common pattern of observable stress response is an elevation of catabolic hormone levels and a decline in anabolic hormone levels. The most consistent systems in producing this response pattern from individual to individual are the adrenocortical (which are related to blood pressure regulation), the sympathetic-adrenomedullary, and the thyroid system.

Mason (1975a) has also challenged the importance of non-specificity of the stress response. Mason points out that research that demonstrated the non-specificity in the physiological response to stressors neglected to describe the common component of the experimental setting. He points out the problem he encountered in studying the effect of fasting on 17-hydroxycorticosteroid (17-OHCS) levels. Mason writes:

For example, in our first effort to study fasting, we simply stopped feeding two monkeys out of a group of eight housed within the same room. The fasting monkeys were, thus, suddenly deprived of their daily food for three days while their neighbors were eating as usual. The familiar animal caretaker was coming into the room at the usual times and the sounds, sights and odors associated with normal eating were present as usual, but these two monkeys found themselves unaccountably being ignored in passing out food. As might be expected under these conditions, the deprived animals often vocalized in apparent protest. In addition, when the fasting is underway, there is the factor of the discomfort of an empty gastro-intestinal tract as another possible basis for psychological reaction. It is not surprising, then, that "fasting" under these conditions was associated with a marked increase in urinary 17-hydroxycorticosteroid (17-OHCS) levels in the first monkeys so studied. (1971, p. 326)

Mason then altered the experiments to control the psychological variables by isolating the two monkeys from their peers and substituting non-nutritional fruit flavored food pellets.

Under these conditions, he noted no significant response of the 17-OHCS to fasting. Although other hormonal changes did occur. Mason concluded:

Fasting per se, then appears to elicit little, if any, adrenal cortical response, but the fasting situation as a whole may indeed evoke a marked 17-OHCS response if it includes factors which elicit psychological reaction or arousal of the subject. (p. 326)

Mason has identified what he believes is a basic weakness on Selye's emphasis of non-specificity. Mason draws attention to the primary mediator of cognition which creates a psychological predisposition toward a stressor and may be the key to understanding individual reactions that create a physiologic state of stress.

Psychological Stress

The confusion in reviewing the psychological stress literature is in the looseness of definition of the concept. Stress has been used to mean response, a stimulus, a state, or an interaction. Often psychological researchers have used words like anxiety, tension, and strain interchangeably with the word stress. This has led some current researchers to suggest abandoning the term "stress" altogether (Hinkle, 1974; Mason, 1975b), while others such as Lazarus (1966), McGrath (1970), and Cox (1978) have suggested using a broad based definition of the word in which many different factors make up a complex interactional

structure in the production of stress.

Mason's work presents a convenient, recent link between the physiological and psychological factors that interact in the production of stress. The psychologic study of stress has been, however, a long standing concern of the scientific community as well as the lay public. The concept of stress was being expressed by poet Robert Manning in his work, Handling Synne, in the year AD 1303. Descartes began writing about the interplay of emotions, the environment and sense organs in the 17th century. In the late eighteenth hundreds, James began to make the first systematic attempt to relate the experience of emotions and the interplay with physical reactions. In his monumental book, Principles of Psychology (1890), James made the point that the emotional experience is produced by body reactions to emotion producing events.

Spielberger (1966) edited a volume entitled, Anxiety and Behavior, in which he presents a state of the art review of anxiety research. Spielberger (1966) postulated two constructs for anxiety; state and trait. State anxiety is defined as a person's subjectively perceived feelings of tension which, in turn, activate the autonomic nervous system. Trait anxiety refers to a personality condition that more or less predisposes a person towards being susceptible to stressful conditions. State anxiety can be seen as paralleling Selye's definition (1956) of stress in that the best outcome measures of state anxiety are physiological measures. Cattell (1966) describes a statistical procedure called the P-technique in which correlations

are found showing how particular manifestations vary in any individual across time. This yields a pattern resembling a generic disposition across individuals which justify using the term state. By using the P-technique, Cattell found that high blood pressure correlated with state anxiety at .71.

In order to study the remediation of identified anxiety, Johnson and Spielberger (1968) conducted a study to test the effect of relaxation training on state and trait anxiety. The sample consisted of 48 hospitalized psychiatric patients given two sessions of relaxation training (autogenic suggestion) over a six to ten day time period. Systolic blood pressure, heart rate and the Zuckerman Affective Adjective Check List were used as outcome measures. Significant findings were found in systolic blood pressure ($p < .001$), heart rate ($p < .001$), and the ZAAC ($p < .05$). No effect was found on trait anxiety. This demonstrated the sensitivity of blood pressure and heart rate to relaxation training. In addition, the statement was made that this training procedure was effective in reducing physiological and psychological stress in this population.

The important figure in emphasizing the phenomenon of "coping" in understanding stress and behavior is Richard Lazarus. Lazarus' concern for coping grew out of his realization that while much research was being conducted on the negative effects of stress, little was being done to study the way in which humans responded positively to stress. This concern has prompted a series of research projects oriented towards coping or adaption (Coelho, Hamburg & Adams, 1974; Moos, 1976).

Lazarus (1975) has defined coping in terms of two major categories; (1) direct actions - behaviors whose goal is to alter a person's troubled relationship with the social or physical environment, and (2) palliative modes - cognitions that alter and relieve the impact of stress on the person.

Work by other researchers (Aas, 1958; Schwartz, 1956) led Lazarus to believe that he could use films to study the phenomenon of psychological stress. Therefore, to pursue his research concerns, Lazarus (1964) used motion pictures in a laboratory situation to experimentally induce states of stress in humans. This work involved having subjects view either a benign control film or a stressful film on subincision (a ritual performed by the men of an Australian stone-age culture in which the penis and scrotum of male adolescents are cut deeply with a sharpened piece of stone). Data was collected on a variety of measures including skin conductance and heart rate. From this data, Lazarus found that these measures were reactive to the film (Lazarus, 1960; Lazarus & Speisman, 1960). This data was used as norms for persons under stress.

Lazarus designed his experiments to consist of three distinct experimental periods: (1) to identify main types of interpersonal conflicts that were possible sources of stress and explore them in terms of their ability to produce stress in any population, (2) to explore the manipulation of "ego defenses" in reducing stress reactions while viewing a stressful film (e.g., denial and intellectualization), and (3) to evaluate the external validity of generalizing laboratory results

to real life situations that are stressful.

This led Lazarus to report in a monograph (Lazarus, Speisman & Mordkoff, 1963), a general pattern of responding to the stressful film. In interviews with the subjects after viewing the films, the experimenters were able to classify the responses into the general categories such as denial of distress, intellectualization, and other reactions. No significant difference was found between degree of arousal as a disturbed affect and tendency to deny or intellectualize. It was hypothesized that there was not adequate time or opportunity for subjects to develop successful defenses.

Lazarus and Alfert (1964) conducted a study in which subjects were divided into the groups of high deniers and low deniers as measured by the MMPI. Both groups were shown the subincision film and were then asked to complete an anxiety checklist. The results indicated that high deniers report less anxiety than did the low deniers. This finding was further backed by the fact that high deniers had significantly higher autonomic levels of activity than did the low deniers. Davidson (1963), in her dissertation, found that in showing the sub-incision film once a week for three weeks, the stressful impact of the film virtually disappeared. From this, it was inferred that subjects were "coping" with the stress of the film by developing effective defense mechanisms. It became clear from the Davidson (1963) and a similar study by Goldstein, Jones, Clemens, Flagg, and Alexander (1965) that time was a significant factor in the development of "coping"

mechanisms.

Additional studies were conducted to assess the impact of manipulating coping styles while viewing stressful films. Speisman, Lazarus, Mordkoff, & Davidson (1968) conducted a study in which soundtracks were used to create a denial defense and an intellectual defense. Another version was created in which there was emphasis on the subincision film with no soundtrack. The results indicate that both defense and denial mechanisms reduce the stress reaction as measured by the autonomic level of arousal (GSR and heart rate). The trauma soundtrack elevated the level of disturbance even over the silent soundtrack group. It was hypothesized that it was possible to effect stress reaction to a stressful event by suggesting non-threatening cognitions as a coping mechanism.

Lazarus attempted to deal with the generality of the vicarious stress experiments by creating films that were closer to the reality of the subjects being studied. Also used was electric shock as a concrete stressor to establish a comparison with the vicarious stressor agent. In a dissertation by Alfert (1964) under Lazarus' supervision, a film was created involving woodshop safety in which fingers are lacerated and cut off and a man is killed. This was combined with telling the subjects they would receive a painful electric shock after the last of seven clicks. The clicks were timed to provide an adequate anticipation period equal to the viewing of a crucial film accident scene. Group 1 saw the film twice, Group 2 was faced with the threat of shock but not shocked,

Group 3 was faced with the threat of shock and shocked, and Group 4 was threatened with shock and then viewed the films. A high degree of similarity between the affective reactions and both conditions of threat were found for all four groups. From this, it was hypothesized that the effects of vicarious and actual stress are similar.

Cox (1978) has pointed out the problem with assuming that laboratory stress is similar to stress in actual life situations. He writes:

In laboratory experiments, the subject has final control over his situation, and most conditions of stress are not extreme. Most laboratory stresses are perceived as annoying, distracting or irritating rather than actually threatening. They can usually be dealt with by attentional strategies... Stress suffered in real situations are different in each respect. The person suffering the stress will probably not have a large degree of control over it. The stress may be very severe and experienced as a real threat to survival: physical, psychological and social. The response to this stress involves much more than shifts in attention. (p. 72)

To test this hypothesis, Burrows, Cox and Simpson (1977) conducted a study on the response of trainee salesmen to a difficult communications exercise embedded in an introduction course. Group 1 consisted of trainees who were unsure of how to handle the communication exercise, and Group 2 consisted of operations research men whose expertise minimized their feelings of threat toward the exercise. The outcome measure used to evaluate stress reaction was blood glucose levels (which have been shown to rise in stressful situations; see Mason, 1968 & 1975). The group of trainees had dramatic elevations in their blood glucose level, while the research group showed little or no elevation. This is a rare example of a study whose design

was to measure responses to stress in vivo.

It should be noted that Lazarus' work and the Burrows' et al., (1977) study pointed toward the importance of considering cognitive factors in understanding the human response to stress.

Teacher Stress

Landsmann (1978) reports the results of a national survey conducted on more than 9,000 teachers with a response rate of 98%. The results provide an interesting look at how teachers view their occupation, stress and health problems. Teachers identified stress as their largest health problem. Of the 9,000 responses, 84% stated that they felt there were health hazards related to teaching. Teachers in the survey acknowledge that many of their physical symptoms, such as nervous stomach, colitis, headaches, allergies, and colds, were stress related. A significant 23% of the survey stated that they felt their ability to cope with stress was poor to fair. If the survey is an accurate sample of the teaching population, this would mean that nearly 500,000 teachers are willing to admit that they need assistance in dealing with job related stress.

The research response to the problem of teacher stress has consisted largely of demographic or descriptive type research in which types of stressors are identified or the typical anxious teacher is described. The NEA (1939, 1951 & 1967), in particular, has published periodic surveys in which sources of anxiety are reported as being related to classroom discipline,

instructional planning and meeting the needs of a wide range of ability within a classroom. Olander and Farrell (1970) identified the sources of teacher stress as: (1) finding time for individual and remedial work, (2) working without benefit of a daily preparation period, (3) obtaining funds for the purchase of extra classroom aids, (4) finding time for creative teaching and planning lessons, (5) grading papers, and (6) completing report cards. These sources represent a wide range of concerns. The diversity of stressors may be a feature of time across teacher development.

Fuller (1974) has delineated a developmental framework for describing the concerns of teachers across time. Inservice teachers are described as being primarily concerned with the issues of self adequacy vs. pupil benefit. Inservice teachers differ from preservice teachers in that preservice teachers are primarily concerned with self adequacy vs. teaching performance. Fuller (1974) states, based on a sample of 1,359 teachers, that once the teacher proves to him or herself that self survival is possible, the concern then shifts to the quality of their survival. This, in terms of cognitive variables, can be a general framework for understanding stressors unique to teaching.

Pratt (1978) conducted a survey involving 124 primary school teachers in which he attempted to analyze the cause and effect relationship of teacher stress. He found that stress in teaching arose from five main areas: (1) a general inability to cope with teaching problems, (2) non-cooperative children,

(3) aggressive children, (4) a concern for children's learning, and (5) staff relationships. Kyriacou and Sutcliffe (1978) further developed the model of teacher stress to include Lazarus' (1976) model of coping in which there is an appraisal of threat to the teacher's well being or self esteem which in turn activates a coping response designed to reduce the perceived threat.

When the focus of research has been on the issue of reduction of teacher stress, the results have been mixed. Of six studies conducted in this area, two have reported no treatment effect (Eder, 1971; Hughes, 1970), and three reported weak effects. Savidge (1969) found that student talk increased in a treatment group and a methods course reduced high anxious teachers' anxiety during student teaching. No effects were found on the Taylor Manifest Anxiety Scale. Breen and Diehl (1970) found that video playback with teacher comment or self analysis reduced differences more than playback without comment, videotape without playback and teacher comment alone. Treese (1972) found reduction in anxiety as measured by the Taylor Manifest Anxiety Scale for female, preservice and secondary teachers. Dollar (1972) conducted a study with 72 female student teachers in which treatment effects were found. In his study, student teachers were randomly assigned to one of five groups: (1) desensitization and behavioral skills training, (2) desensitization only, (3) relaxation only, (4) behavioral skills training only, and (5) no contact control. The results indicated (based on the State-Trait Scale) that

desensitization and behavioral skills training was clearly superior to any of the other treatments in the reduction of self reported anxiety.

In reviewing the literature of teacher stress, Coates and Thoresen (1976) place the blame in finding little or no treatment effects for systematic desensitization on the invalidity of the measurement instruments. They state that paper and pencil measures such as the Taylor Manifest Anxiety Scale, the IPAT Anxiety Scale and the MMPI are not specific enough to measure the true treatment effect. Several other studies have also made the point that situation-specific measures of anxiety may be better predictors of specific behaviors than are general anxiety measures (Alpert & Harber, 1960; Mandler & Cowen, 1958; McReynolds, 1965; Raphelson, 1957; Spence & Spence, 1966). An alternative hypothesis for the lack of treatment effect when using desensitization strategies with teachers to reduce their stress is that the treatment itself is ineffective and the measures are accurately showing that fact (Porter, personal communication, 1979).

There is a high level of agreement within the research community (Coates & Thorensen, 1976) that there is a need for research to examine promising new techniques in the reduction of teacher stress. Cognitive restructuring has been identified as a way to help people alter maladaptive cognitions regarding stress by challenging irrational beliefs (Goldfried et al., 1974). Similar techniques such as stress inoculation (Meichenbaum & Cameron, 1974) and behavioral self management (Goldfried

& Merbaum, 1972; Kanfer & Phillips, 1970; Thoresen & Mahoney, 1974) have also demonstrated promising results in the reduction of stress. Sparks (1979) describes a workshop approach to help teachers deal with stress conducted with "thousands of teachers and administrators in several states." No data is reported, however, the author subjectively states that the approach is beneficial.

Brown (1977) has demonstrated significant effects in the reduction of stress through the use of biofeedback assisted relaxation. Teacher associations have also recognized the need for stress management programs for teachers. NEA Resolution E79-81 states: "The Association urges its local affiliates, in cooperating with local school authorities, to develop stress-management programs that will facilitate the recognition, prevention, and treatment of stress-related problems." (Scrivens, 1970)

Lustman (1980) conducted a study on stress reduction using a sample of preservice teachers ($n = 24$). He compared the effects of individualized EMG biofeedback training, cognitive restructuring training and a no treatment control condition as measured by systolic and diastolic blood pressure, the Taylor Manifest Anxiety Scale and the Teaching Anxiety Scale. The training in the study lasted 5 weeks and consisted of two 40 minute individual sessions per week. Lustman's results indicated a significant reduction in the direction of the treatment groups for systolic blood pressure ($p = .008$).

It should be noted, however, that the purpose of training interventions with teachers is not to create a desensitized and overly tolerant person who is inactive. The intention of such interventions is to equip teachers with coping skills that will enable them to achieve maximum proficiency in their role as educator.

Synthesis

There are two basic research questions addressed in this study. The first deals with the effect of stress reduction on a population of teachers. It is predicted that both of the treatments will have a significant effect on reducing teacher stress. Until this study, neither of these specific treatments have been experimentally tested on a sample of teachers, although both treatments (see: Brown, 1977; Meichenbaum, 1976) have been proven effective on other populations.

The second research question involves identifying a difference between treatments if both are found significant. In broad terms, this will address an issue important to psychology since its inception - that of mind vs. body. Specifically in this study, a cognitively oriented intervention was compared with a somatically oriented intervention with the results being compared across several outcome variables. This is not to say either treatment is purely cognitive or somatic, but in fact, they both are dominated by one of these features. Since few studies have compared these treatments against a control group,

it is difficult to predict which treatment, if either, will prove to be more significant in reducing teacher stress.

Also of interest is the possibility of interactions of treatments with current levels of stress. A test for the interactions will be provided by blocking the subjects as high, medium or low, based on their scores on the Life Experiences Survey (LES). It is possible that subjects with higher levels of stress will benefit more from treatment than those with medium or low.

CHAPTER II

METHOD

Sample and Population

The sample for this study consisted of 27 volunteer teachers, 9 from secondary school settings, 9 from middle school settings and 9 from elementary school settings. All of the teachers in the sample were also participants in the Teacher Corps Project '79. This project is a federal program geared to providing inservice experiences for K-12 Lansing Public School personnel*. Subjects were contacted through the Improving School Climates component of the Teacher Corps Project '79 with the assistance of Dr. Joyce Putnam, Project Director; Dr. Henrietta Barnes, Project Development Specialist; and Dr. Larry Lezotte, Component Coordinator. The subjects in the study represented teachers with a wide range of experience. Teachers ranged in age from 24 to 64 with the average age of 38. Subjects ranged in teaching experience from 1 year to 28 years with an average of 12 years teaching experience. There were 15 female teachers and 12 male teachers. Descriptive statistics regarding the sample's pretest mean scores on the

* Additional information regarding the Teacher Corps Project '79 can be obtained by contacting:

Dr. Joyce Putnam
School of Teacher Education Faculty
College of Education
Michigan State University
East Lansing, Michigan 48824

dependent measure are provided in Appendix F. All of the teachers worked in Title I schools, which means that a significant percentage of their students came from homes whose social status and economic income was below the poverty level. Also of importance is the occurrence of a district wide strike in which all teachers participated. This delayed the opening of school 5 weeks and eliminated Christmas vacation. The study began 5 weeks after the strike was settled and all teachers had returned to work.

Inasmuch as the sample was not randomly selected, a Cornfield-Tukey Bridge Argument is employed to generalize to a larger population of teachers having similar characteristics as the sample. The Cornfield-Tukey Bridge suggests that in a non-random sample, careful description of subject characteristics and identification of variables related to the dependent measures permits a researcher to generalize to subjects with similar characteristics.

Training and Trainers

Relaxation Response Assisted EMG Biofeedback

Treating stress and stress related disorders through the use of electromyogram (EMG) biofeedback is a relatively new treatment technique. EMG biofeedback is oriented toward providing feedback (visual and auditory) about the firing of electrical impulses through muscle fibers. This is achieved by placing two sensors on the skin over the appropriate muscle and a third electrode over a bone or any other neutral

electrical tissue. The impulses from the electrodes are fed into an amplifier which can in turn intensify a light signal and/or increase the pitch of an auditory tone. Thus, a subject is given immediate feedback concerning his or her biological muscular functioning.

Brown (1977) states that EMG biofeedback is the most useful of all the biofeedback modes because it has an extraordinary range of applications. It has been successfully used to treat tension headaches (Haynes, Griffin, Mooney, & Parise, 1975; Wickramesekera, 1973), insomnia (Brown, 1977), essential hypertension (Weston, Love & Montgomery, 1975), bruxism (grinding of the teeth) (Budzynski & Stoyva, 1973), and asthma (Davis, Saunders, Creer, & Chai, 1973). The aforementioned disorders are known to be caused and/or exasperated by chronic states of stress. It would be reasonable to assume then that EMG biofeedback has the possibility of assisting individuals to relax and reduce their stress to a more healthy and adaptive level.

Of particular interest for this study is the research that demonstrated EMG biofeedback's effect in reducing chronic anxiety. A study by Raskin (1973) reports the effect of EMG biofeedback on ten patients suffering from chronic anxiety. The patients were instructed in relaxation assisted by biofeedback and were asked to chart symptoms and practice at home. The author reports that four patients achieved complete recovery from the anxiety and its symptoms (tension headaches and insomnia), five other patients achieved

significant improvement, and one patient remained the same. These results are impressive due to the chronic nature of the problem and the lack of response to previous interventions. Townsend, House and Addario (1975) report a study in which significant reduction in chronic anxiety is achieved using a two week period of EMG relaxation followed by two weeks of self practice. The results demonstrated that the EMG group, when compared to a group receiving group psychotherapy, had significantly lower EMG levels, improved mood and relief from anxiety. Through sound methodological design the study also demonstrated biofeedback's effectiveness in reducing anxiety in highly stressed populations. No study has been found in which a sample of teachers is trained in EMG biofeedback.

Typical in EMG biofeedback training is the use of auto-suggestion techniques as a way to facilitate and enhance the desired relaxation. Benson (1975) has delineated the "Relaxation Response", which is a mediational technique that results in a restorative form of resting. The technique is simple, easy to master and effective in stress reduction (Benson, Klemchuk & Graham, 1974). (See Appendix D.)

The first treatment consisted of two 40 minute sessions of EMG biofeedback assisted relaxation training per week, using the format suggested by Brown (1977) for a five week period. In this format subjects were asked to practice at home as part of this training. Training was provided at the school in which the teacher worked.

Systematic Rational Restructuring

Recent advances in behavior therapy have included a recognition of cognitive factors as being consistent with behavioral theory (Bandura, 1969; Davison & Goldfried, 1973; Kanfer, 1970; Kanfer & Phillips, 1970). Internal thoughts or cognitions can act as punishers or rewards that can increase or decrease a given behavior. Ellis (1962) has developed a technique called Rational-Emotive Therapy (RET) through which behavior can be changed through the altering of cognitions. RET has been proven effective in the reduction of anxiety (Meichenbaum, Gilmore & Fedoravicius, 1971; Trexler & Kraust, 1972).

Recently, Goldfried, et al., (1974) took Rational-Emotive Therapy and restated it in learning theory terms to provide what he calls a method to help people in the use of self-control for anxiety. This model was used as the training for the cognitive restructuring group in the study. The technique involved a five-step procedure for the modification of anxiety producing cognitions that impact on the stress a person experiences. The five steps are: (1) the individual is exposed (in imagination or via role playing) to an anxiety-provoking situation, (2) the person is asked to evaluate the degree of anxiety being felt, (3) the person is called on to use this anxiety as a signal for eliminating any self-defeating, anxiety-provoking attitudes or expectations held concerning the situation, (4) these self statements are re-evaluated in a rational manner, and (5)

assessment is taken of the anxiety level after rational re-evaluation has occurred.

Goldfried and Trier (1974) conducted a small study using systematic rational restructuring as a treatment. The study involved four subjects who had applied too late to be part of a speech anxiety study being conducted. The subjects were given an explanation of the potential irrational assumptions within the RET format. This included such self statements as, "I'm really going to look foolish when I freeze up", and "I am not capable of giving a talk to this many people". They were then left on their own to imagine themselves through a standard 15 item hierarchy, at their own pace. The duration of treatment varied from two to three weeks. Results indicated significant improvement as based on pre- and posttest scores on the S-R Inventory of Anxiousness and the Personal Report of Confidence as a Speaker Questionnaire devised by Paul (1966).

To date, no studies have been conducted using this training technique with a sample of teachers. Teachers in this treatment group received individual training two times a week, 40 minutes per session, for a five week period. They were seen on the site of the school in which they worked.

Control Group

The third condition in the study was the control group. Teachers in this group received no training during the

course of the study and continued their normal teaching responsibilities. At the conclusion of the study, the control group was offered the opportunity for training and 6 of the 9 teachers in the group requested and received training.

Trainers

All treatment was conducted by the experimenter and an advanced doctoral student in counseling at Michigan State University. Both had extensive clinical experience in the field of counseling as well as a background of working in the school environment. Supervision was provided by two faculty members, both certified psychologists in the state of Michigan.

Instrumentation

The outcome measures for the study were: Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), the Teaching Anxiety Scale (TCHAS), and two subscales of the State-Trait Anxiety Inventory (STAI), state and trait. The Life Experiences Survey (LES) was administered for the purpose of blocking subjects based on current level of stress.

Systolic and Diastolic Blood Pressure

SBP and DBP were found by using a baumanometer mercurial blood pressure device with a cuff and stethoscope. The cuff measures 14 x 40 cm. Systolic blood pressure refers to the pressure on the vascular walls at the peak

of the heart's thrust. Diastolic refers to the pressure on the vascular walls when the heart is at rest. SBP has been reported to be a highly labial measure that is sensitive to situational stress (Turek, VanDerKuy, Pelgrim, DeKeyzer, VonDerFurh, & Voerman, 1977; DeGood, 1975). Care was taken to take readings on blood pressure in a consistent manner within and between all subjects. All readings were taken on the right arm in a sitting position after a one minute rest.

DBP is much less labial than SBP and is significantly correlated with trait anxiety (Cattell, 1963). DBP is a measure of the constant stress levels on the vascular walls with a higher number reflecting a higher stressed condition. DBP is less sensitive to stress of a transient nature.

Reliability. Geddes (1970) reports that there is conflicting evidence regarding the reliability of cuff readings for systolic and diastolic blood pressure. Evidence suggests that the use of a cuff 30 cm. by 12 cm. minimizes the error of measurement (Simpson, Jamieson, Dickhaus & Grover, 1965). Karoonen, Telvio and Jarvenen (1964) conducted a study in which they measured indirect pressure with a cuff 14 x 40 cm. and compared the values to those obtained with directly recorded bracheal artery pressure. The cuff yielded systolic pressure values which were 3.0 ± 1.16 mm. Hg. too low and diastolic readings which were 1.4 ± 1.26 mm. Hg. too high.

Validity. Blood pressure readings have consistently

correlated with physical well being. High blood pressure (over 140/90) is predictive of potential heart and kidney damage (Wheatley, 1977).

Teaching Anxiety Scale (TCHAS) -- (See Appendix A)

The TCHAS is a research instrument designed and tested by Parsons (1973). This scale was selected in response to those researchers (Alpert & Harber, 1960; Mandler & Cowen, 1958; McReynolds, 1965; Raphelson, 1957; Spence & Spence, 1966) who have argued for specific anxiety measures for predictors of specific behaviors. The TCHAS measures a unitary factor identified as teaching anxiety. As previously stated, teaching has its unique and specific stressors.

Reliability. Parsons has reported the test-retest reliability of this instrument to be .98. Internal consistency is reported as being between .87 and .94.

Validity: The TCHAS is reported to correlate significantly and in a positive direction with other measures of stress. Parsons (1977) reports that 76% of what the instrument measures is non-error variance unique from the anxiety measured by the Manifest Anxiety Scale (Taylor, 1953), 16% overlaps with the MAS and 8% of the variance is due to error. These percentages were obtained by using a statistical procedure suggested by Cronbach (1960).

State-Trait Anxiety Inventory (STAI) -- (See Appendix B)

The STAI is a research and clinical assessment instrument designed by Spielberger, Gorsuch and Lushene (1970).

The test produces two subscales: trait anxiety and state anxiety. Trait anxiety is described as a stable individual difference between people in their predisposition to stress. State anxiety is described as a transient emotional condition that is characterized by tension, apprehension and heightened autonomic nervous system activity. Both scales consist of 20 separate items. On the state scale, subjects were asked to rate on a continuum items such as: I am calm, I am tense, and I feel upset; as they felt at the moment they were taking the test. On the trait scale, subjects were asked to rate 20 similar items on how they felt in general.

Reliability. Test-retest reliability for a lag of 3 weeks is reported for the state scale as being .54 for males and .27 for females. The authors suggest that this low range is expected in that state anxiety is by nature sensitive to situational factors. They state that a more meaningful reliability measure is that of internal consistency. Using a formula suggested by Cronbach (1951), KR_{20} reliability coefficients were found to range from .83 to .92. This would suggest using the state anxiety scale as a posttest only since test-retest reliability is low but internal consistency is high.

Test-retest reliability for a lag of 3 weeks is reported for the trait scale as being .86 for males and .76 for females.

Validity. The trait scale of the STAI has been cor-

related with other measures of anxiety; the IPAT (.75), and the Taylor Manifest Anxiety Scale (.80). The state scale has been validated by subjecting subjects to normal and stressful situations and measuring subsequent changes on the state anxiety scale. Significant differences existed for both males and females under the different conditions. (Spielberger et al., 1970).

Life Experiences Survey (LES) -- (See Appendix C)

The LES is an instrument designed by Sarason, Johnson and Siegel (1978) to measure the effect of life changes on a person. The LES is a revision of the Schedule of Recent Events (SRE) (Holmes & Rahe, 1967). The LES asks subject to respond to a list of stressing events such as death of a spouse and marital problems and then allows the subject to self report the degree of effect a specific situation had on the individual using a Likert scale with a range from -3 to +3. The LES also adds items in areas not covered by the SRE (e.g., impact on males of pregnancy of wife or lover). Subjects were rank ordered into blocks and randomly assigned to treatment groups from levels of stress as measured by the LES.

Reliability. The LES reports a moderate test-retest reliability for positive change score (.19 and .53, $p < .001$), and negative change score (.56 and .88, $p < .001$). The time between tests was five to six weeks, which may explain the moderate range of these scores as the instrument is designed

to measure situational change. An appropriate reliability measured would be that of internal consistency - which is not reported for this instrument.

Validity. The LES has been correlated with measures of anxiety. The authors reported significant correlations between the LES and state and trait anxiety subscales of the STAI of .46 ($p < .001$), and .40 ($p < .001$) respectively. The authors reported the negative change score as being consistently more valid in the prediction of stress related illness than total score or positive change score (Mueller, Edwards & Yarvis, 1977). For this reason, the negative change score was used as the blocking variable.

Design

This study involves a 3 x 3 factorial design with multiple outcome measures. The random assignment of subjects to treatment condition facilitates arguing a cause and effect relationship between the dependent and independent variables (Hays, 1973). The design is presented in table 2.1

Hypotheses

The following hypotheses were investigated in the study. They are broken into two major areas of analysis procedures. MANOVA Hypotheses and Univariate hypotheses.

Figure 2.1

Randomized levels design to test hypotheses

Levels of Stress	Treatment 1 Biofeedback	Treatment 2 Cognitive Restructuring	Treatment 3 Control
High	N = 3	N = 3	N = 3
Medium	N = 3	N = 3	N = 3
Low	N = 3	N = 3	N = 3

MANOVA Hypotheses

- H_1 : There is no difference among the means of the three treatment conditions on the dependent measures.
- H_2 : There is no difference among the means of the three stress levels on the dependent measures.
- H_3 : There is no interaction between treatments and levels of stress on the dependent measures.

Univariate Hypotheses

- H_4 : There is no difference between the means as measured by TCHAS score averages for the three treatment groups.
- H_5 : There is no difference between the means as measured by TCHAS score averages for the three

stress levels.

- H₆: There is no difference between the means as measured by TCHAS score averages for the interaction of the three treatments with the three stress levels.
- H₇: There is no difference between the means as measured by the STAI trait subscore averages for the three treatment groups.
- H₈: There is no difference between the means as measured by STAI trait subscore for the three stress levels.
- H₉: There is no difference between the means as measured by STAI trait subscore averages for the interaction of the three treatments with the three stress levels.
- H₁₀: There is no difference between the means as measured by STAI state subscore averages for the three treatment groups.
- H₁₁: There is no difference between the means as measured by TCHAS score averages for the three stress levels.
- H₁₂: There is no difference between the means as measured by STAI state subscore averages for the interaction of the three treatments with the three stress levels.
- H₁₃: There is no difference between the means as measured by systolic blood pressure averages for

the three treatment groups.

H₁₄: There is no difference between the means as measured by systolic blood pressure averages for the three stress levels.

H₁₅: There is no difference between the means as measured by systolic blood pressure averages for the interaction of the three treatments with the three stress levels.

H₁₆: There is no difference between the means as measured by diastolic blood pressure averages for the three treatment groups.

H₁₇: There is no difference between the means as measured by diastolic blood pressure averages for the three stress levels.

H₁₈: There is no difference between the means as measured by diastolic blood pressure averages for the interaction of the three treatments with the three stress levels.

Data Collection

A pretest group session was held before the onset of training. All subjects were asked to complete an answer sheet for the Life Experiences Survey, the Teaching Anxiety Scale and the trait scale of the State-Trait Anxiety Inventory. In addition, all subjects had their systolic and diastolic blood pressure measured. All these instruments were given both in pretest and posttest by the two trainers except in the case of blood pressure readings. Blood

pressure readings were taken by a nurse in the elementary schools, a biology teacher in the middle school and a human physiology teacher in the high school. Readings were blind for pre- and posttest situations in that the readers were not informed of which subject was in which experimental group. The pretest session also included an orientation segment in which an overview of the study was given and teachers had the opportunity to ask any questions concerning the study.

After the pretest session, each teacher was visited at least three more times (morning, noon and after school) for additional blood pressure readings. Each subject's readings were averaged for a pretest diastolic blood pressure and systolic blood pressure mean reading. Each subject had four readings. This minimized the effect of variance in blood pressure across time (Geddes, 1970).

The final week of the study consisted of posttesting. At this time, none of the subjects were receiving treatment. The subjects again filled out the TCHAS and the STAI trait subscale. The authors of both instruments state that it is not necessary to provide alternate forms. They argue that there is no reason to believe that practice and recall of specific items affect retest scores in any way that is relevant to the construct being measured. In addition, subjects were asked to complete the STAI state subscale. Once again, each subject had a reading taken of systolic and diastolic blood pressure. For three days after the posttest

session, subjects were visited in the schools for 3 additional blood pressure readings. An average blood pressure (DBP and SBP) was computed for all subjects as a posttest measure.

Data Analysis

In analyzing the data, the level of significance was set at .05 for each hypothesis. A multivariate analysis of variance (MANOVA) was used to test Hypotheses 1, 2, and 3. The dependent variable for each measure except the state scale of the STAI was a pre- to posttest change score. Because the state scale of the STAI has poor test-retest reliability (.54 for males and .27 for females), a posttest only score was reported for the measure. Individual analyses of variance (ANOVAs) were then performed on each of the dependent measures to test Hypotheses 4 through 18. When the analysis of variance indicated significance, post hoc T-tests were used to determine the direction and location of the significance. Dunn's procedure (Hay's, 1973) was used to control for the inflation of error due to the use of multiple T-tests in the post hoc procedures.

In addition, correlations were computed between each of the dependent measures. This was done separately for all subjects, and for subjects in each of the three treatment conditions.

The results of these analysis procedures are presented in the following chapter (Chapter III).

CHAPTER III

RESULTS

This chapter presents the results of the study. It consists of five components. The first component is a multivariate analysis (MANOVA) of all dependent measures. The second component is an analysis of variance (ANOVA) for each of the dependent variables. The third component is a presentation of post-hoc comparisons using Dunn's procedure to assess the direction and location of significant differences among treatments. The fourth component is a presentation of the Pearson Product moment correlations between the dependent measures for all subjects, biofeedback subjects, cognitive restructuring subjects and control subjects. The fifth component is an overall summary of the results of the study.

Hypothesis Testing

Multivariate Analysis of Variance

Hypotheses 1-3, as stated in Chapter II, were tested by conducting a multivariate analysis of variance (MANOVA) on all the dependent measures. Table 3.1 presents the results of this multivariate analysis. As indicated in Table 3.1, none of the three multivariate F tests were significant at $\alpha = .05$. Therefore, Hypotheses 1, 2 and 3 were not rejected.

Table 3.1
Summary of Multivariate Analysis of Variance
for All Dependent Measures

Source of Variation	Degrees of Freedom	F-Value	p
Treatment	10, 28	1.82896	.10
Level	10, 28	1.08112	.41
Interaction	20, 28	.64942	.87

Analysis of Variance of Dependent Measures

Hypotheses 4-18, as stated in Chapter II, were tested by conducting an analysis of variance for each of the dependent measures. Table 3.2 presents the results of the univariate analysis of variance using pre and post change on the Teaching Anxiety Scale as a dependent measure.

As indicated in Table 3.2, there were no significant effects for levels of L.E.S. or for interaction. For this reason, Hypotheses 5 and 6 were not rejected. A significant difference ($p < .05$) did exist among treatment means. Therefore, Hypothesis 4 was rejected.

Table 3.3 is a presentation of the results of the univariate analysis of variance using pre post change on the Trait Subscale of the State-Trait Anxiety Inventory.

As indicated in Table 3.3, there were no significant effects for levels of L.E.S. or for interaction. Hypotheses

Table 3.2
Summary of the Analysis of Variance
for the Teaching Anxiety Scale

Source of Variation	Degrees of Freedom	F-Value	p
Treatment	2, 18	5.97305	.01*
Level	2, 18	3.15499	.07
Interaction	4, 18	.39151	.81

*p < .05

Table 3.3
Summary of the Analysis of Variance for the
Trait Sub-scale of the State-Trait Anxiety Inventory

Source of Variation	Degrees of Freedom	F-Value	p
Treatment	2, 18	4.89893	.02*
Level	2, 18	2.59265	.10
Interaction	4, 18	1.11562	.37

*p < .05

8 and 9 were not rejected. A significant difference ($p < .05$) did exist among treatment means. Therefore, Hypothesis 6 was rejected.

Table 3.4 is a presentation of the results of the univariate analysis of variance using posttest scores on the State Subscale of the State-Trait Anxiety Inventory.

Table 3.4
Summary of Analysis of Variance for the
State Subscale of the State-Trait Anxiety Inventory

Source of Variation	Degrees of Freedom	F-Value	p
Treatment	2, 18	1.38751	.27
Level	2, 18	.99651	.39
Interaction	4, 18	.13130	.97

As indicated in Table 3.4, there were no significant effects for treatment, levels of L.E.S, or for interactions. Therefore, Hypotheses 10, 11 and 12 were not rejected.

Table 3.5 is a presentation of the results of the univariate analysis of variance using pre post change of systolic blood pressure.

As indicated in Table 3.5, there were no significant effects for treatment, levels of L.E.S., or for interactions. For this reason, Hypotheses 13, 14, and 15 were not rejected.

Table 3.6 is a presentation of the results of the univariate analysis of variance using pre post change of diastolic blood pressure.

Table 3.5

Summary of Analysis of Variance for Systolic Blood Pressure

Source of Variation	Degrees of Freedom	F-Values	p
Treatment	2, 18	1.85600	.18
Level	2, 18	1.52918	.24
Interaction	4, 18	.39208	.81

Table 3.6

Summary of Analysis of Variance for Diastolic Blood Pressure

Source of Variation	Degrees of Freedom	F-Values	p
Treatment	2, 18	2.01128	.16
Level	2, 18	.31367	.73
Interaction	4, 18	.44426	.77

As indicated in Table 3.6, there were no significant effects for treatments, levels of L.E.S. or interactions. Therefore, Hypotheses 16, 17, and 18 were not rejected.

Post Hoc T-Tests

Since the treatment effect was significant on pre post

change for the TCHAS and the Trait Subscale of the STAI, post hoc comparisons using Dunn's procedure were performed. This procedure allowed for the assessment of the location and direction of the differences. Dunn's procedure (Hays, 1973) was used to control the Type I error rate. The procedure involves dividing the original alpha level (.05) by the number of comparisons (3) which produced an alpha level of .017 for each comparison. The three comparisons were: T^1-T^2 , T^1-T^3 , and T^2-T^3 .

Table 3.7

Dunn's Procedure Contrasting Treatments on Dependent Measures for Which the Omnibus Test Was Significant

	T_1-T_2		T_1-T_3		T_2-T_3	
	mean difference	p	mean difference	p	mean difference	p
TCHAS	.1975	.044	.3127	.005*	.1152	.235
TRAIT	.0123	.897	.2264	.017*	.2387	.013*

*p < .017.

The statistical procedure involved in computing significance for each of the comparisons was a T-value. The formula used was:

$$T_{df_{18}} = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{MSE} \sqrt{2/n}}$$

In this formula, $\bar{x}_1$ = mean 1, $\bar{x}_2$ = mean 2, MSE = mean square error, and n = number of subjects per group.

The population variance was estimated by pooling within cell variance across cells. This was done to provide a more precise test of the data (Hays, 1973). In Table 3.7 there were no significant differences between the treatment means in comparing Treatment 1 (cognitive restructuring) to Treatment 2 (biofeedback) on either of the dependent measures. Significant differences did exist in the comparison of Treatment 1 (cognitive restructuring) to Treatment 3 (control). On both the Teaching Anxiety Scale and the Trait Subscale of the STAI, teachers in Treatment 1 had greater reductions in anxiety than teachers in Treatment 3. In the comparison of Treatment 2 (biofeedback) and Treatment 3 (control) a significant difference existed between the means of the Trait Subscale. The direction suggests that teachers in Treatment 2 had greater reductions in trait anxiety than teachers in Treatment 3 (control). However, a significant difference did not exist between the means of the Teaching Anxiety Scale in this comparison.

Correlations Between Dependent Measures

Tables 3.8, 3.9, 3.10 and 3.11 are a presentation of the Pearson Product Moment Correlations for change scores of the dependent measures. Table 3.8 represents correlations for subjects scores in all of the treatment conditions. Table 3.9 denotes correlations for subjects who were in the cognitive

Table 3.8
Summary of Pearson Product Moment Correlations
for Change Scores of All Subjects (n=27)

	Teaching Anxiety	Trait Anxiety	State* Anxiety	Systolic Blood Pressure	Diastolic Blood Pressure
Teaching Anxiety	1.0000 s=.001	.5496 s=.001	.5086 s=.003	.2413 s=.113	.2238 s=.131
Trait Anxiety		1.0000 s=.001	.5422 s=.003	.3797 s=.025	.3913 s=.022
State Anxiety			1.0000 s=.001	.2749 s=.083	.1618 s=.210
Systolic Blood Pressure				1.0000 s=.001	.5783 s=.001
Diastolic Blood Pressure					1.0000 s=.001

*Posttest only for this measure

restructuring treatment. Table 3.10 denotes correlations for subjects who were in biofeedback training. Table 3.11 denotes correlations for subjects who were in the control group and received no training.

These tables will be analyzed in Chapter IV to address 3 basic questions. First, what is the relationship between the paper and pencil measures (TCHAS & STAI)? Second, what is the relationship between the paper and pencil measures and the blood pressure measures? Finally, what effect does being in one of the treatment conditions have on the correlations of the dependent measures?

Table 3.9

Summary of Pearson Product Moment Correlations for
Change Scores of Cognitive Restructuring Subjects (n=9)

	TCHAS	TRAIT	STATE*	S-B.P.	D-B.P.
TCHAS	1.0000 s=.001	.7492 s=.010	.5822 s=.050	.4163 s=.133	.1539 s=.346
TRAIT		1.0000 s=.001	.6179 s=.038	.3644 s=.168	.0846 s=.414
STATE			1.0000 s=.001	.2840 s=.229	-.2322 s=.274
S-B.P.				1.0000 s=.001	.2390 s=.268
D-B.P.					1.0000 s=.001

*Posttest only for this measure

Summary

The results of the study were first analyzed in terms of an overall MANOVA to assess significant differences among treatment means, levels of LES, and treatment by levels interactions. No significant differences were found at $p < .05$ (treatment, $p = .10$; levels of LES, $p = .41$; and interaction, $p = .87$).

A series of ANOVAs were then performed on each of the dependent measures. This, again, was done to assess significant differences among treatment means, levels of LES means and treatment by level interactions. A significant difference was found between treatment means on both gains

on the Teaching Anxiety Scale ($p = .01$) and gains on the Trait Subscale of the STAI ($p = .02$) at $p < .05$. No significant differences were found for levels of LES or treatment by level interaction for gains on either of these measures. The ANOVAs on the State-Subscale gains on systolic blood pressure and gains on diastolic blood pressure revealed no significant differences for treatments, levels, and treatment by level interactions.

Because significant differences were found between treatment means for the TCHAS and the STAI, post hoc comparisons were conducted. The statistical calculation utilized was Dunn's procedure in order to assess the direction found to be significant. Dunn's procedure was used to

Table 3.10
Summary of Pearson Product Moment Correlations for
Change Scores of Biofeedback Subjects (n=9)

	TCHAS	TRAIT	STATE*	S-B.P.	D-B.P.
TCHAS	1.0000 s=.001	.5145 s=.078	.5861 s=.049	.6387 s=.032	.2965 s=.219
TRAIT		1.0000 s=.001	.0416 s=.458	.4850 s=.093	.4926 s=.089
STATE			1.0000 s=.001	.5132 s=.079	.3731 s=.161
S-B.P.				1.0000 s=.001	.8514 s=.002
D-B.P.					1.0000 s=.001

*Posttest only for this measure

Table 3.11

Summary of Pearson Product Moment Correlations for
Change Scores of Control Subjects (n=9)

	TCHAS	TRAIT	STATE*	S-B.P.	D-B.P.
TCHAS	1.0000 s=.001	.0478 s=.451	.3705 s=.163	-.4669 s=.103	-.0345 s=.455
TRAIT		1.0000 s=.001	.3915 s=.149	-.0354 s=.464	.3675 s=.165
STATE			1.0000 s=.001	-.5075 s=.082	.0335 s=.466
S-B.P.				1.0000 s=.001	.5396 s=.067
D-B.P.					1.0000 s=.001

*Posttest only for this measure

control the inflation of error. This resulted in setting the alpha level at .017 as the level of significance for these tests. The T-tests comparing Treatment I (cognitive) to Treatment II (biofeedback) revealed no significant differences for either of the measures. The T-tests comparing Treatment I (cognitive) to Treatment III (control) did reveal significant differences for gains on the teaching anxiety measure ($p = .005$) and gains on trait anxiety (.017). The direction of the differences suggested that there was a greater reduction in teaching and trait anxiety in Treatment I (cognitive). The T-tests comparing Treatment II (biofeedback) and Treatment III (control) indicated significant

differences in gains on the Trait Subscale ($p = .013$) but no significant difference for gains on teaching anxiety. The direction of the difference demonstrated a greater reduction in trait anxiety for Treatment II (biofeedback) when compared to Treatment III.

The final statistical procedure was the computation of correlation coefficients for the change scores of the dependent measures. This was done for scores of all subjects and then for scores of subjects in each of the treatment conditions. Comparisons of interest among these correlations were then described.

CHAPTER IV

SUMMARY AND DISCUSSION

Summary

The purpose of the study was to examine the effect of two training techniques on the reduction of teacher stress. Many studies had revealed that the phenomenon of stress was a realistic concern of teachers. Little research has been done to evaluate models that purport effectiveness in reducing stress with a sample of teachers. Towards that end, this study compared the effects of two training methods with a no treatment control group for a sample of teachers.

The subjects in the study were 27 teachers from the Lansing Public Schools. These subjects were blocked on levels of stress and then randomly assigned to one of three treatment conditions. The first group received training in rational restructuring. This consisted of two individual sessions per week for a five week period with a trainer. The second group received biofeedback training. This consisted of two individual sessions per week for a five week period with a trainer. The third group received no training and served as a control group. All subjects in the study were pretested for systolic and diastolic blood pressure, the State-Trait Anxiety Inventory (Trait Subscale only), and the Teaching Anxiety Scale. In addition, all subjects were administered the Life Events Survey which served as a blocking variable. Subjects were rank ordered into high, medium, and

low states of stress and randomly assigned to a treatment condition.

At the completion of the five week period, all subjects were posttested on each of the dependent measures. This included the State Subscale of the STAI as well as the three previously mentioned measures. A change score was computed for each of the subjects. These change scores, plus the posttest score from the State Subscale, were analyzed to assess differences between the treatment, level, and interaction of treatment and level for the three groups. A multivariate analysis of variance (MANOVA) plus separate analysis of variance (ANOVAs) were computed to test the 18 hypotheses. Post hoc comparisons using Dunn's procedure were conducted when differences in treatment were found. In addition, correlations of the dependent measures change scores were computed for all treatments and each of the separate treatment conditions.

The overall MANOVA revealed no significant differences for treatment, level or treatment by level interaction. However, separate ANOVAs did reveal significant differences for treatment gains on the Teaching Anxiety Scale and gains on the Trait Subscale. No significant differences were found for systolic and diastolic blood pressures nor were any found the the State Subscale. None of the ANOVAs denoted significant differences for levels of stress or interactions of treatments and levels. The post hoc T-tests revealed that the cognitive restructuring had greater

reduction in teaching anxiety that did the control group. The biofeedback group had a greater reduction in trait anxiety than did the control group. A post hoc T-test also revealed no significant differences between the cognitive restructuring and biofeedback treatment conditions.

DISCUSSION

Limitations

This section will consist of an appraisal of the limitations of the study. In any study there are factors that operate beyond the researcher's control. These factors have the potential for influencing the study in such a way as to question the results of the study. The purpose of this discussion is to explore the adequacy of the findings in terms of sample, instruments, treatments, design and methodology employed in the study.

Sample

The non random nature of the sample may have influenced the results of the experiment. All subjects were volunteers and represented teachers who were willing to give up two forty-minute time segments for training during or after school for a five week period. Then this is combined with the fact that none of the 27 teachers dropped out during the course of the study, a highly motivated sample is indicated. After the completion of the study the 9 teachers in the control group were offered stress training. Of this

group, 6 teachers requested and received training. Clearly in generalizing the results of the study to a larger population of teachers, the characteristic of volunteering needs to be emphasized as well as motivation for training.

The small size of the sample (27) may also have influenced the outcomes of the study. Sample sizes smaller than 100 increase the probabilities of sampling error and lower the power of the statistical test applied to the data (Isaac & Michaels, 1971). However, it has also been argued by Isaac and Michaels that samples with Ns between 10 and 30 have many practical advantages in exploratory research and pilot studies. They argue that samples of this size are more likely to have meaningful significance when statistical significance is found.

The results of the study may further be questioned because the sample was not randomly selected from a larger population of teachers. It could be argued that special characteristics of the sample are unique and not representative of any population. Although the possibility exists, it seems unlikely. The Lansing Schools are fairly representative of school systems throughout the nation. The problems of non-supportive administrators, disruptive children, and uninvolved parents are typical stressors reported by teachers in the sample. These are the same stressors reported over and over in research studies on teacher stress. The phenomenon of the strike 5 weeks before the study may also have influenced the sample. Again, this is not untypical of what

is occurring on a regular basis in school districts in many parts of the nation.

Instruments

The reliability and validity of the instruments used in an experimental study impact on the precision of the results of a study. It is possible that error in measurement can mask significant differences when they do exist (Type I Error) or create statistical differences when they do not exist (Type II Error). Both possibilities need discussion in the content of this study. In addition, the validity of the instrument needs careful appraisal before ties to theory can be made.

In the case of the physiological dependent measures, systolic and diastolic blood pressure can be taken in a reliable fashion and is a valid measure of physiological stress. The three persons taking the blood pressure readings were not told the purpose of the study, nor were they told which subject was in which training condition. Therefore, it seems unlikely that systematic bias among treatments occurred on these measures.

The State-Trait Anxiety Inventory and the Teaching Anxiety Scale represented the psychological dependent measures of stress. It must be emphasized that these instruments reflected the self perception of each subject. There is the possibility of a halo effect in which the teachers in the training groups wanted the results to show a

reduction in stress. This could have occurred because of the large investment of time and energy by the teachers in the training as well as a strong personal connection to the trainers. This concern is significant in the interpretation of any clinical research results. Therefore, the feelings that the subjects have about the study and the trainers could impact on the rating of the paper and pencil instruments.

Design

A major concern in the analysis of the design of the experiment was the selection of the LES as the blocking variable. It was hypothesized that the current level of stress would impact on the response to treatment. The selection of a blocking variable can be costly when it is not related to the independent variable due to the loss of one degree of freedom. The lowering of degree of freedom can result in a Type II Error in interpreting the results of the analyses of the data. Because no levels effects were found in any of the analyses, it is pertinent to question the utility of the LES. It is further possible that the separation of means on the instrument was not great enough to truly reflect high, medium, and low levels of stress (See Appendix F)*.

Beyond the possible lack of utility of the blocking

*An equally probable conclusion regarding non-significance of the LES is that levels of stress do not effect treatment.

variable, there would seem to be no major flaws in the design of the experiment. The basic intent was to control for threats to validity of the results by the use of a control group. This allows for the comparison of training effects between two techniques and then to no training as reflected in a control group. This design answers a more interesting question than does one in which only two treatment groups are compared.

Methodology

The analysis of the results was done using the analysis of variance approach. Multivariate and univariate analysis of variance procedures were appropriate for the data being analyzed. A major concern in methodology was the use of a change score as the dependent measure. Change scores have the potential for doubling the error of measurement in a pre- posttest situation. However, because the reliability of each of the instruments was relatively high, it was thought that the negative impact on precision was minimized.

In addition, it could be argued that Dunn's procedure should have been used on each of the separate ANOVAs with an alpha of .01 and again on each of the post hoc comparisons with an alpha of .003. It was decided a priori that, in an exploratory study, it would be better to risk a Type I Error than a Type II Error. The outcomes, however, would be clearly different if the more conservative use of Dunn's procedure had been used on the separate ANOVAs. This is

a limitation needing emphasis in the interpretation of the results of the study.

Discussion of Results

This section will present a discussion of the results of the study. The first section consists of an analysis of the hypotheses tested as well as the post hoc comparisons for the assessment of direction and location of treatment effect. The second section is a discussion of the correlation of the change scores between measures of the dependent variables.

Hypotheses Testing

As presented in Chapter III, the hypotheses tested by the MANOVA indicated no significant differences for treatment, levels of stress and interaction of treatment and level. When this is compared to a similar study by Lustman (1980), several questions are raised. In Lustman's study, similar treatments (EMG biofeedback and cognitive restructuring) were tested with a sample ($n=24$) of preservice elementary teachers. In this study, the overall MANOVA (using the TCHAS, the Taylor Manifest Anxiety Scale, systolic and diastolic blood pressure) revealed treatment effects at $p = .04$. This may indicate in outcomes involving physiological and psychological dependent measures that preservice teachers are more responsive to stress training than are inservice teachers. Another explanation for the difference

in treatment effects of the MANOVA might be the selection of the TMAS as the measure of general trait anxiety. Possibly another instrument would have reflected differences.

The analysis of variance on the separate dependent measures produced treatment differences for the Teaching Anxiety Scale and the Trait Subscale. The post hoc T-tests revealed that subjects in the cognitive group had greater reductions than the control group on both measures. The biofeedback had greater reductions than the control group on only the Trait Subscale. This implies that teachers who participated in training, either biofeedback or cognitive restructuring, received some benefit from the experience. It was thought that the benefit was not only reflected in a significant statistical difference but also in a meaningful difference. As reflected in the change of means from pre to posttest (see Appendix F), teachers in the cognitive restructuring group dropped an average of nearly 5 points on the Trait Subscale and 7 points on the Teaching Anxiety Scale. Teachers in the biofeedback group dropped from pre to posttest an average of nearly 4 points on the Trait Subscale. Of further note is the fact that the control group showed an average increase for both of these scales (Trait Subscale = $+.89$, TCHAS = $+1.0$) during the same pre- post-test time period.

The difference is that teachers who received cognitive restructuring training reduced the stress specific to teaching as well as their personal predisposition to stress.

The teachers in the biofeedback group showed only a reduction in their predisposition to stress but not in the stress specific to teaching. An explanation of why this difference exists may be found in examining the nature of each treatment. In the cognitive restructuring, teachers were involved in talking with a trainer about events they found stressing. The fact that all subjects were teachers and were seen in the schools in which they worked certainly may have influenced the situations they discussed. Both trainers reported a large percentage of the content of the sessions related to events occurring in the schools (i.e., unsupportive administrators, disruptive children, hostile parents, conflicts with other teachers, etc.). Subjects were then asked to rationally assess and adjust their cognitions about these situations. It is logical to assume that subjects trained effectively on stressors related specifically to teaching would demonstrate differences when compared to a group receiving no training. The interesting finding is that beyond the teaching anxiety, this training also demonstrated differences on the Trait Subscale. This suggests that training may generalize into a client's general predisposition toward stress.

The biofeedback group, on the other hand, only had differences from the control group on the Trait Subscale. This, too, may be explained by the nature of the training. In this treatment, teachers were trained to quiet themselves physiologically through EMG monitoring. This required a minimal amount of interaction with the trainer. Although

personal relationships did develop between the trainers and teachers in this treatment, the task at hand was the lowering of the EMG guage. This was achieved through the teachers' individual interaction with the biofeedback equipment. The trainers did instruct the teachers in Benson's Relaxation Response, but this is clearly a different quality and focus on interaction with a trainer than the cognitive restructuring group received. It is not surprising, therefore, that the biofeedback group had significant reductions in their general stress but not in the stress related specifically to teaching.

The overall conclusion would be, then, that the cognitive restructuring training may be a better treatment than the biofeedback training in reducing teacher stress. According to the results of the study, cognitive restructuring is capable of reducing two different types of anxiety: general and teaching. Parsons (1973) has confirmed that the differences between these two types of anxiety is distinct. This conclusion is somewhat tempered by the lack of a significant difference in the post hoc comparisons between cognitive restructuring and biofeedback training. Certainly, a significant difference in this comparison would have strengthened the argument that the cognitive restructuring is more effective with teachers than biofeedback training.

Also of interest are the non-significant findings for the systolic and diastolic blood pressure measures as well as the State Subscale. Again, this is a different finding than Lustman's study with preservice teachers. He found

significant differences for treatment on systolic pressure ($p = .008$); however, Lustman did not find significant differences for the paper and pencil measures, or diastolic blood pressure. The most obvious interpretation of the discrepancy would be that neither of these training techniques is effective in lowering inservice teachers' blood pressure over a five week period. It is possible that a change might have occurred if the training had been extended. This is a question that could be answered in further research studies.

Still, however, the question remains as to why the Lustman study found systolic blood pressure differences and this study did not. One explanation might be that unique characteristics of the teacher population make their blood pressures less responsive to training than preservice teachers (e.g., age, race, etc.). Another explanation might be that the teachers in this study were much more acclimated to the demands of teaching. Their physiologic responses were likely to be much more resistant to change than the sample in Lustman's study. Lustman's sample consisted of twenty-four 19-21-year-old, white females with much less teaching experience than the teachers in this study. This, then, might act as an explanation for the different findings of the two studies.

The nonsignificance of the State Subscale should be considered in light of the instrument itself. The State Subscale asks subjects to respond to a series of anxiety

phrases as they are feeling at the moment they take the instrument. An interpretation of this finding is that neither training technique is effective in affecting a teacher's perception of how stressed he or she is at a given moment in time. That is to say, from moment to moment a teacher who received training was not helped by the training in lowering their stress. However, their feeling about how stressed they were in general as measured by the Trait Subscale was positively effected by the training and resulted in a significant reduction for this measure.

Correlations

This section will consist of an answer to the questions posed regarding correlations in Chapter II. The first question involved the relationship between the paper and pencil measures for all subjects. It is clear in examining the data that a significant correlation exists between all these measures. Each measure is over 25% predictive of each of the remaining two measures. This would suggest that for all subjects the three tests contain much overlap in what they measure. Also of interest is the relationship between all subjects paper and pencil measures and their blood pressure scores. There appears to be a weak correlation in this case with no correlation equal to or greater than .40.

The other question to be considered is the effect that treatment conditions had on the correlations between the

measures. The data suggest that training conditions did have a definite impact on the correlations. Take, for instance, the TCHAS correlation with the Trait Subscale. In the cognitive restructuring group, there is a significant correlation of .75 ($s=.01$). In the biofeedback group, the correlation is .51 ($s=.08$). And in the control group, the correlation is much lower at .05 ($s=.45$). This would suggest that the cognitive restructuring training may have made subjects more aware of their stress and, therefore, more consistent in their responses to the paper and pencil instruments.

A somewhat confusing finding is the strong correlation of the change score in the Trait Subscale with the posttest score in the State Subscale in the cognitive restructuring group ($r = .62$). However, in the biofeedback group the correlation is .04, which is even lower than the control group, .39. A tentative explanation of this finding might, again, be attributed to the nature of treatment. The cognitive restructuring group may have become more aware of the connection between situational stress and their predisposition to stress. Therefore, a more consistent change is to be expected. It is interesting to note that even if they were more aware they did not have significant treatment reductions on this measure.

A final interesting finding is the impact on the correlations between the change scores of the paper and pencil measures and the change scores of the blood pressure

measures in each treatment. Cattell's study (1966) would suggest that a change in trait anxiety would positively correlate with a change in diastolic blood pressure and a change in state anxiety would positively correlate with a change in systolic blood pressure. An examination of this data does not support Cattell. It is interesting to note the negative correlations for the control group for this data. The correlations for the training groups also tend to not support Cattell as well. It would seem questionable to attach a great deal of importance to this observation. The small sample size suggests that these findings are speculative and exploratory in their nature.

Implications for Teachers' Professional Development

The findings of this study indicate that the training techniques tested may be effective in helping teachers deal with the negative effects of stress. It is clear that teachers as a group are concerned about the issue of stress and its effect on themselves and their profession. It is also clear that teachers as a group are sceptical about the value of inservice experience. This scepticism arises from a history of inservice being a one day a year experience in a group of 50 to 100 teachers. Teachers leave this experience sometimes entertained, but rarely feeling that they have learned something they could practice (Barnes, Putnam & Wanous, 1979).

The training as structured in this study was partly chosen in response to the aforementioned criticism. Two

key differences in this training, as opposed to traditional inservice, were the length of contact time (5 weeks) and the training of the teachers in the schools in which they worked. Often the individual training was done in the classroom where the teachers taught. This factor should not be minimized. The biofeedback group learned to relax in the schools where often their stress originated. The cognitive restructuring training also occurred in classrooms. This provided a reality base for the trainer and the teacher in that situations described were dealt with in the actual classroom. Many teachers complain (Goodwin & Coates, 1976) that the suggestions of a psychologist are often out of line with the demands of teaching 30 to 40 children for 5 to 6 hours a day. This criticism is confronted when the assistance given a teacher occurs in the environment where it is to be practiced. Effects were further enhanced by the trainers seeing the teachers for 10 sessions over a 5 week period, which allowed the teachers to practice the strategies with an opportunity for feedback. These two factors may have contributed to the treatment effects found in the study. They may be of value to those who would desire to provide meaningful and significant inservice or professional development experiences for teachers.

Of no small importance was the relationship developed by the trainers and the teachers. Rogers (1961) has highlighted the importance of this aspect in any helping role. He has, in fact, identified genuine, unconditional positive regard, and empathy in a relationship as the key ingredients

in helping others change. Arthur Jersild (1955), in a volume entitled When Teachers Face Themselves, identifies the need teachers have as individuals to be heard. He states:

"Many teachers express a deep loneliness, a loneliness related to the fact that so often (among teachers as among others) there is little mutual understanding or community of feeling with associates or even with 'friends'."

The importance that teachers expressed for the opportunity to talk to someone should not be missed. Appendix G provides a list of teachers written reactions to the training received. In this list, several teachers highlighted the chance to talk to someone about the problems. They note their appreciation for the support and caring of the trainers. An additional implication is that meaningful professional development allows for a dialogue between the teacher and the trainer. This is a need that seems to go unmet in many schools and no doubt contributes to the stress in teaching.

In summary, it would appear that three implications for teachers' professional development emerge from this study. The first, which is supported by the data, is that meaningful change can occur when teachers have time to practice and receive feedback on their implementation of a strategy. The second, although not directly supported by data, is that it seems reasonable to assume that much can be gained from working with teachers in the environment in which they work. This is of value to the trainer as well as the teacher. Third, and again, not directly supported by the data, but still of importance, is that teachers can

grow and change within the context of a relationship. Teachers will respond to this opportunity when it is presented to them. This undetermines the general criticism that teachers are unwilling to commit their time (before school, lunch planning, or after school) without monetary reimbursement. Teachers in this study were not paid. However, one teacher was willing to pay to be in this study.

Based on the findings in the study, it is recommended that school administrators consider providing funds for individual stress training for teachers. In their written reactions to the study (see Appendix G), 100% of the teachers found the training they received helpful and 100% of the teachers would recommend that other teachers receive similar training. This overwhelmingly positive response suggests that teachers would participate and find benefit from such training if it were made available to them.

Recommendations for Future Research

The results of this research offer promising findings in the reduction of teachers' stress through both cognitive restructuring and biofeedback training. These treatments need further exploration to affirm their effectiveness with the population of teachers. There are several areas in which future research might be conducted. These areas are:

1. A study with a larger sample size would provide a more precise test of the effects of this training.
2. The use of additional physiologic dependent measures

such as heart rate, skin temperature and/or 17-OHCS levels might give a clearer picture of the physiologic effects of these treatments.

3. A study with different training techniques would test whether any training technique or just specific techniques worked with teachers in reducing stress.
4. A replication in which pretest scores are used as covariates with a posttest analysis of variance might give a more precise measurement of the effects of the independent variables.
5. A study in which there are two control conditions might be useful. In one control condition teachers would be given supportive counseling and in another no training. This would provide data to test the impact of the relationship on the training.
6. A study in which there was a follow-up evaluation to assess the impact of training across time might provide valuable data.

Conclusion

This study was seen as an answer to the numerous requests for research on training that would be effective in the reduction of teacher stress. Teachers as a group have become more and more concerned with how to effectively cope with the stress created by their jobs. It is hoped that the findings will provide a small piece in the puzzle of providing effective training for teachers regarding this important professional issue.

APPENDICES

APPENDIX A
TEACHING ANXIETY SCALE

THE TEACHING ANXIETY SCALE (TCHAS (1) - 29)

FORM IB

Teacher Questionnaire

Name: _____

Date: _____

Your answers will be kept strictly confidential. Your principals and teaching supervisors will not have access to this information.

Instructions: Please read each question carefully.

Answer every question, even if it seems vague to you or difficult to answer.

Mark an "x" in only one box for each question. Be sure the "x" falls well within the box and does not extend into another box.

Use the following scale for all questions:

(1) <u>Never</u>	(2) <u>Infrequently</u>	(3) <u>Occasionally</u>	(4) <u>Frequently</u>	(5) <u>Always</u>
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	Never (1)	Infrequently (2)	Occasionally (3)	Frequently (4)	Always (5)
*1. I feel calm and collected when I think about holding parent-teacher conferences.	☐	☐	☐	☐	☐
2. If I have trouble answering a student's question, I find it difficult to concentrate on questions that follow.	☐	☐	☐	☐	☐
3. I feel uncomfortable when I speak before a group.	☐	☐	☐	☐	☐
*4. I feel calm when I am preparing lessons.	☐	☐	☐	☐	☐
5. I'm worried whether I can be a good teacher.	☐	☐	☐	☐	☐
*6. I feel sure I will find teaching a satisfying profession.	☐	☐	☐	☐	☐

	Never (1)	Infrequently (2)	Occasionally (3)	Frequently (4)	Always (5)
*7. I would feel calm and collected if a student's parent observed in my classroom.	☐	☐	☐	☐	☐
8. I feel inferior to other teachers in my school.	☐	☐	☐	☐	☐
*9. I feel that students will follow my instructions.	☐	☐	☐	☐	☐
*10. I feel secure with regard to my ability to keep a class under control.	☐	☐	☐	☐	☐
11. I'm less happy teaching than I thought I'd be.	☐	☐	☐	☐	☐
12. I feel nervous when I am being observed by my building supervisor.	☐	☐	☐	☐	☐
*13. I feel confident about my ability to improvise in the classroom.	☐	☐	☐	☐	☐
*14. I feel other teachers think I'm very competent.	☐	☐	☐	☐	☐
15. I feel panicky when a student asks me a question I can't answer.	☐	☐	☐	☐	☐
16. I feel anxious because I don't know yet whether I really want to be a teacher.	☐	☐	☐	☐	☐
*17. I feel better prepared for teaching than other teachers in my school.	☐	☐	☐	☐	☐
18. Lack of rapport with my students is one of my biggest worries.	☐	☐	☐	☐	☐
19. I would feel anxious if the principal informed me he was coming to my class to observe.	☐	☐	☐	☐	☐

	Never (1)	Infrequently (2)	Occasionally (3)	Frequently (4)	Always (5)
*20. I find it easy to speak up in the staff room.	☐	☐	☐	☐	☐
21. I worry about being able to keep the students interested in what I teach them.	☐	☐	☐	☐	☐
*22. I find it easy to admit to the class that I don't know the answer to a question a student asks.	☐	☐	☐	☐	☐
23. Deciding how to present information in the classroom makes me feel uncertain.	☐	☐	☐	☐	☐
*24. I feel I will have good recall of the things I know when I am in front of the class.	☐	☐	☐	☐	☐
*25. I feel I am as competent in the classroom as other teachers in my school.	☐	☐	☐	☐	☐
26. I'm concerned about how to use my testing of students as a useful indication of how effectively I'm teaching them.	☐	☐	☐	☐	☐
27. I'm worried that differences in background between my students and me prevent me from teaching effectively.	☐	☐	☐	☐	☐
*28. I am certain that my own personal "hang-ups" do not hinder my teaching effectiveness.	☐	☐	☐	☐	☐
29. I'm uncertain whether I can tell the difference between really seriously disturbed students and those who are merely "goofing off" in class.	☐	☐	☐	☐	☐

APPENDIX B
STATE-TRAIT ANXIETY INVENTORY

SELF-EVALUATION QUESTIONNAIRE

Developed by C. D. Spielberger, R. L. Gorsuch and R. Lushene

STAI FORM X-1

Name: _____

Date: _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you *feel* right now, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	1	2	3	4
2. I feel secure	1	2	3	4
3. I am tense	1	2	3	4
4. I am regretful	1	2	3	4
5. I feel at ease	1	2	3	4
6. I feel upset	1	2	3	4
7. I am presently worrying over possible misfortunes.	1	2	3	4
8. I feel rested	1	2	3	4
9. I feel anxious	1	2	3	4
10. I feel comfortable	1	2	3	4
11. I feel self-confident	1	2	3	4
12. I feel nervous	1	2	3	4
13. I am jittery	1	2	3	4
14. I feel "high strung"	1	2	3	4
15. I am relaxed	1	2	3	4
16. I am content	1	2	3	4
17. I am worried	1	2	3	4
18. I feel over-excited and "rattled"	1	2	3	4
19. I feel joyful	1	2	3	4
20. I feel pleasant	1	2	3	4

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SELF-EVALUATION QUESTIONNAIRE

STAI FORM X-2

Name: _____

Date: _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
21. I feel pleasant	1	2	3	4
22. I tire quickly	1	2	3	4
23. I feel like crying	1	2	3	4
24. I wish I could be as happy as others seem to be .	1	2	3	4
25. I am losing out on things because I can't make up my mind soon enough	1	2	3	4
26. I feel rested	1	2	3	4
27. I am "calm, cool and collected"	1	2	3	4
28. I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
29. I worry too much over something that really doesn't matter	1	2	3	4
30. I am happy	1	2	3	4
31. I am inclined to take things hard	1	2	3	4
32. I lack self-confidence	1	2	3	4
33. I feel secure	1	2	3	4
34. I try to avoid facing a crisis or difficulty	1	2	3	4
35. I feel blue	1	2	3	4
36. I am content	1	2	3	4
37. Some unimportant thought runs through my mind and bothers me	1	2	3	4
38. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
39. I am a steady person	1	2	3	4
40. I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

APPENDIX C
LIFE EXPERIENCES SURVEY

The Life Experiences Survey

Listed below are a number of events which sometimes bring about change in the lives of those who experience them and which necessitate social readjustment. *Please check those events which you have experienced in the recent past and indicate the time period during which you have experienced each event.* Be sure that all check marks are directly across from the items they correspond to.

Also, for each item checked below, *please indicate the extent to which you viewed the event as having either a positive or negative impact on your life at the time the event occurred.* That is, *indicate the type and extent of impact that the event had.* A rating of -3 would indicate an extremely negative impact. A rating of 0 suggests no impact either positive or negative. A rating of $+3$ would indicate an extremely positive impact.

Section 1

	0 to 6 mo	7 mo to 1 yr	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
1. Marriage			-3	-2	-1	0	+1	+2	+3
2. Detention in jail or comparable institution			-3	-2	-1	0	+1	+2	+3
3. Death of spouse			-3	-2	-1	0	+1	+2	+3
4. Major change in sleeping habits (much more or much less sleep)			-3	-2	-1	0	+1	+2	+3

	0 to 6 mo	7 mo to 1 yr	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
5. Death of close family member:									
a. mother			-3	-2	-1	0	+1	+2	+3
b. father			-3	-2	-1	0	+1	+2	+3
c. brother			-3	-2	-1	0	+1	+2	+3
d. sister			-3	-2	-1	0	+1	+2	+3
e. grandmother			-3	-2	-1	0	+1	+2	+3
f. grandfather			-3	-2	-1	0	+1	+2	+3
g. other (specify)			-3	-2	-1	0	+1	+2	+3
6. Major change in eating habits (much more or much less food intake)			-3	-2	-1	0	+1	+2	+3
7. Foreclosure on mortgage or loan			-3	-2	-1	0	+1	+2	+3
8. Death of close friend			-3	-2	-1	0	+1	+2	+3
9. Outstanding personal achievement			-3	-2	-1	0	+1	+2	+3
10. Minor law violations (traffic tickets, disturbing the peace, etc.)			-3	-2	-1	0	+1	+2	+3
11. <i>Male</i> : Wife/girlfriend's pregnancy			-3	-2	-1	0	+1	+2	+3
12. <i>Female</i> : Pregnancy			-3	-2	-1	0	+1	+2	+3
13. Changed work situation (different work responsibility, major change in working conditions, working hours, etc.)			-3	-2	-1	0	+1	+2	+3
14. New job			-3	-2	-1	0	+1	+2	+3
15. Serious illness or injury of close family member:									
a. father			-3	-2	-1	0	+1	+2	+3
b. mother			-3	-2	-1	0	+1	+2	+3
c. sister			-3	-2	-1	0	+1	+2	+3
d. brother			-3	-2	-1	0	+1	+2	+3
e. grandfather			-3	-2	-1	0	+1	+2	+3
f. grandmother			-3	-2	-1	0	+1	+2	+3
g. spouse			-3	-2	-1	0	+1	+2	+3
h. other (specify)			-3	-2	-1	0	+1	+2	+3
16. Sexual difficulties			-3	-2	-1	0	+1	+2	+3
17. Trouble with employer (in danger of losing job, being suspended, demoted, etc.)			-3	-2	-1	0	+1	+2	+3
18. Trouble with in-laws			-3	-2	-1	0	+1	+2	+3
19. Major change in financial status (a lot better off or a lot worse off)			-3	-2	-1	0	+1	+2	+3
20. Major change in closeness of family members (increased or decreased closeness)			-3	-2	-1	0	+1	+2	+3
21. Gaining a new family member (through birth, adoption, family member moving in, etc.)			-3	-2	-1	0	+1	+2	+3
22. Change of residence			-3	-2	-1	0	+1	+2	+3
23. Marital separation from mate (due to conflict)			-3	-2	-1	0	+1	+2	+3
24. Major change in church activities (increased or decreased attendance)			-3	-2	-1	0	+1	+2	+3

	0 to 6 mo	7 mo to 1 yr	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
25. Marital reconciliation with mate			-3	-2	-1	0	+1	+2	+3
26. Major change in number of arguments with spouse (a lot more or a lot less arguments)			-3	-2	-1	0	+1	+2	+3
27. <i>Married male</i> : Change in wife's work outside the home (beginning work, ceasing work, changing to a new job, etc.)			-3	-2	-1	0	+1	+2	+3
28. <i>Married female</i> : Change in husband's work (loss of job, beginning new job, retirement, etc.)			-3	-2	-1	0	+1	+2	+3
29. Major change in usual type and/or amount of recreation			-3	-2	-1	0	+1	+2	+3
30. Borrowing more than \$10,000 (buying home, business, etc.)			-3	-2	-1	0	+1	+2	+3
31. Borrowing less than \$10,000 (buying car, TV, getting school loan, etc.)			-3	-2	-1	0	+1	+2	+3
32. Being fired from job			-3	-2	-1	0	+1	+2	+3
33. <i>Male</i> : Wife/girlfriend having abortion			-3	-2	-1	0	+1	+2	+3
34. <i>Female</i> : Having abortion			-3	-2	-1	0	+1	+2	+3
35. Major personal illness or injury			-3	-2	-1	0	+1	+2	+3
36. Major change in social activities, e.g., parties, movies, visiting (increased or decreased participation)			-3	-2	-1	0	+1	+2	+3
37. Major change in living conditions of family (building new home, remodeling, deterioration of home, neighborhood, etc.)			-3	-2	-1	0	+1	+2	+3
38. Divorce			-3	-2	-1	0	+1	+2	+3
39. Serious injury or illness of close friend			-3	-2	-1	0	+1	+2	+3
40. Retirement from work			-3	-2	-1	0	+1	+2	+3
41. Son or daughter leaving home (due to marriage, college, etc.)			-3	-2	-1	0	+1	+2	+3
42. Ending of formal schooling			-3	-2	-1	0	+1	+2	+3
43. Separation from spouse (due to work, travel, etc.)			-3	-2	-1	0	+1	+2	+3
44. Engagement			-3	-2	-1	0	+1	+2	+3
45. Breaking up with boyfriend/girlfriend			-3	-2	-1	0	+1	+2	+3
46. Leaving home for the first time			-3	-2	-1	0	+1	+2	+3
47. Reconciliation with boyfriend/girlfriend			-3	-2	-1	0	+1	+2	+3
Other recent experiences which have had an impact on your life. List and rate.									
48. _____			-3	-2	-1	0	+1	+2	+3
49. _____			-3	-2	-1	0	+1	+2	+3
50. _____			-3	-2	-1	0	+1	+2	+3

	0 to 6 mo	7 mo to 1 yr	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
Section 2: Student Only									
51. Beginning a new school experience at a higher academic level (college, graduate school, professional school, etc.)			-3	-2	-1	0	+1	+2	+3
52. Changing to a new school at same academic level (undergraduate, graduate, etc.)			-3	-2	-1	0	+1	+2	+3
53. Academic probation			-3	-2	-1	0	+1	+2	+3
54. Being dismissed from dormitory or other residence			-3	-2	-1	0	+1	+2	+3
55. Failing an important exam			-3	-2	-1	0	+1	+2	+3
56. Changing a major			-3	-2	-1	0	+1	+2	+3
57. Failing a course			-3	-2	-1	0	+1	+2	+3
58. Dropping a course			-3	-2	-1	0	+1	+2	+3
59. Joining a fraternity/sorority			-3	-2	-1	0	+1	+2	+3
60. Financial problems concerning school (in danger of not having sufficient money to continue)			-3	-2	-1	0	+1	+2	+3

Received June 23, 1977 ■

APPENDIX D
RELAXATION RESPONSE METHOD

Relaxation Response

To be used with EMG biofeedback

1. Sit quietly in a comfortable position
2. Close your eyes
3. Deeply relax all your muscles, beginning at your feet and progressing up to your face. Keep them relaxed.
4. Breathe through your nose. Become aware of your breathing. As you breathe out, say the word, "ONE," silently to yourself. For Example, breathe IN ... OUT, "ONE,"; IN ... OUT, "ONE": etc. Breathe easily and naturally.
5. Continue for 10 to 20 minutes. You may open your eyes to check the time, but do not use an alarm. When you finish, sit quietly for several minutes, at first with your eyes closed and later with your eyes opened. Do not stand up for a few minutes.
6. Do not worry about whether you are successful in achieving a deep level of relaxation. Maintain a passive attitude and permit relaxation to occur at its own pace. When distracting thoughts occur, try to ignore them by not dwelling upon them and return to repeating "ONE." With practice, the response should come with little effort. Practice the technique once or twice daily, but not within two hours after any meal, since the digestive processes seem to interfere with the elicitation of the Relaxation Response.

APPENDIX E
INFORMED CONSENT AGREEMENT

INFORMED CONSENT AGREEMENT

I, _____ have had the purposes of this project explained to me. I understand that the general purpose of the study is to improve stress coping skills.

I understand that the personal information collected during the course of this study is essential to the research. This information is confidential and will not be released to anyone without my written permission. I give Richard Day permission to obtain any necessary information from my file and records. In any research report prepared subsequent to this project, I will not be identified by name, and any identifying information will be changed so as to protect my identity. I understand I can stop participating in the study at any time. This consent agreement will terminate March 1, 1980, but confidentiality will be extended indefinitely.

I certify that I have read this document, or had it read to me, prior to signing it.

Signed _____

Dated _____

APPENDIX F
TABLE OF MEANS FOR BLOCKING VARIABLE AND
DEPENDENT MEASURES

Table A.1
Mean Levels of Stress as Measured by the
Life Experiences Survey

Level	Mean Negative Change Score	Standard Deviation
High	13.44	5.15
Medium	5.33	1.25
Low	1.55	1.26

Table A.2
Pretest Means for Dependent Measures (n=27)

Dependent Measures	Means	Standard Deviation
Trait Subscale	38.33	8.33
Teaching Anxiety Scale	61.96	10.87
Systolic Blood Pressure	121.28	7.51
Diastolic Blood Pressure	77.27	6.89

Table A.3
Means for Dependent Measures of
Cognitive Restructuring Treatment (n=9)

Dependent Measure	Pre		Post	
	Mean	Standard Deviation	Mean	Standard Deviation
Trait Subscale	41.00	8.96	36.78	9.23
State Subscale*	N/A	N/A	34.11	11.05
Teaching Anxiety Scale	65.67	10.72	58.22	7.90
Systolic Blood Pressure	119.19	3.56	120.25	11.79
Diastolic Blood Pressure	77.00	6.05	73.22	5.51

*Posttest only for this measure

Table A.4
Means for Dependent Measures of
Biofeedback Treatment (n=9)

Dependent Measure	Pre		Post	
	Mean	Standard Deviation	Mean	Standard Deviation
Trait Subscale	34.89	6.55	30.33	6.75
State Subscale*	N/A	N/A	52.00	6.82
Teaching Anxiety Scale	55.22	9.35	53.11	10.73
Systolic Blood Pressure	121.89	12.51	118.42	18.21
Diastolic Blood Pressure	77.83	8.01	72.39	11.10

*Posttest only for this measure

Table A.5
Means for Dependent Measures
of Control Group (n=9)

Dependent Measures	Pre		Post	
	Mean	Standard Deviation	Mean	Standard Deviation
Trait Subscale	39.11	8.95	41.00	9.81
State Subscale*	N/A	N/A	39.44	8.73
Teaching Anxiety Scale	65.00	10.22	66.00	11.43
Systolic Blood Pressure	122.75	2.40	125.67	5.58
Diastolic Blood Pressure	76.97	7.28	76.39	7.66

*Posttest only for this measurement

APPENDIX G
TEACHERS' WRITTEN REACTION TO TRAINING
IN STRESS MANAGEMENT

Teachers' Written Reaction to Training in Stress Management

1. What training did you receive? BIOFEEDBACK
2. What was your reaction to the training you received?
 - a. I found that I enjoyed the challenge of trying to lower my stress level but wanted to control the way I achieved it. I am not sure if I pin-pointed exactly what I do to lower it, but with more time I feel it would be useful.
 - b. I was pleased to find that I could have some control over the amount of activity and thoughts going on in my brain. It was nice to know that it is possible to help control stress and tension which seems to be with us.
 - c. It is an excellent program.
 - d. Very positive. It gave me more perspective into my own self.
 - e. It was interesting the amount of energy one generates without knowing of the happening. I was pleased that I could control this stress energy if I applied myself to the task.
 - f. I really enjoyed it because it helped me recognize certain relaxation feelings as compared to tension and seeing recorded on the biofeedback machine.
 - g. I see it as a useful technique for spot relaxation when stress becomes acute--even for preparation for stress.
 - h. I felt it was very worthwhile. As busy as I am, it is great to discover a way of relaxing for a period of time.
 - i. Beneficial. It helps you realize how it feels to be truly relaxed.

Training Received: Biofeedback

3. Would you recommend that other teachers receive training? Why?
 - a. Yes. To help them find out what they or their bodies do to lower their stress level.
 - b. I feel it is beneficial training for any person who is in a situation that can be stressful. It trains a person to be in control of himself and deal with the stress that is always there.
 - c. Yes, it teaches you about stress and different methods of coping with it.
 - d. Very definitely. I think this is the answer to teacher burn-out.
 - e. Several of my colleagues experience stress during their working and some ask me what can one do to counteract this effect.
 - f. Definitely yes. We are exposed to a lot of tensions every day and learning to recognize and control these tensions would be a definite asset for every teacher. I feel it would improve our patience with the kids, and also stimulate our energy for the latter part of the school day.
 - g. Yes. Teaching is like most other professions centering around services to people - individually and in groups. It requires tremendous nervous energy coupled with self-control. One must be constantly poised for emergencies, small and large. To be able to escape the emotional wear and tear, even for seconds at a time, is a very real help.
 - h. Yes - all of us need to relax and forget our routine. Any teacher who really puts himself into his work is ready for a different approach to pressure and its release.
 - i. Yes. It helps one better deal with tensions.
4. Any other comments or reactions to the study?
 - a. no response
 - b. no response
 - c. no response

Training Received: Biofeedback

- d. I only wish it were an ongoing project. So that many, many others could take advantage of this project.
- e. I feel that the research to be valid should be tested with both bio & cognitive on the same patient to see which is most effective. Also, it is difficult to practice "bio" without the box.
- f. Students should also be exposed as a seminar, or better yet, as a class.
- g. I hope the opportunity will be available to other teachers. My only reservation is that I suspect one could become dependent on both the psychologist and the equipment as incentive for the regular practice of the technique.
- h. I would be interested in comments made by others about the program.
- i. no response.

Teachers' Written Reaction to Training in Stress Management

1. What training did you receive? COGNITIVE RESTRUCTURING
2. What was your reaction to the training you received?
 - a. The training provided a format for verbalizing statements which allowed me to better acknowledge and, subsequently alter certain feelings toward stressful incidences/situations.
 - b. This has been a very stressful year, especially since school started one month late. It was very beneficial to have someone outside our school to discuss problems with and to receive suggestions as to ways to handle the situation.
 - c. Very positive. I had several problems that I was concerned about and I think I was able to look at them or seek a solution with the help I was given.
 - d. It was excellent! I benefitted a great deal from our sessions.
 - e. It helped me to think about myself and my thoughts before I got all upset. I have started to learn how to rate things and not to get so upset about all the "little stuff" and save all my "upsets" for the "big stuff".
 - f. I found it helpful in becoming aware of the stress areas in my day to day experience. I also felt more choices were opened up in my thinking for handling these pressure areas. I felt much more positive about coping.
 - g. Very good. It was uneven. Some days were merely pleasant, other days were very thought provoking and some made significant changes in my outlook. Mr. Day was very helpful. He made me feel very secure and gave me the feeling that he cared. I still find it difficult to remember to stop in class when I find myself tensing up, to relax - breathe deeply and slow down.
 - h. Very positive - I felt the training was helpful, useful, and since it was "one to one" it was very personal, and pertained specifically with my problems, and dealings with tension and stress.

Training Received: Cognitive Restructuring

- i. I enjoyed it.
3. Would you recommend that other teachers receive training? Why?
- a. Yes. In that stress appears predominant in talk sessions of educators, a training program seems fitting and could only be beneficial for teachers and those in high stress areas.
 - b. I think all teachers should have the opportunity. I feel that in this day and age that teaching has become a very stressful occupation and we need positive reinforcement.
 - c. Yes. Because teaching is a stressful job and all teachers need to know how to deal with it. With understanding stress and dealing with it, it makes you feel on top of things.
 - d. Definitely! We all have stress to one degree or another. The important thing that comes out is getting a person to become aware of the stress and finding alternatives to cope with the stress. It has given me a chance to look deeply into myself and see my strengths and weaknesses.
 - e. Yes. If it can help me feel better about myself then it might help someone else. Teaching is a pressure job and all teachers need to learn how to shut it off.
 - f. Yes, because most teachers today badly need to think more positively and experience another person who treats them as valuable assets to education.
 - g. Perhaps--if they feel they need someone intelligent and caring to talk to. Many people could benefit from an outsider of this type to talk with. Many teachers suffer from a feeling of alienation and frustration. Husbands and administrators are not always understanding of our problems.
 - h. Yes. People need help in being able to think through a stressful situation so they can begin to see what they can control and cannot control, so as to turn those stressful situations into tolerable ones.
 - i. Yes! It helps remove problems in your life.

Training Received: Cognitive Restructuring

4. Any other comments or reactions to the study?
- a. Stress training in the form which I received enabled me to be more in control of stressful situations rather than stressful situations controlling my behavior.
 - b. A good program!
 - c. I was happy to know that some concerns that I had about teaching were normal kinds of things that all other teachers have.
 - d. 5 weeks is too short--
 - e. I would like to continue to study and learn some more.
 - f. I appreciated airing private things that are exasperating and fearful. I appreciated the respect and understanding I received from the interviews.
 - g. no response
 - h. I enjoyed it very much--and would be interested, sometime, in going through the biofeedback training also.
 - i. no response.

APPENDIX H
SPECIFICATIONS OF EMG

SPECIFICATIONS OF EMG

Technical Specifications of the J & J EMG Model M-55

Amplifier

Differential type, fully protected

Input noise: 0.2 uV RMS maximum
Common mode rejection greater than 100 db
60 H₂ notch filter, 40 db notch depth
60 H₂ normal mode rejection, 60 dg
Four bandpasses
Ten ranges: 1-1000 uV full scale
Input impedance: 10 megohms

Feedback

Meter: direct reading, uV RMS calibration better than
3%
Outputs: raw EMG, selected band EMG, rectified EMG,
audio, meter signal

Controls

Range: 1, 2, 5, 10, 20, 50, 100, 200
500, 1000 uV full scale
Threshold: 0 to full meter scale

Inputs

Electrode test, electrode operate
Electrodes: (3) silver/silver chloride fully shielded,
screw-on type

Power

Clinical: (4) size "D" flashlight cells

APPENDIX I
SPECIFICATIONS OF SCORE KEEPER

SPECIFICATIONS OF SCORE KEEPER

Technical Specifications of the J & J LGS-150 Digital Integrating Score-Keeper

Display

3 1/2 digit LED display, 0.5% accuracy

Count indicator: lights when integrating

Controls

Time Base: .25s, 25, 4s, 8s, 15, 30s, 1m, 2m, 4m, 8m,
16m, 32m

Range and function: Temperature, threshold, microvolts:
1, 2, 5, 10, 20, 50, 100, 200, 500, 1000.

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