THE EFFECT OF SHORT TERM AUTOGENIC TRAINING ON THE STRESS REACTIVITY OF HOSPITALIZED EMOTIONALLY DISTURBED ADOLESCENTS

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CHAPTER ONE

INTRODUCTION

Emotional disturbance is a term used to describe various forms of dysfunctional behavior. Characteristics associated with emotionally disturbed youth include depressive states, excessive variations in mood, irrational thinking, psychosomatic complaints, developmental lags in social and emotional maturity, disruptive and aggressive acting out behavior, depressed intellectual functioning and academic underachievement (Cullinan, Epstein & Sarbornie, 1992; Paul & Epanchin, 1982).

Numerous forms of emotional disturbance are known to adversely affect a student's ability to cope with the behavioral and instructional demands of the classroom. A useful description of the characteristics of emotionally disturbed students is presented in the January, 1985 edition of the California Association of School Psychologists' newsletter, CASP TODAY:

Intrapersonal Dynamics:

1. Often is characterized by a pervasively poor self-concept.

2. Often overly dependent or impulsively defiant.

3. Is generally anxious, fearful; mood swings from depression or high activity; frequent inappropriate affect.

4. Frequent denial and confusion; often distorts reality without regard to self-interest.

Personal-Social-Relationships:

1. Peer relationships are pervasively poor; short-lived, a source of anxiety, and even chaotic.

2. Has difficulty in establishing or maintaining group membership.

3. Others are often alienated by the intensity of need for attention or bizarreness of idea and/or behavior.

4. Conflict and tension characterize almost all relationships.

Educational Performance:

1. School is a source of confusion and anxiety; often responds to structure in the educational program.

2. Achievement is often uneven; attention and concentration are impaired by anxiety (p. 8).

Estimates range as high as 30% of the student population requires some form of intervention for emotional problems some time during their school careers (Kaufman, 1988; Strider & Strider, 1980). Even the most conservative estimates suggest a minimum of 7% of all children and

adolescents experience emotional disorders severe enough to warrant treatment (Brandenburg, Friedman & Silver, 1990).

Intervention can range from counseling and/or individualized instructional assistance provided by the school, to intensive psychiatric treatment administered in a hospital setting. Residential placement is reserved for students with particularly severe emotional problems. These students are among those who cannot be educated adequately in a regular school system and are generally unable to function appropriately in their home environment.

Stress has become recognized as an important motivational variable influencing learning and behavior in school (Sheridan & Smith, 1987). Stress is essentially an arousal of psychophysiological systems involving an integrated response of mind and body, to prepare an individual for action (Chandler, 1981; Pelletier, 1992). A stressor is any physical, psychological or social event or condition, including anticipation and imagination, that triggers a stress reaction (Girdano & Everly, 1979). Chandler (1987) views stress as a state of emotional tension arising from needs and/or environmental demands.

Boyle (1987) claims emotional states in particular are influenced by stress. Excessive stress is now known to be an important variable in the

emergence and maintenance of dysfunctional behavior of emotionally disturbed youth. Adverse effects of stress include prolonged hyperarousal, constructed affect, social withdrawal and academic underachievement (Chandler, 1981; Pelletier, 1992). Substance abuse, runaway behavior, self-abusive and suicidal behaviors are a few of the reported miscoping responses to excessive stress characteristic of emotionally disturbed youth (Thoreson & Eagleston, 1983). Extreme reactions to stress may result in a psychiatric classification (e.g, post-traumatic stress disorder).

STATEMENT OF THE PROBLEM

In comparison to the general school population, emotionally disturbed students are more likely to experience excessive stress and anxiety. Generally, the more severe the emotional disturbance, the greater the degree of stress and anxiety. In particular, these emotionally disturbed students need to learn how to effectively cope with excessive stress in order to gain maximum benefit from prescribed instructional and therapeutic interventions. Stress does provide a common focus or target for intervention (Chandler, 1981). Therefore, a definite need exists for the development and use of intervention strategies allowing emotionally disturbed students to more effectively manage stress.

Relaxation procedures are applied with increased frequency with children and adolescents exhibiting various stress related disorders. The psychophysiological treatment effects of relaxation techniques including progressive relaxation, meditation and biofeedback are in direct opposition to the hyperarousal effects of excessive stress.

Autogenic training is a self-directed relaxation-based treatment approach involving the practice of mental exercises allowing for the simultaneous self-regulation of both somatic and mental functions. The six standard exercises which form the foundation of autogenic training are designed to allow trainees to directly modify their psychophysiological responses to stress and to more effectively cope with traumatic events and stressors of daily life.

The purpose of this investigation was to examine the effectiveness of short term autogenic training in reducing stress in hospitalized emotionally disturbed adolescents. Autogenic training was used as a self-directed stress reduction technique which involved an ordered series of mental exercises, each of which entailed the silent repetition of a standard verbal formula (e.g., "My arms are heavy and warm."). Subjects practiced an abbreviated version of the autogenic standard exercises consisting of the first two exercises promoting the experience of heaviness and warmth in the limbs.

The effectiveness of autogenic training as a stress reduction intervention strategy was assessed by both physiological and psychological (subjective) measures of stress reactivity.

RESEARCH HYPOTHESES

HO_1 Autogenic training subjects will demonstrate less stress reactivity than subjects in the self-relaxation placebo control group or subjects in the no treatment control group as measured by changes in skin conductance levels.

HO_2 Autogenic training subjects will demonstrate less stress reactivity than subjects in the self-relaxation placebo control group or subjects in the no treatment control group as measured by changes in peripheral skin temperature level.

HO_3 Autogenic training subjects will demonstrate less stress reactivity than subjects in the self-relaxation placebo group or subjects in the no treatment control group as measured by changes in state anxiety levels.

CHAPTER TWO

REVIEW OF THE LITERATURE

Stress

A theoretical rationale for stress management begins with a discussion of stress. Selye (1974) defines stress as a non-specific but consistent physiological response to any stimulus which demands an adjustment of behavior. In this context stress is viewed as an adaptive reaction necessary for survival.

The "General Adaption Syndrome" (G.A.S.) is useful in understanding the effects of stress on the mind and body. The stress response is divided into three stages: (1) Alarm, (2) Resistance, and (3) Exhaustion. The alarm reaction is characterized by dominant sympathetic nervous system activity. Bodily hormones are secreted including adrenaline and hydrocortisone to allow somatic defenses to adapt to a stimulus/stressor. In the resistance stage the adaptive response persists until the stressful situation is accommodated. During this stage bodily functions attempt to return to normal levels of activity. This often depleting expenditure of energy and bodily recuperative resources leads to the third stage, exhaustion, which continues until the body can rest and replenish its

reserves (Selye, 1974). Stress reactions only become problematic when adjustments must be made too frequently or maintained over an extended period of time, exceeding the recuperative reserves of the body to restore equilibrium. This excessive stress, labeled "distress" by Selye (1974), can fatigue or damage any bodily system to the point of malfunction and/or disease.

The fight or flight response is an emergency reaction to prepare the individual for overt action in particularly demanding or threatening situations. In nature this is to either fight or flee. This emergency response to a stressor involves a rapid activation of the sympathetic nervous system resulting in an increase in blood pressure and heart rate, acceleration of breathing and body metabolism, and a marked increase in the flow of blood to the muscles of the arms and legs.

However, as civilization has developed, this fight or flight response apparently has lost much of its adaptive purpose. Usually, the stress an individual experiences is caused by only symbolic sources of threat, which are not actually life endangering, but only a perceived threat to one's ego (self-esteem). In these instances, stress is not usually alleviated by simply fighting or running away. The elicitation of a stress reaction in these situations (e.g., public speaking) usually results in an inappropriate, non-

adaptive response which usually interferes with coping or adaption. During a normal adaptive stress reaction psychophysiological activities (fight or flight response) reach such a peak that when the perceived threat or stressor is removed, the activity level of these bodily systems drop rapidly or "trough" into an exhaustion, recuperative period. In a short period of time a return to normal functioning occurs.

However, in modern society, sources of stress are often not clearly perceived or defined. An individual can be responding unconsciously to a particular stressor such as television news coverage of some disaster elsewhere in the world. Also, an individual may decide not to act overtly in response to an identified stressor. An example is an individual who is angry, but does not engage in the physical act of fighting. In either case, the physiological correlates can proceed unhindered. This arousal state can go unnoticed for prolonged periods because there is no experience of discomfort or pain. Since the individual is not usually aware of this increase in sympathetic nervous system activity a rebound or "trough" effect does not occur as in the normal stress reaction. As a result, this increased sympathetic activity is maintained and, with the cumulative effects of other stressors, can intensify. When this condition of stress reactivity is not relieved an adverse condition develops which has

deleterious effects on mind and body (Pelletier, personal communication, October 25, 1995).

McManus (1984) provides a description of the integral response of the mind and body to stress. Appraisal and evaluation functions of the brain first determines the presence and/or extent of a stressor. Once a stressor is perceived, hormonal stimulation of the sympathetic nervous system occurs. An arousal of biological systems ensues, including an increase in basal metabolic rate. This stress reactivity is described as a condition resulting from some change or imbalance requiring an adjustment of the individual. Once stress is relieved during this adjustment or adaption phase of the stress response, biological systems return to a normal state.

Matthews (1989) advocates the inverted "U" theory of stress claiming stress reactivity occurs on a continuum of arousal where an optimal level of arousal exists for every activity. Over and under states of arousal during a specific activity tend to be associated with impaired functioning. Once an optimal level of stress has been achieved there is a negative correlation between increases in stress and the quality of performance, especially with more complex and creative tasks (Gmelch, 1983). These theorists propose moderate levels of stress lead to peak performance, especially with intellectual and academic tasks.

Nuernberger (1981) supports an equilibrium model by conceptualizing stress as a state of internal imbalance, reflecting the unrelieved dominance of either arousal or inhibition, which leads to impaired physiological and/or mental functioning. Maintenance of neurological balance allows for a condition free from deleterious stress. A constant state of response readiness in unwarranted situations termed emotional reactivity can become a chronic condition that disrupts homeostasis and recuperative processes (Girdano & Everly, 1979; Pelletier, 1992).

The inverted "U" and psychophysiological equilibrium models of stress reactivity are represented in this chapter. These theories appear consistent in that certain levels of stress lead to optimal functioning or performance with different degrees of stress resulting in dysfunctional behavior. Both theories appear useful in the conceptualization of stress. No judgment is proposed concerning which theory is most sound. However, the equilibrium theory appears most consistent with the theoretical framework presented for autogenic training, the primary intervention used in the investigation.

Stressors

Living in a modern society provides considerable stress without the occurrence of traumatic or life threatening events. Numerous stressors exist in the every day lives of children and adolescents. Adjustments to stressful events occur frequently both at home and at school. Interpersonal demands include relating positively to family members, peers and various adult authority figures, including teachers at school. Performance demands primarily involve consistent pressure to succeed academically and in other activities in school. Poverty and/or dysfunctional family situations usually result in conditions of chronic excessive stress (Chandler, 1987; Matthews & Casteel, 1984; Nenortas, 1986).

A full day of school involving six hours of academic course work is considered a significant area of stress. School is a particularly stressful experience for those students with learning and interpersonal limitations. All forms of punishment administered in an educational setting increases a students stress level exacerbating problematic behavior in school (Nenortas, 1986).

Psychological stress in children and adolescents develops from either excessive demands, real or perceived or the failure of significant others in the environment to meet the needs of the individual. Chandler (1981)

defines this psychological stress as a state of emotional tension arising from the experience of stressful or traumatic life events.

There exists a casual relationship between the experience of certain life events and the amount of stress in a child's or adolescent's life. Life events can be ranked from minor to major sources of stress. Physical and/or sexual abuse, death of a parent and the marital separation or divorce of parents are events considered major or traumatic sources of stress. Events including changing schools, wearing glasses or the birth of a sibling are also considered stressful, but to a lesser degree. However, the accumulation of minor life events can prove as detrimental as the experience of a more traumatic life event. Individuals are more vulnerable to various medical and psychological disorders during the time major life events occur (Sensor, 1986).

Effects of Stress

Unrelieved conditions of stress can result in numerous adverse conditions affecting both mind and body. Each individual displays a characteristic psychophysiological reactivity to stress. McManus (1984) groups signs or symptoms of stress into three different categories. Physical signs of stress include shallow breathing, cold hands and feet, goosebumps, dilated pupils and body tremors. These symptoms are easily associated

with the increase in sympathetic nervous system activity involved in stress reactions. Hyperactivity, limited attention span and dysponetic movements such as tics, hair twirling, nail biting are several of the behaviors listed in the category of behavioral signs of stress. Apathy, withdrawal, nightmares, impulsiveness, temper outbursts and feelings of worthlessness are conditions found in the category of psychological/emotional signs of stress.

Sensor (1986) also provides a comprehensive list of similar signs or symptoms of stress. She emphasizes looking for a change from the individuals typical behavior pattern to determine the presence of excessive stress. A change in temperament or a decrease in performance level are just two examples of maladaptive responses to stress.

Stress reactivity can also impair cognitive functioning. Matthews (1989) claims conditions of stress interfere with contemplative or reasoned activities. Perception is also influenced in stressful situations as individuals tend to focus on irrelevant details resulting in poor decision making. According to Matthews (1989) individuals experiencing excessive stress become more action oriented "doers" rather than more reflective "thinkers".

Stress exaggerates certain emotional states and, in particular can heighten anxiety (Pelletier, 1992). Anxiety is generally conceived of as an emotional response to stress. Also, anxiety has often been referred to as

fear experienced in the absence of any "real" physical threat or danger. Bridges (1977) defines anxiety as a transitory emotional state or condition characterized by heightened sympathetic nervous system activity accompanied by feelings of tension and apprehension. Two types of anxiety can be differentiated. State anxiety is a transient anxiety relative to a specific situation, while trait anxiety involves an individual's predisposition to anxiety (Spielberger, 1985). Anxiety level is a useful construct in determining the degree to which an individual is responding emotionally to stress.

Miscoping occurs when an individual responds in a maladaptive way to excessive stress. Thoreson & Eagleston (1983) list social withdrawal, truancy, alcohol or drug abuse and low self-esteem as common examples of miscoping. Aggressive and overt anti-social behavior are frequent miscoping responses of children or adolescents under stress (Nenortas, 1986).

Unless conditions of excessive stress are alleviated, miscoping responses can develop into life long patterns of maladaptive behavior. Extreme patterns of miscoping behavior in response to stress are usually viewed as forms of emotional disturbance. Chandler (1981) claims children experiencing excessive stress are often referred for psychological

intervention because their behavior has become problematic to self and others.

As a generalized response, stress affects the weakest organ or functional system first. Excessive stress can suppress the immune system, lowering an individual's resistance to infectious disease (Pelletier, 1992). Acknowledged stress-related disorders include ulcers, hypertension, headache, asthma, insomnia, and cancer. Stress-related disorders are now considered the most debilitating medical problem in the United States (Nuernberger, 1981; Pelletier, 1992).

Extreme emotional reactions in attitude and behavior are also associated with excessive stress (Chandler, 1987; Pelletier, 1992). Stress is believed to be a causal factor in the development of numerous psychiatric disorders including various anxiety disorders. Adolescent psychiatric patients experienced a greater magnitude of stressful life events when compared with normal or medically hospitalized adolescents (Vincent & Rosenstock, 1979). Post-traumatic stress disorder is a diagnosis given to individuals who have experienced severe emotional trauma. Characteristic symptomology includes hyperarousal, constricted affect, social withdrawal and dissociative "flashback" experiences (Famuloro, Kinscherff & Fenton, 1990; Quinn, 1992).

Assessment of Stress

Both physiological and psychological measures are commonly used to assess stress. Physiological measures involve biofeedback devices capable of detecting sympathetic arousal characteristic of stress reactivity. Pencil and paper self-report anxiety and adjustment inventories are often used as subjective or psychological measures of stress. Self-report measures are dependent on the subject's cognitive awareness of their behavioral and emotional responses to stress. Both cognitive and physiological measures are viewed as necessary to accurately assess stress (King, Stanley & Burrows, 1987).

The most frequently used biofeedback modalities in stress research include the changing electrical conductance of the skin and peripheral skin temperature involving the wrist or fingertips. Skin conductance is a function of sweat gland activity controlled by the sympathetic nervous system. An individual perspires in direct relationship to the level of stress experienced. Skin conductance increases when an individual is stressed and decreases with relaxation.

Peripheral skin temperature is a reliable physiological variable which reflects the degree of stress an individual is experiencing. The temperature of the skin changes as a function of blood flow in the underlying tissue.

Blood passes through arterioles which are surrounded by smooth muscles innervated by the sympathetic nervous system. Sympathetic arousal causes the muscles to constrict the arterioles resulting in vasoconstriction which reduces the amount of blood flow. As a result, the temperature of the skin decreases. When the smooth muscles relax with a reduction in sympathetic activity the arterioles expand or vasodilate. Blood flow increases as does the temperature of the skin. A precision sensor wired to a feedback monitor is attached to the skin to measure the temperature of the underlying tissue.

Various rating scales exist to assess the amount of stress influencing an individual's life. The best known stress scale, the Social Readjustment Rating Scale is designed for use with an adult population. There are several versions of this scale adapted for children (Nenortas, 1986). The Loss Inventory for Kids measures the accumulation of stress during the past four years of a child's life. Another measure, The Adolescent-Family Inventory of Life Events and Changes incorporates a 50 item self-report schedule to assess stressful events occurring during the prior 12 months. The Adolescent Coping Orientation for Problem Experiences takes a different approach by assessing the coping skills of adolescents.

The State-Trait Anxiety Inventory (STAI) is the most widely used anxiety or stress measure in psychological research (Marteau & Becker, 1992). More than 3,300 studies utilizing the STAI are listed in Speilberger's (1989) published comprehensive bibliography. State anxiety describes transitory emotional conditions which may vary in intensity and fluctuate over time as a function of the amount of stress impinging upon the individual. The STAI Form Y-1, the state anxiety scale, consists of 20 statements that evaluate how individuals feel at that particular moment in time. The concept of trait anxiety refers to relatively stable individual differences in anxiety-proneness. The STAI Y-2, the trait anxiety scale, consists of 20 statements that assess how individuals generally feel (Speilberger, Gorsuch, Lushene, Vagg & Jacobs, 1983).

Psychophysiological Self-Regulation

Stress is viewed as a common element or focus for treatment of many physical and psychological disorders (Chandler, 1981). Effective self-management techniques are necessary to assist individuals in coping with the deleterious effects of excessive stress. Coping or adaptive responses to stress require maintaining a balance or equilibrium of psychophysiological systems inherent in the individual. Self-regulation techniques do exist which allow individuals to control and directly modify

their psychophysiological responses to stress (Alley, 1981; McManus, 1984; Matthews, 1989; Pelletier, 1992).

According to psychosomatic theory, an integration or balanced operation of mind and body is required for optimal functioning of the individual (Girdano & Everly, 1979). For this to occur, there must be a balance or integration of functional systems, in particular, of the various divisions of the brain and nervous system (Ornstein, 1972; Pelletier, 1992). The right and left hemispheres of the brain must not work in opposition but should complement the functioning of each other in most activities. Generally, the left hemisphere is primarily responsible for analytical, rational thinking, especially pertaining to verbal and mathematical activities, and processes information in an orderly, linear manner. In contrast, the right hemisphere has limited verbal ability and appears primarily concerned with visual imagery, spatial relationships, creativity, and intuitive functioning.

The cerebral cortex and subcortical (lower brain) areas must also work in balance or dysfunctioning occurs. The cerebral cortex governs all higher-order functions such as language, memory and judgment and processes information concerning the external environment. The subcortical brain areas regulate vital bodily functions, comprise the basic control center

for the autonomic nervous system, and are concerned with the activity of the internal environment.

The individual's nervous system consists of two main subdivisions — cortical and autonomic. The cortical or voluntary nervous system is involved with control of the striated musculature and usually functions within the individual's conscious awareness. Normally, unconscious and involuntary functions are regulated by the autonomic nervous system which is divided into two complementary subdivisions — the sympathetic and parasympathetic nervous systems.

The function of the sympathetic nervous system is to mobilize the body's resources when threat occurs. This subdivision is responsible for the "fight or flight" reaction during which the bodily organs are rapidly brought to a condition of response readiness. The parasympathetic nervous system, in contrast, decreases the rate at which these organs have to work allowing restorative, recuperative processes to occur. Effective functioning of the individual depends upon a dynamic equilibrium between these opposing systems.

Homeostasis can be thought of as a normally unconscious coordinated process, primarily involving the autonomic nervous system, which maintains the body's internal environment within the narrow

physiological limits conducive to normal cell functioning. Homeostasis depends upon a balanced functioning of the biological systems discussed above (Pelletier, 1992).

The integration of functional systems is the foundation of Deikman's bimodal theory of consciousness. According to Deikman (1971), an individual's physiological and psychological processes are integrated into two basic organismic states, the action and receptive modes. Effective functioning by an individual requires a balanced alternation between these two modes.

The major function of the action mode is to ensure the survival of the individual by achieving the goals necessary to satisfy physical and psychological needs. The primary orientation is directed toward the manipulation and control of the external environment. The striated musculature and sympathetic nervous system are the dominant physiological components. Associated with functioning in this mode is an increase in muscle tension, a predominance of beta brain waves, and attentional efforts directed toward the environment. Sharp conceptual boundaries exists to ensure a distinction between self and objects. Characteristic of the action mode is an orientation toward the future which is necessary for accomplishing goals external to the individual. Since

language and logical verbal thought processes are highly involved in the functioning of the action mode, it can be generally associated with the functioning of the left hemisphere of the brain (Ornstein, 1972).

In contrast, the receptive mode maximizes the reception of sensory information from both the internal and external environments. The sensory-perceptual system is dominant over the striated musculature and parasympathetic nervous system functioning predominates. Alpha and Theta brain wave rhythms and a decreased muscular tension are characteristic of this mode. Other significant attributes of this mode include diffuse attending, paralogical thought processes, and decreased perceptual and object-self boundaries. These attributes, including the orientation to the present (present-centeredness) required for the intake of the environment, appear to be more closely associated with the functioning of the right hemisphere of the brain (Ornstein, 1972).

In order to ensure survival, the action mode tends to dominate consciousness and, as a result, has been considered man's normal state of consciousness. Tart (1969) argues the normal state of consciousness for any individual is one which has adaptive value within one's particular culture and environment. Therefore, this normal state of consciousness can

be considered a result of living in a particular physical and psychosocial environment. In contrast, Deikman (1971) considers the receptive mode

> . . .to be a mature, cognitive and perceptual state, one that is not ordinarily dominant, but is an opposition that has developed in richness and subtlety in parallel with the development of the action mode that is our customary state of consciousness. (p. 487)

James (1929) originally postulated that man has the potential for many states of consciousness in addition to the normal waking state. States other that "normal" waking consciousness, including functioning of the receptive mode, are generally referred to as altered states of consciousness. Krippner (1972) simply defines an altered state of consciousness as "a mental state which can be subjectively recognized by an individual (or by an objective observer of that individual) as representing a difference in psychological functioning from that individual's normal, alert, waking state."

Roberts (1989) claims the human mind and body (considered as one) produces and uses a large number of psychophysiological states. He believes it is more useful to substitute "mindbody state" for state of consciousness. Mindbody state is then defined as a system or pattern of overall psychological and physiological functioning at any one time.

Dysfunctional states which involve an imbalance of one or more of these divisions of the brain or nervous system can be caused by excessive stress. An individual's ego consciousness (evaluation of self) is responsible for most stress-related health problems.

In modern society, psychological stability appears to be of more importance than physiological stability. Often stress reactivity or the "fight or flight" response is initiated inappropriately when there is excessive demand or one's self-esteem is threatened. Ego gratification is often at the expense of mind body wellness. However, the mind cannot be satisfied at the expense of the body for prolonged periods without dysfunctional states occurring. An executive working extensive overtime to earn a promotion but in the process becomes ill is just one example (Girdano & Everly, 1979; Pelletier, 1992).

An imbalance between the right and left brain hemispheres contributes to the development of psychodynamic and psychosomatic disorders. This usually takes the form of excessive left hemisphere activity inhibiting right hemisphere functioning (Bogen, 1975). Also, the cerebral cortex has evolved sufficiently that it can assert excessive control over subcortical/lower brain centers. Chronic worry usually involves the dominance of left hemisphere cortical activity over right hemisphere and

subcortical functions associated with homeostatic and recuperative processes (Pelletier, 1992).

An imbalance of the autonomic nervous system usually involves over-activation of the sympathetic nervous system characteristic of stress reactivity. If prolonged, this high arousal state can result in various dysfunctional states.

Essentially, when any one of the aforementioned systems becomes imbalanced, homeostasis is disrupted with ensuing deregulation affecting both physical and mental functions. As a result, various disorders develop over time. Any stress related dysfunctional state will affect both psychological and physiological processes since neither one can function independently of the other. The "psychophysiological principle" explains this by stating,

> Every change in the physiological state is accompanied by an appropriate change in the mental-emotional state, conscious or unconscious, and conversely, every change in the mental-emotional state, conscious or unconscious, is accompanied by an appropriated change in the physiological state (Green, Green & Walters, 1970).

According to the psychophysiological principle an effective treatment or normalization of aforementioned dysfunctional states must approach mental and bodily functions simultaneously. Psychophysiological treatment

techniques which intervene at both these levels are termed holistic since they approach the mind and body as a single unit (McManus, 1984; Pelletier, 1992).

A psychophysiological treatment approach is effective because it directly intervenes in the stress arousal cycle itself. An alteration in consciousness or shift to the receptive mode of operation is necessary to counteract excessive sympathetic nervous system activity and also shift mental processes away from the service of the ego to a more passive ego-less state (without conscious concern) where the environment is perceived as non-threatening (Girdano & Everly, 1979; Pelletier, 1992). Learning to initiate the receptive mode is particularly beneficial in enabling the individual to alleviate the harmful effects of stress (Deikman, 1971).

Ludwig (1966) claims altered states of consciousness may be self-induced through techniques which result in a reduction of internal and external stimulation, motor activity and/or active goal directed thinking. Techniques which allow individuals to produce altered states of consciousness (mindbody states) are called psychotechnologies. Yoga, various meditative techniques, and biofeedback are examples of psychotechnologies (Roberts, 1989).

Ludwig (1966) makes reference to the practical health benefits of initiating an altered state of consciousness in the following statement:

> There are countless instances of healing practices designed to take advantage of the suggestibility, increased meaning, propensity for emotional catharsis and the feelings of rejuvenation associated with altered states of consciousness. (p. 20)

Also, Ludwig claims that altered states of consciousness help an individual in:

> . . .resolving emotional conflicts. . . often enabling him to cope better with his human predicament and the world about him . . . There are also numerous instances of sudden illumination, creative insights and problem solving occurring while man has lapsed into...altered states of consciousness. (p. 20)

Relaxation Response

Benson (1974) has proposed that an integrated central nervous system reaction, termed the relaxation response, is the basis for the alleged benefits of altered states of consciousness or receptive mode functioning produced by meditation and other relaxation techniques. The relaxation response can be thought of as a generalized psychophysiological response primarily decreasing sympathetic nervous system activity and possibly increasing activity of the parasympathetic nervous system. Physiological correlates of the relaxation response include decreased heart and respiratory

rates, lowered metabolism rate and blood pressure, reduced muscle tension , increased skin temperature in the extremities, and predominance of alpha brain wave activity.

What Benson calls the relaxation response was previously termed trophotropic activity by Hess who described it as a protective mechanism against excessive stress, belonging to the trophotropic-endophylactic system promoting restorative processes. Hess (1957) claims the trophotropic response was in opposition to ergotropic reactions, otherwise known as the "fight or flight" response.

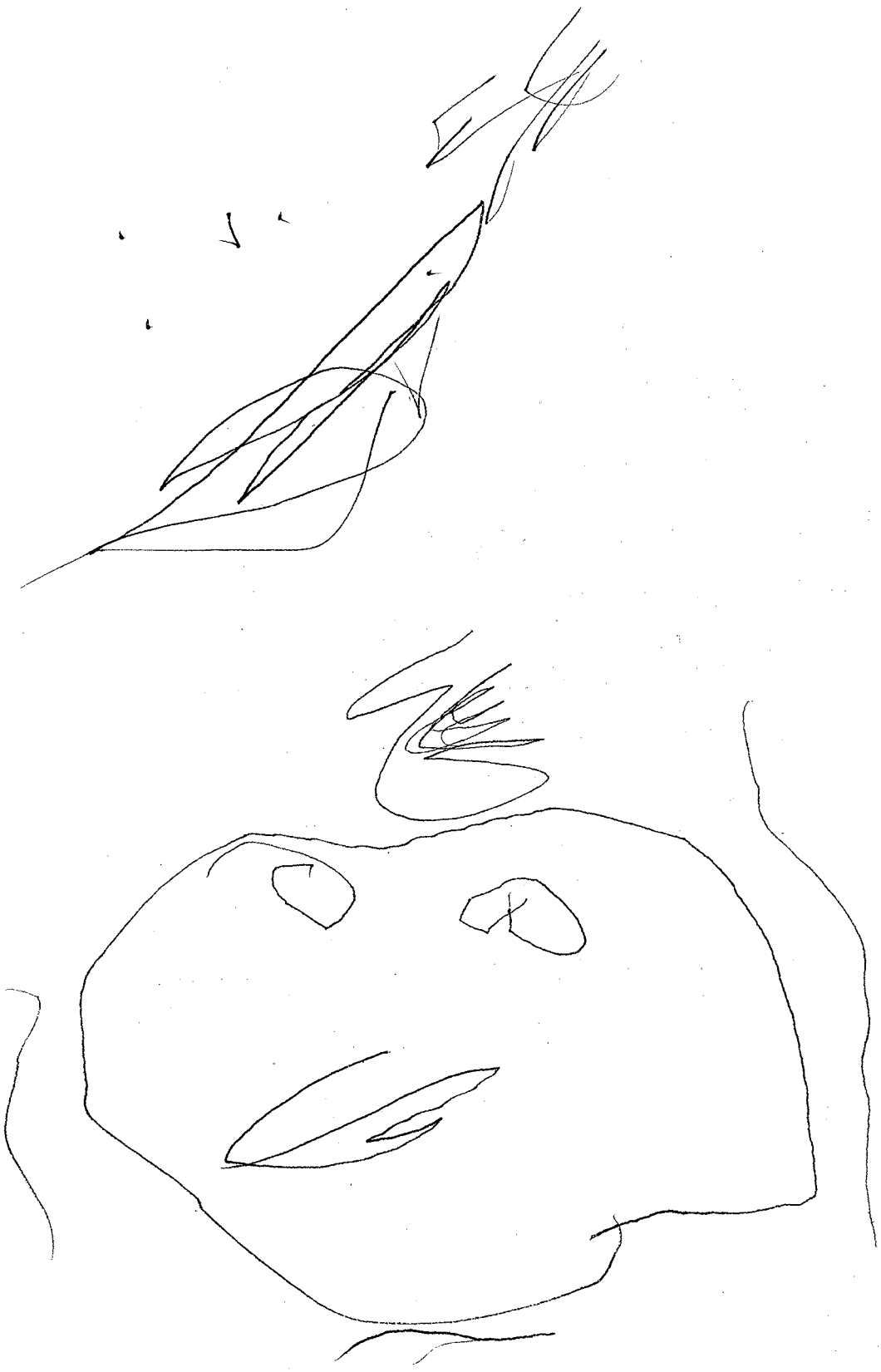
Regular elicitation of the relaxation response has proven especially useful in lowering the blood pressure of hypertensive subjects. The relaxation response is believed to be valuable in preventive health care as well as therapeutic for disorders in which increased sympathetic nervous system activity is implicated. Various forms of yoga and meditation, progressive relaxation training, certain biofeedback techniques, and autogenic training can reportedly initiate the relaxation response (Benson, 1983).

The psychophysiological requirements to initiate the relaxation response form the rudimentary basis of meditation. The combination of a

quiet environment, reduced muscle tones, focused attention on a mental device, and a passive attitude is necessary to elicit the relaxation response.

A quiet environment is necessary to minimize external stimulation. A comfortable posture, with the spine kept straight and the body supported essentially by the ligaments and skeleton reduces tension in the musculature. Attention must be focused on a mental device which can take the form of a stimulus such as a repeated sound or a constant visual image. According to Benson (1975), a passive attitude is the most essential factor in eliciting the relaxation response which involves a lack of goal-directed effort or apprehensiveness concerning one's progress. If distracting thoughts occur, they are to be disregarded, redirecting one's attention back to the mental device.

Self-regulation of the autonomic nervous system is achieved not through active effort or striving but through a passive awareness or volition. Essentially, this involves an attitude of letting it happen as opposed to making it happen. To much conscious effort or active striving on the part of the individual concerning any biological function or system, which usually works automatically, may initiate new functional disturbances or exacerbate others that already exist (Pelletier, 1992). To control the voluntary nervous system, active volition is necessary while control of the



involuntary autonomic nervous system requires passive volition. Passive volition is defined as detached effortless volition (Green, Green & Walters, 1970).

Techniques designed to allow self-regulation of inner states rely primarily on the initiation of the relaxation response/receptive mode functioning. This allows the recuperative, homeostatic mechanisms naturally occurring within the individual to normalize various dysfunctional states achieving a more balanced interaction of functional systems. This involves going along with the curative wisdom of the body. Self-regulation of inner states aids the individual in achieving greater (self) control of overt behavior and enhancing adaptation to external demands (Pelletier, 1992).

Meditation

Meditation is generally viewed as an exercise in learning to control or train attention. During meditation, attention is usually restricted to or focused on a single unchanging source of stimulation for a finite period of time. The object of meditation can be visual, auditory, physical movement or a physiological process such as breathing.

Controlling the mind through selected attention reduces ego consciousness and heightens awareness of inner states. In the process, ego defenses diminish. Meditative techniques are designed to produce an

alteration in consciousness or awareness involving a shift from the outward-oriented active mode toward the more quiescent receptive mode (Ornstein, 1972). Deikman (1971) claims meditative techniques are primarily designed to develop the attributes of the receptive mode. The procedures of meditation are consistent with the requirements to elicit the relaxation response previously mentioned. Since awareness must be completely focused on the object of meditation, the meditator attempts to minimize external sources of stimulation to avoid being distracted. There is also an emphasis on maintaining a specific posture in order to keep body movements to a minimum, and, therefore, out of awareness during meditation.

This state of alertness and selective attention must be maintained but in such a way as not to become stressful (Girdano & Everly, 1979). Continuously focusing attention on the meditative object is quite difficult, especially for the novice. If distractions occur, they are to be disregarded, redirecting awareness back to the object of meditation.

Concentrating attention on the meditative object is designed to overcome the mind's continuous activity and distractibility. If practiced correctly, a meditator can stop his ordinary cognitive processes so as to experience direct perception of stimuli devoid of preconceptions. In other

words, meditation allows the individual to circumvent the effects of accumulated past experiences.

This process has been termed de-automization, a characteristic of the receptive mode, which can be viewed as withdrawing attention from thinking and reinvesting it in percepts reversing the normal learning sequence (Deikman, 1966). An opening up of awareness is a common post-meditative effect where the meditator claims to have a fresh perception, seeing familiar objects as if for the first time. The shift from the action to the receptive mode involved in meditation also allows the individual to become aware of subtle stimuli (inner states) of which the individual is not usually aware while in the action mode (Ornstein, 1972). Alterations in an individual's psychophysiological state accompanying meditation are the same as in the relaxation response and in direct opposition to stress activity. Among the major changes which occur are slowing of respiratory and heart rates, decrease in oxygen consumption, lowering or stabilization of blood pressure and decrease in skin conductivity. There are also characteristic changes in brain wave patterns with alpha and theta activity becoming more predominant after continued practice (Benson, 1975). Pelletier (1992) claims meditation is neither a sleep state nor accompanied by drowsiness when practiced properly. The

meditative state is essentially a state of profound physical relaxation with the mind in a relaxed but alert state.

One of the initial and most important benefits of mediation has been termed unstressing. According to Goleman (1988), the nervous system is the repository of all experiences of emotional strain and tensions either of physical or mental origin. The practice of meditative techniques allows for the process of unstressing which consists of freeing the nervous system from past accumulated stresses in an unintentional spontaneous manner through such manifestation as muscular twitches, fleeting thoughts or images, and various sensate phenomena. Unstressing at the somatic level leads to an increase in mobility, coordination and motor control. At the psychological level, there is improved organization of thinking and feeling states.

When meditation neutralizes the degenerative syndrome of prolonged stress reactivity, the individual experiences direct improvement in energy level and overall coping ability. The effects of meditation, especially in the area of stress reduction are not just limited to the periods of meditation. A carry-over effect exists according to Pelletier (1992) which is due primarily to the experienced meditator learning to maintain a low arousal state in response to stressful situations. The more the relaxed state (receptive

mode) is induced through meditation, the greater the carry-over effect to the non-meditative state. The relaxed state initiated through meditation not only diminishes physical arousal but promotes stress desensitization by allowing an individual to experience previously stressful situations in a relaxed state, gradually diminishing stress and anxiety. The more proficient one becomes in meditation, the more the general state of arousal resembles the meditative state. Gradually, this state of low psychophysiological arousal becomes a stable part of the personality structure (Girdano & Everly, 1979).

Pelletier (1992) claims that the ability to elicit a state which is the exact physiological and psychological opposite of the "fight or flight" response provides the individual with a beneficial form of adaptation. The low arousal state achieved through meditation can result in increased emotional and psychological stability as well as an increased capacity to cope with stressful situations.

Autogenic Training

Autogenic training is a meditative, relaxation-based treatment approach involving the practice of a prescribed series of mental exercises allowing for the simultaneous self-regulation of somatic and mental functions. Autosuggestion is used to induce a relaxed state. The verbal

formulas or self-suggestions involved in autogenic exercises are designed to support and facilitate the homeostatic, self-regulatory mechanisms inherent in the individual. Normalization of dysfunctional psychophysiological states appear associated with the initiation of the relaxation response/ receptive mode functioning allowing for a more functional integration or balance of the various divisions of the brain and nervous system. Treatment effects resulting from this balance are considered global in that improvement occurs in all areas of functioning and therefore adaptable to each individual's particular disturbances or imbalances.

Clinical evidence obtained by Schultz & Luthe (1959) shows that when an individual is exposed to an excessive amount of disturbing stimuli or stress, the negative effects accumulate over time. In other words, disturbances recorded in the brain remain present until neutralized. Fortunately, the brain has the potential to utilize natural biological processes to reduce the disturbing consequences of the stimulation and readjust functional disorders which have developed as a result.

Schultz & Luthe (1959) claim a biological discharge mechanism exists to maintain homeostasis by unloading or freeing the nervous system of past accumulated stress. In the psychophysiological state evoked by autogenic training, spontaneous discharges occur in various parts of the

brain with a need for "unloading". This discharge activity leads to a reduction of the disturbing potency of traumatic events.

These autogenic discharges include various forms of spontaneous sensory, motor, and ideational activity. Discharges are self-terminating and usually of brief duration. Some self-regulatory discharges occur naturally during rest and sleep. Many discharges occur subliminally. This discharge activity, referred to as unstressing, is also experienced during meditation. Reportedly, each individual experiences a varying set of discharges. The specific manifestation of each type of discharge is related to that individual's specific life events. Autogenic discharge activity decreases in intensity and frequency with continued practice. During the practice of autogenic training discharge activity can never become excessive because the nervous system is responsive to each individuals level of physical and/or psychological tolerance (Luthe, 1977). Linden (1990) contends discharge activity during the practice of autogenic training results in a reduction of physiological and psychological inhibition.

History and Development of Autogenic Training

Autogenic training originated from research on sleep and autohypnosis conducted in the 1890s by Vogt, a German neurologist. He developed auto-hypnotic phrases which, when repeated by subjects,

produced various recuperative effects. The repetition of these verbal phrases several times during the day reduced tension, fatigue and alleviated other dysfunctional symptomology. Feelings of heaviness and warmth in the subjects limbs were often experienced with the repetition of the verbal phrases Vogt developed (Linden, 1990; Luthe, 1977).

Schultz, a psychiatrist and neurologist practicing in Berlin, started in 1905 to explore the therapeutic potential of suggestibility. Schultz had trainees induce a relaxed state by repeating verbal phrases promoting heaviness and warmth in the arms and legs. The trainees experienced similar therapeutic effects as in Vogt's studies.

This early experimentation by Schultz eventually led to the development of autogenic training. The six standard exercises were first developed followed by other sets of exercises used for supplemental treatment. The practice of autogenic techniques gained considerable prominence in Europe beginning with the publication of Schultz's first edition of autogenic training in 1932.

Luthe, a German psychiatrist, joined Schultz in the development and refinement of autogenic exercises. Luthe promoted the use of autogenic exercises in other countries, in particular Canada, Japan and most recently the United States. Autogenic training became a more widely known and

accepted treatment approach when biofeedback gained immense popularity during the 1970s.

Advantages of Autogenic Training

In the practice of autogenic training the emphasis is not on trying to control the natural systems of the body but in supporting or facilitating their self-regulatory function. Any conscious regulation of these usually subconscious processes has proven counter productive and is to be avoided. Autogenic training involves neither "mind over matter" nor "mind control" but developing and maintaining a functional harmony or balance of mind and body.

Autogenic training is a psychophysiological oriented treatment approach. The focus of treatment is on the total individual, preserving the unity of mind and body rather than treating isolated symptomology. Symptoms are warning signals and are not to be treated specifically or the condition becomes exacerbated and/or symptom substitution occurs (Luthe, personal communication, March 8, 1980).

Traditional treatment approaches rely predominantly on external methods such as surgery, medication, behavioral reinforcement or therapist intervention to effect change. In contrast, learned self-regulation through autogenic training allows the individual to develop more direct awareness

or control of inner states and resulting behavior. In autogenic training the trainee is essentially responsible for treatment through the systematic practice of brief sets of mental exercises. There is a low dependence on the trainer whose role is primarily that of technical advisor instructing the trainee on the correct way to practice autogenic exercises. Autogenic training requires little time as exercises require only a few minutes several times a day and if necessary can be accomplished practically anywhere or at any time.

Autogenic training has been successfully applied to individuals ranging from elementary school children to the elderly. Autogenic training approaches are not culturally biased as they are practiced in as many as 68 countries. Even individuals with limited verbal abilities are able to benefit from autogenic exercises, although poor results are reported with mentally retarded or actively psychotic individuals (Linden, 1990; Luthe, 1977).

Autogenic training is cost effective as no expensive equipment is required. Autogenic exercises can be used in conjunction with biofeedback and other psychological treatment approaches such as behavior therapy and psychoanalysis.

Preparatory Steps for Autogenic Training

Autogenic literally means self-generating and refers to the self-induced psychophysiological shift from the normal waking state to the autogenic state, a qualitatively different level of consciousness. Preparatory and procedural steps similar to those found in traditional meditative techniques are required in order to allow this shift in consciousness to occur. Distractions need to be minimized by reducing external and internal stimulation. A quiet room with dim lights plus a comfortable temperature limits external stimulation. Assuming an acceptable training posture serves to reduce internal stimulation. The trainee's eyes are then closed to further reduce external stimulation, and thereby enhance concentration (Luthe, 1977).

An autogenic exercise requires the trainee to inwardly repeat a verbal phrase (formula) designed to initiate a certain psychophysiological effect. Simultaneously, the trainee must focus attention on the area or function of the body targeted in the verbal formula. A passive attitude needs to be maintained toward the intended outcome of the exercise. Any goal-directed effort toward or anxiousness about the progress and/or outcome is to be avoided. The trainee needs to allow the experience to happen without trying to force or make it happen. Schultz & Luthe (1959) refer to this

process as passive concentration and define it as a self-induced state where one abandons oneself to an "on going organismic process".

Autogenic Standard Exercises

The six standard exercises of autogenic training are the foundation of all other autogenic exercises. They are physiologically oriented and when used alone are sufficient for the majority of treatment situations (Luthe, 1979). The practice of the standard exercises is designed to be a slow, gradual and deliberate process. Mastery of the entire sequence of standard exercises can take from 3 to 12 months (Pikoff, 1984). Condensing the time of presentation for the standard exercises or limiting practice to the first two exercises (heaviness and warmth) are two modifications which have proven effective, especially for reducing anxiety and stress (Pelletier, 1992; Shealy, 1976). The experiences promoted include the following: warmth and heaviness in the limbs, regulation of heartbeat and breathing, warmth in the abdominal cavity and cooling of the forehead.

A. First standard exercise: The summarizing heaviness formula, i.e., "My arms and legs are heavy."

B. Second standard exercise: The summarizing warmth formula; i.e., "My arms and legs are warm."

C. Third standard exercise: The cardiac formula, i.e., "My heartbeat is calm and regular."

D. Fourth standard exercise: The respiratory formula, i.e., "My breathing is calm and regular."

E. Fifth standard exercise: The abdominal formula, i.e., "My solar plexus is warm."

F. Sixth standard exercise: The forehead formula, i.e., "My forehead is cool."

Autogenic training initially focuses on the musculature as it is most easily influenced by conscious effort. Muscular relaxation can be achieved rapidly and is usually experienced as a heaviness of the extremities (Linden, 1990). The first of the six standard exercises, heaviness in the limbs follows a set progression. Success seems to be more easily obtained by first focusing on the dominant arm. The progression usually begins with passive concentration on the verbal formula "my right arm is heavy." Even after other formulas are mastered, this first formula is retained and serves as a signal type stimulus.

Research indicates about 40% of trainees readily experience a feeling of heaviness in the forearm. Another 50% experience the feeling over a period of time; however, about 10% never experience a sensation of heaviness. Therefore, it is essential that trainees understand from the outset that the experience of heaviness is not necessary for the formula to be effective. The repetition of the formula serves as a signal to bring about

many different functional changes that one may or may not be aware of feeling. Sensing a feeling of heaviness is not considered a valid or accurate assessment of what psychophysiological processes are on-going at the time. Autogenic exercises are effective as long as they are performed correctly, even if the trainee does not experience any changes (Luthe, 1977).

Often, continued practice with the first verbal formula results in generalization of heaviness to the other arm, with leads to its inclusion in the next formula. The formula thus becomes "my right arm is heavy" followed by "my left arm is heavy." After a period of training, the summarizing formula "both my arms are heavy" is permitted.

Then the focus of the verbal formula is directed to the legs in essentially the same progression. The training formula becomes "my right arm is heavy, my left arm is heavy, both my arms are heavy" and then add "my right leg is heavy" (dominant leg). The progression continues by adding the other leg, then the summarizing formula including both legs, and finally the summarizing formula "my arms and legs are heavy. At this point the formula is "my right arm is heavy, my left arm is heavy, both arms are heavy, my right leg is heavy, my left leg is heavy, both legs are heavy, my arms and legs are heavy." The next formula is reduced to simply "my right arm is heavy" and "my arms and legs are heavy."

The second standard exercise follows a similar progression but focuses on warmth in the limbs through peripheral vasodilation. Seventy-five percent of trainees report experiencing warmth in the limbs while practicing the heaviness formula (Luthe, 1977). Each verbal formula for warmth begins by including the final heaviness formula "my right arm is heavy" and "my arms and legs are heavy." The heaviness and warmth exercises are finally reduced to "my right arm is heavy" and "my arms and legs are heavy and warm."

The third standard exercise is specifically designed to support the normalization of heart rate already initiated by passive concentration on the heaviness and warmth exercises. The verbal formula "my heartbeat is calm and regular" is added to the previous formulas "my right arm is heavy" and my arms and legs are heavy and warm." Mental contact with the heart is enhanced if the trainee is instructed to become more aware of his heart beating before starting the exercise.

The fourth standard exercise involves adding the formula "my breathing is calm and regular" or "it breathes me." Repetition of either formula promotes slow, deep, regular breathing and has been found to reduce the influence of stress on respiratory functioning.

The formula for the fifth standard exercise, which is designed to promote the experience of warmth in the depth of the abdominal cavity, is "my solar plexus is warm." This exercise "calms" the central nervous system, facilitates muscle relaxation, and results in increased blood flow to the abdomen. A sleep-promoting effect is also reported.

Passive concentration on the verbal formula "my forehead is cool" is the sixth standard exercise. A contrast in temperature between the torso and the cranial region is considered effective in producing a general calming effect (Luthe, 1977).

The mental practice periods are to be terminated in a three step procedure: flexing the arms briskly, taking a deep breath, and then opening the eyes. This procedure ensures a return to a normal waking state of consciousness.

Luthe (1977) contends the practice of just the first two exercise, promoting heaviness and warmth in the limbs, is usually sufficient to produce the desired treatment effects. The remaining four exercises are primarily designed to support the effects established through practice of the first two exercises.

Physiological measurements taken from trainees practicing the standard exercises of autogenic training are consistent with the functional

theme of the particular verbal formula. There is a reduction of muscle potentials and an increase in the weight of the trainee's arm or leg, through increased blood flow, resulting from repetition of the heaviness formula (Schultz & Luthe, 1959).

A significant increase in the heat emanating from various regions of the trainee's arms and legs has been measured during autogenic training (Luthe, 1977). Characteristically skin temperatures in the distal parts of the extremities increase more rapidly and reach higher values than in more proximally located regions. This is believed due to an increase in metabolic rate in peripheral parts of the body and a simultaneous reduction in these same processes in central body regions.

During passive concentration on the first two exercises involving heaviness and warmth of the limbs, there is usually a decrease in heart rate, a predominance of alpha brain wave activity, with theta waves increasing as training progresses. The practice of the first three standard exercises results in a marked decrease (10 to 20%) in systolic and diastolic blood pressure in most hypertensive trainees (Schultz & Luthe, 1959).

Each of the six standard exercises are known to exert a specific effect on a variety of respiratory factors. Systematic practice of autogenic training results in a significant decrease in breathing rate with a

corresponding increase in the amount of air taken in and utilized. Normalization of disturbed breathing patterns such as found in asthmatic trainees has also been achieved.

Advanced Autogenic Exercises

Following mastery of the standard exercises, other more advanced autogenic exercises may be employed. The meditative exercises were developed by Schultz to complement the more physiologically oriented standard exercises. They were designed to improve the trainee's awareness of self and others and enhance such mental functions as imagery, creativity and problem solving (Luthe, 1977).

Autogenic modification exercises were later designed to reinforce the effects initiated by the standard exercises and to provide for more specific and intensive programming. "My eyes are cool" is an example of a formula designed to alleviate hay fever symptomology.

Several techniques were specifically developed by Luthe (1977) to promote neutralization, that is, self-normalizing discharge activity. The technique of autogenic abreaction requires the trainee to assume a spectator-like, "carte blanche" attitude and spontaneously describe everything experienced while in an autogenic state of passive acceptance. Autogenic verbalization is a different approach since it does not involve the

"carte blanche" attitude but requires the trainee to elaborate on predetermined topics.

Autogenic training can also be combined with biofeedback techniques. This practice has proven more effective than the same biofeedback procedures used alone (Luthe, 1977). The Menninger team of Green, Green & Walters (1970) were the first to combine autogenic training and biofeedback techniques. Subjects learn to produce low arousal states as evidenced by increased theta brain wave activity associated with vivid visual imagery and creativity. The variety and combinations of autogenic methods available allow effective and flexible treatment of numerous organic, psychosomatic and psychiatric disorders (Linden, 1990; Luthe, 1977).

Applications of Autogenic Training

The functional integration or balance of the various divisions of the brain and nervous system is responsible for the alleged benefits of autogenic training. Because autogenic training supports or reinforces the homeostatic, recuperative mechanisms of the body, the trainee develops such after effects as an increase in resistance to the effects of stress and a concomitant decrease in susceptibility to infectious diseases.

This normalization of psychophysiological functioning, especially in the reduction of tension and anxiety levels, results in increased energy and a sense of rejuvenation. Various functional disturbances are neutralized in the process. The overall functioning of the trainee improves. Autogenic training has proven effective in the treatment of numerous stress-related disorders (Linden, 1990; Luthe, 1977; Pelltier, 1992).

Autogenic exercises have proven particularly useful in reducing anxiety and alleviating other adverse symptomology of chronic stress. Subjects utilizing autogenic training were able to induce low arousal responses to stress (Yorde, 1977). Angus (1989) combined yoga and autogenic phrases in stress management with children. Elkins, Anchor & Sandler (1978) used both physiological and subjective measures of anxiety to assess the effect of autogenic training on subjects' stress management. At the end of ten sessions subjects showed significant reduction in anxiety as measured by Spielberger's State-Trait Anxiety Inventory and electromyographic readings (muscle tension).

Autogenic training and a standardized meditation technique were equally effective in the reduction of anxiety as measured by Spielberger's State-Trait Anxiety Inventory (Gilmore, 1984/1985). Cobb (1980) also demonstrated autogenic training could significantly lower anxiety with

treatment gains sustained over a three month period. When Vasilos (1977) compared autogenic training with five other competing treatment interventions, only autogenic training and a self-relaxation group significantly reduced anxiety. Olshan (1975) found short-term autogenic training (one week period) assisted by electromyographic feedback was effective in the reduction of anxiety.

In a study by Kahn, Baker & Weis (1968) eleven of thirteen subjects suffering from insomnia reported a decrease in sleeping difficulties as a result of practicing autogenic training. Nicassio & Bootzin (1974) reported autogenic training and progressive relaxation were equally effective in the treatment of insomnia. Alley (1983) claimed autogenic training is one of a range of behavior therapy techniques useful in treating sleep disturbances and capable of restoring an individual's sense of control and positive psychological growth.

A number of researchers have evaluated the effectiveness of autogenic training in treating migraine headaches. Two-thirds of York's (1974/1975) subjects treated for migraine headaches with autogenic exercises reported a reduction in pain. Autogenic training combined with various biofeedback techniques also proved effective in the treatment of migraine headaches. Subjects using temperature training and autogenic

exercises in order to regulate blood flow and thereby increase hand temperature were able to modify the frequency and intensity of their migraine headaches (Boller & Flom, 1979; Sargent, Green & Walters, 1973). Labbe & Williamson (1984) also combined thermal feedback training and autogenic training in an attempt to develop an effective nonpharmeological treatment procedure for childhood migraine. Ninety-three percent of the subjects were clinically improved using a criterion of 50% reduction of headache activity. Andrasick, Blanchard, Edlund and Rosenblum (1982) reported success using autogenic feedback training with school age children suffering from migraine headaches.

Shealy (1976) developed "Biogenics," a systematic and intensive program of autogenic training and visualization techniques designed to allow subjects to eliminate or better control conditions of severe or chronic pain. In other studies autogenic training utilized as a "stress inoculation" technique proved effective in the self-regulation of pain (Hartman & Ainsworth, 1986; Wernick, 1980).

Autogenic training proved useful in reducing psychopathological symptomology. Five sessions of the heaviness, warmth, and breathing standard exercises significantly decreased anxiety and depression as measured by the SCL-90, a self-report inventory (Shapiro & Lehrer, 1980).

In a study conducted by Jessup & Neufeldt (1977) four sessions of autogenic training were successful in decreasing anxiety in psychiatric patients.

Autogenic techniques have been applied in a wide variety of medical situations. Autogenic training proved useful in the suppression of motion sickness (Toscano & Cowings, 1982), in the alleviation of withdrawal symptoms during the treatment of heroin addiction (Reinberg, 1979) and in emergency situations as a technique preventing accident victims from going into a state of shock (Luthe, personal communication, 1980). Autogenic exercises in combination with visualization techniques were used to enhance the immune system of subjects in the treatment of cancer (Shealy, 1976).

Luthe (1977) categorizes the educational benefits of autogenic training into the following aspects:

> Intellectual Aspects:
>
> Increased facility to establish and maintain attention, improved concentration, better short- and long-term memory, improved learning readiness, more appropriate learning strategies, better utilization of cognitive abilities, increased flexibility and more systematic approaches to task demands, more sustained intellectual performance (better marks), enhanced flexibility and deployment of response style, greater facility in mental re-manipulation and reorganization of information, improved consistency in performance, better study habits.

Interpersonal and Socio-Dynamic Aspects:

More active involvement in classwork, more productive student-teacher interaction, better relations with classmates, public speaking easier, reduced dependency on external control for motivation, increased receptivity, facilitated self-expression.

Affective and other Psychodynamic Aspects:

Decrease or elimination of examination anxiety, enhanced emotional stability, enhanced objectivity; decrease of nervousness, irritability and hostile reactions; increased tolerance of frustrations in task-related failures; more self confidence, (reduced inferiority feelings, improved self-reliance); fewer behavior problems, reduced behavioral variability, smoothing out of neurotic reactivity (e.g., school phobia, fear of failure, avoidance reaction), reduction of depressive tendency, more social extroversion.

Psychophysiologic Aspects:

Decrease or disappearance of interferences from physiological reactions (e.g., sleep disorder, gastrointestinal disturbances, headaches, tics, speech disorders, writing difficulties, writer's cramp, respiratory disorders, allergic reactions). Decrease or discontinuation of a supportive medication. (pp. 7 & 8)

Autogenic training was initially introduced into educational settings in the United States as an intervention strategy for reducing test anxiety in students. Snider & Oetting (1966) and later Reed & Meyer (1974) effectively used an abbreviated version of autogenic training (heaviness and warmth standard exercises) in the reduction of test anxiety. Subjects claimed that practicing autogenic exercises before and during examinations

increased their ability to concentrate and allowed only moderate anxiety appropriate to the taking of exams. Besides a marked and rapid reduction in anxiety, examination scores improved as well. Improvement in sleeping and such autogenic functions as digestion were also reported. Many subjects experienced increases in sensory awareness, as taste, smell and visual acuity were enhanced. In particular, a greater awareness of muscular tension developed (Snider & Oetting, 1966).

An abbreviated form of autogenic training consisting of the heaviness and warmth standard exercises was presented to subjects individually or in group situations. Subjects in both groups reported autogenic training proved useful in coping with a variety of anxiety-provoking academic situations (Sellers, 1974).

Harlem (1975/1976) was the first to systematically evaluate the effects of autogenic training upon cognitive functioning in school children. Second grade students received one ten-minute session daily for ten days of an abbreviated form of the autogenic standard exercises. Improvement in learning and academic performance proved an indirect benefit of the psychophysiological changes associated with autogenic exercises. Students were able to reduce anxiety levels and develop more precise control of

attention. Harlem claimed autogenic training was useful in developing an optimal set or readiness state to facilitate learning.

Elementary school students, classified as highly anxious, poor readers, practicing autogenic training throughout the school year scored significantly higher on a measure of reading achievement and significantly lower on a measure of anxiety (Frey, 1980). Autogenic training in combination with other relaxation techniques resulted in significant reductions in state and trait anxiety and various stress related symptoms in twelfth grade students (Hiebert & Eby, 1985). Ballenger (1979/1981) found enhanced self-concept in 32 middle school students following five 30-minute autogenic training sessions. In a study conducted by Weems (1982/1983) autogenic training significantly increased the abstract thinking ability of college students. Autogenic exercises have also been applied successfully to behavioral problems within an educational setting. Four of five behaviorally disordered students using the heaviness and warmth standard exercises were able to significantly reduce muscle tension and decrease inappropriate behaviors (e.g., aggressiveness) by over 50% (Walton, 1979). Matthews (1986) used a structured program of relaxation exercises including the quieting reflex, autogenic training and visual imagery with 532 students exhibiting problem behavior in regular

classroom situations. Wrist temperatures were recorded before and after the exercises. Students proved very successful in lowering wrist temperatures. A significant reduction in discipline problems occurred.

Little empirical evidence exists concerning the application of autogenic training or other relaxation techniques with emotionally disturbed children or adolescents in residential or hospital treatment centers. Corder, Whiteside & Haizlip (1986) combined cognitive training, relaxation techniques and biofeedback as an adjunct to traditional therapy to help hospitalized behaviorally disordered adolescents control anger and modify their behavior. This multi-model treatment approach appeared useful in reducing incidents of acting out behavior on residential units. Relaxation strategies including autogenic training can be a useful adjunct to traditional forms of child care and treatment in residential care centers (Chang, 1991).

The review of the literature provides empirical support for the effectiveness of autogenic training as a stress reduction intervention strategy for use in various education and mental health settings. Continuing research is necessary to evaluate the efficacy of these programs with a hospitalized emotionally disturbed population.

CHAPTER THREE

METHODOLOGY

Subjects

Subjects in the investigation were adolescents ranging in age from 13 to 17 years admitted to a psychiatric hospital who participated in a stress management program while enrolled in the inpatient school. Parental permission for each adolescent to participate in the stress management program (investigation) was obtained at the time of admission. A signed permission form (see Appendix A) was obtained for 49 of the 58 adolescents admitted to the hospital during the time span of the investigation. A signed participation contract was required from each adolescent before they were able to participate in the program (see Appendix A). Actively psychotic adolescents were excluded from participating as subjects. Also, adolescents with reading levels determined as too limited to adequately comprehend written items on the anxiety scale did not participate as subjects. Only four adolescents with signed parental permission forms were not used as subjects. One adolescent appeared to be experiencing a drug induced psychotic episode and three others lacked adequate reading skills.

Adolescents admitted to the psychiatric hospital during the investigation exhibited various forms of dysfunctional behavior and were diagnosed with diverse psychiatric classifications. Many were determined to be a danger to self or others. Shared characteristics of this population included the severity of emotional problems and the excessive levels of stress experienced.

Treatment received prior to admission to the hospital varied for each subject. Most subjects had been involved in some level of counseling. Some subjects had been previously hospitalized for treatment. Several subjects had histories of medication intervention. None of the subjects in the investigation were prescribed psychoactive medication during the evaluation period. Also, there were no controls for residual effects of prior medication.

In the diagnostic staffing each adolescent received a numerical rating on a hypothetical continuum of mental health, the Global Assessment of Functioning (GAF) Scale (Endicott, Spitzer, Fleiss & Cohen, 1976). Subject GAF scores ranged from 28, revealing serious emotional disturbance, to 55, representing less severe or a more moderate level of exhibited emotional difficulties. The mean GAF score for subjects was 37. A majority of subjects were rated within the 31 to 40 range indicative of

major impairment in psychological/emotional functioning at home and/or school.

All subjects experienced some degree of learning and/or behavioral problems in school. Educational services varied from regular classroom attendance to various special education placements. The most frequent special education classifications were Specific Learning Disabilities (LD) and Seriously Emotionally Disturbed (SED). Class placements ranged from sixth to twelfth grade level. Several of the subjects had ceased attending school before their admission to the hospital.

The Wechsler Individual Achievement Test (WIAT) screener (Wechsler, 1992) was administered to all subjects. The screener consisted of three subtests (reading, math reasoning and spelling) which provided grade level scores for each subtest plus a composite grade level score. Composite achievement scores ranged from beginning third (3.0) to upper twelfth (12.9) grade level. The mean composite achievement grade level score was 7.8. The reading subtest of the WIAT was used to assess the reading level of all subjects. Reading achievement scores ranged from beginning fourth (4.0) grade to upper twelfth (12.9) grade level. The mean reading grade level score of all subjects was beginning eighth grade (8.0) grade level.

The Kaufman Brief Intelligence Test (K-BIT) (Kaufman & Kaufman, 1990) was used as a measure of current intellectual functioning. The K-BIT assessed both verbal and nonverbal areas of ability. Composite standard scores considered equivalent to IQ scores, ranged from 63 to 125. The mean composite intelligence score of subjects was 95, falling within the average range. The mean verbal and nonverbal standard scores were equivalent (96) and consistent with the mean composite score.

Thirty-eight subjects participating in the investigation were white. Three Native Americans, three Blacks (African Americans) and one Asian American also served as subjects. Subject participation by race appeared consistent with past admission rates by race at the hospital. Selected demographic information is presented by treatment condition in Appendix B.

Procedures

Stress Management Program

The current investigation formed an integral part of a stress management program conducted during a five month period (May through September, 1995) with adolescents admitted to a psychiatric hospital for evaluation and possible treatment. The multi-disciplinary evaluation usually

required only a few days to complete. Adolescents not recommended to remain in acute care at the hospital were discharged to other adolescent care facilities or to home soon after the completion of the diagnostic staffing.

A total of 45 adolescents were randomly assigned to participate as subjects in one of the three experimental conditions. The same number of males and females were assigned to each condition to account for possible differences due solely to gender. Eight males and seven females participated as subjects in each of the following conditions: (1) an autogenic training relaxation group, (2) a self-relaxation placebo control group, and (3) a no treatment control group. Attrition was not a problem as all 45 subjects complied with all treatment and measurement demands.

The stress management program was designed to be of short duration accommodating time restraints and allowing for the completion of experimental treatments and posttesting. A minimum stay of three days in the hospital was required for adolescents to complete the program. None of the subjects were discharged before completing the program. Subjects admitted before 10:30 a.m. began the program including pretesting that morning. Those subjects admitted after this time deadline started the program the following morning. The mean elapsed time between admission

and pretesting was roughly equal between experimental and control groups. The difference between these groups in elapsed time was less than one hour.

Introduction to the Program

In order to participate as a subject in the stress management program inpatient adolescents were required to have a written permission form signed by a parent or legal representative. Also, to be eligible to participate adolescents had to score at the fourth grade level or higher on a reading achievement test to demonstrate the ability to read items on a self-report anxiety scale used to assess stress. Adolescents meeting these requirements were invited to participate in the stress management program. Each adolescent was informed that their participation was strictly voluntary with no penalty if they decided not to participate. Before making a decision to participate each adolescent was allowed to view the stress management room at which time they were provided a brief description of the measurement instruments. A demonstration of the biofeedback equipment followed which involved taking skin conductance and peripheral skin temperature measures of the investigator in an attempt to dispel possible concerns measurements were in any way uncomfortable or painful.

The participation contract, which had to be signed by an adolescent before they could participate, was reviewed by the adolescent with the assistance of the investigator. The stated purpose of the stress management program was for participants to learn relaxation skills designed to reduce stress allowing them to gain maximum benefit from therapeutic and educational interventions. A brief description of the program indicated participants were required to partake in two measurement sessions and complete as many as six relaxation sessions of brief duration conducted over a two day period. The contract also specified adolescents could discontinue participating in the program at any time without penalty.

Once the participation contract was signed the first measurement session was initiated. Randomization procedures determined which treatment condition a participant was to become a subject. Subjects in the no treatment control group participated in pre- and posttest measurements before being offered assistance in learning autogenic exercises. Participants assigned as subjects in the self-relaxation placebo control group and autogenic training group began their first of six relaxation sessions upon completion of pretest measurements. Final (posttest) measurements for all subjects were conducted approximately 48 hours after pretesting.

Measurements

Measurements were conducted individually for each subject. Each subject first completed the self-report anxiety scale while seated at a student desk. The 20 item scale was usually completed in less than 5 minutes. A dictionary was available so subjects could find definitions of words they did not understand. Only one word (indecisive) proved consistently problematic. No other assistance in completing the scale was provided. The scale was not scored by the investigator until the completion of posttesting.

Physiological measurements required subjects to assume a supine position on the bed. The subjects were instructed to lie in a comfortable position while on their backs and to refrain from moving their right arms, hands and/or fingers while measurements were in progress. Sensors were placed on two different fingers of the subject's right hand by the investigator. Skin conductance readings were recorded at the end of a two minute stabilization period. A temperature probe was then attached to the forefinger of the right hand with peripheral skin temperature recorded at the end of a one minute stabilization period.

Biofeedback measures appeared to be viewed by subjects as noninvasive. No feedback was given subjects concerning measurement

findings. The digital feedback display was never in the view of subjects. Posttesting was conducted approximately 48 hours from the time of pretesting. Final measurements were conducted in the same manner as pretesting. All physiological measurements were taken in the morning to be consistent.

Description of Instruments

Physiological and psychological measures of stress were used to assess the effectiveness of each treatment condition. Skin conductance and peripheral skin temperature were used to measure the stress reactivity of each subject. A self-report rating scale, the State Anxiety Inventory (STAI Form Y-1) provided a subjective measure of current stress.

The Thought Technology Temp/SC 201 T Biofeedback System provided both peripheral skin temperature and skin conductance measures. The portable nine-volt battery operated monitor provided data by digital display. The measurement of peripheral skin temperature required the attachment of a fast response temperature sensor to the forefinger of the subject's right hand. Skin temperature feedback sensitivity ranged from 65.0 to 100.0 degrees Fahrenheit. Due to an inverse relationship between peripheral skin temperature and level of stress, high and/or increasing temperatures were indicative of stress reduction or increased relaxation.

Low or decreasing temperatures were associated with an increase in stress. Silver-silver chloride electrodes were attached to two fingers of the subject's right hand to measure skin conductance levels. Electrode gel was used to allow for more accurate data acquisition. Skin conductance sensitivity ranged from .01 to 19.99 micro-ohms. High and/or increasing skin conductance scores were indicative of increased arousal associated with stress while low and/or decreasing scores revealed a condition of low arousal associated with relaxation.

The STAI-Form Y-1 is a 20 item self-report anxiety scale in which subjects respond to each statement based on how they feel "right now." Subjects rated their level of anxiety on the following 4-point scale: (1) Not at all, (2) Somewhat, (3) Moderately so, (4) Very much so.

The influence of an acquiescence response set is reduced with half of the items worded so that a high rating indicates the absence of anxiety. The scoring weights for the anxiety-absent items are reversed; i.e., responses marked 1, 2, 3 or 4 are scored 4, 3, 2 or 1, respectively. The weighted scores are summed to yield a total score which can vary from a minimum score of 20 (low anxiety) to a maximum score of 80 (high anxiety).

Subjects possessing a minimum fourth grade reading level can generally respond to all scale items on the STAI Form Y-1. If necessary, a prorated score can be obtained if one or two items are not completed. However, the validity of the scale is in question if three or more items are omitted.

In the development of the revised STAI, 30% of the original test items were changed on both the state and trait forms. Correlations between the original (Form X) and revised (Form Y) of the STAI are uniformly high, ranging from .96 to .98. Research based on Form X can be readily generalized to Form Y. The two forms are considered essentially equivalent for the assessment of anxiety. Due to superior psychometric properties, Form Y is more useful in differentiating between anxiety and depression (Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983).

Relatively low stability coefficients are reported for STAI Form Y-1 which reflects the influence of unique situational factors affecting state anxiety at the time of evaluation. The alpha coefficient, a measure of internal consistency is a more meaningful index of reliability of state anxiety than test-retest correlations. A mean alpha coefficient of .90 is presented in the statistical analysis. Evidence of concurrent, convergent,

divergent and construct validity of the STAI is presented in the (Form X) manual (Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983).

The STAI correlates well with other self-report anxiety scales. The STAI is particularly useful in evaluating the effectiveness of biofeedback and other relaxation-based treatment approaches in the reduction of anxiety and stress reactivity (Spielberger, Gorsuch, Lushner, Vagg & Jacobs, 1983).

Experimental Setting

A dorm room located on a vacated wing of the adolescent unit served as the stress management room and experimental setting. Due to limited access there were few external distractions. Lighting was easily adjusted to provide a dimly lit environment. Room temperature ranged consistently from 68°F to 70°F which appeared within the comfort zone for summer-like outdoor temperatures. A bed was provided to allow subjects to rest comfortably. The experimental setting was designed to provide a reduction in afferent and efferent stimulation, the environmental requirements necessary to correctly practice autogenic training (Luthe, 1977).

Treatment Conditions

Autogenic Training (Relaxation) Group

The training environment was designed to limit external distractions. Subjects followed certain instructions or preparatory steps to further reduce internal and external stimulation. Closing the eyes during the practice of autogenic exercise ensured a significant reduction in visual stimulation resulting in enhanced concentration. The investigator who served as the autogenic trainer (instructor) assisted each subject in assuming the correct horizontal posture necessary to effectively reduce proprioceptive efferent stimulation, a critical requirement in the practice of autogenic training.

The horizontal posture required the trainee to lie down on the bed. The spine was kept straight by keeping the trunk, shoulders and head in a symmetric position. Pillows were often used in providing appropriate support for the neck and head. The arms were rested beside the trunk slightly bent at the elbow. The hands were laid palms down with the fingers slightly spread; not making contact with the trunk. The legs were also kept slightly apart with the feet inclined outward at a v-shaped angle. The heels were not to touch. A pillow under the knee was often used to provide added support allowing for greater relaxation of the proximal muscles of both legs. Shoes were removed to allow for increased comfort.

Subjects (trainees) in the autogenic training group practiced the first two autogenic standard exercises which were designed to promote heaviness and warmth in the arms and legs. The formula progression used by all subjects was a close approximation of the classical presentation (see Luthe, 1977).

Each autogenic formula was first verbalized by the investigator and then repeated silently by the subject (trainee). Each subject was instructed to simultaneously focus attention on the area or function of the body targeted in the repeated verbal formula. When distractions occurred the subject was to allow them to pass and then continue on with the formula progression.

The number of silent repetitions of the verbal formula depended on the subject's ability to maintain passive concentration, the most difficult aspect of autogenic training to learn. Passive concentration involved the subject allowing the desired experience to happen without trying to force or make it happen. Before the start of training each subject was assured the correct practice of each exercise allowing for the desired results even with no direct experience of the specific effect of the autogenic formula (e.g., the experience of heaviness in a designated limb).

Autogenic discharge activity was explained to subjects as naturally occurring phenomena associated with passive concentration on verbal formulas. An example provided was the involuntary twitching of muscles. Autogenic discharge activity was also described as psychophysiological evidence the exercises were effective. Subjects were encouraged not to become concerned with discharge activity and maintain focus on the appropriate verbal formula.

The progression of autogenic exercises was standardized for all subjects with specific formulas practiced in each training session (see Table 1). Training time for each session was not to exceed 10 minutes. The heaviness formula was initiated in the first morning session. The three step termination procedures were also taught at this time. The second session scheduled at midday and the third session conducted later in the afternoon were concerned with the remaining formula progression of the heaviness exercise. The fourth, fifth and sixth sessions were conducted the next day following the same time frame as the first day. During these sessions the heaviness formulas were summarized and the progression of the warmth exercises were divided and practiced within these three periods.

Self-Relaxation Placebo Control Group

Subjects practicing self-relaxation assumed a similar horizontal posture under the same experimental conditions as the autogenic trainees. They were allowed to close their eyes and assume any posture on the bed that allowed them to feel comfortable. The only instruction these subjects received was to relax on their own. The investigator was present in all sessions only in a supervisory capacity and did not provide subjects assistance in how to relax. Conversation was discouraged.

Six sessions were conducted over a two-day period following the same time frame as the autogenic training sessions. Subjects practiced self-relaxation for no longer than 10 minutes in one session. Following posttesting subjects were offered brief instruction in autogenic training.

No Treatment Control Group

Subjects in this control group participated in only pre- and posttesting measurement activity. No relaxation training was provided in the interim. Subjects were informed relaxation training was to begin with the completion of two measurement sessions. Control group subjects received brief instruction in autogenic training with the completion of posttesting.

Table 1

Formula Progression Autogenic Standard Exercises I & II

Session	Formulas
I	RAH
	RAH - LAH
II	RAH-LAH-BAH
	RAH-BAH-RLH
III	RAH-BAH-RLH-LLH
	RAH-BAH-BLH-ALH
IV	RAH-ALH-RAW
	RAH-ALH-RAW-LAW
V	RAH-ALH-BAW
	RAH-ALH-BAW-RLW
VI	RAH-ALH-BAW-RLW-LLW
	RAH-ALH-ALW-ALHW

Verbal Formulas:

RAH — my right arm is heavy LAH — my left arm is heavy

BAH — both arms are heavy

RLH — my right leg is heavy LLH — my left leg is heavy

BLH — both legs are heavy

ALH — my arms and legs are heavy

RAW — my right arm is warm LAW — my left arm is warm

BAW — both arms are warm

RLW — my right leg is warm LLW — my left leg is warm

BLW — both legs are warm

ALW — arms and legs are warm

ALHW — arms and legs are heavy and warm

Design and Data Analysis

In order to evaluate the effectiveness of treatments both physiological and psychological measures of stress were used. Skin conductance levels and peripheral skin temperatures were physiological indices provided via a biofeedback monitor. The STAI Form Y-1, a self-report anxiety scale served as a psychological (subjective) measure of stress. A pretest-posttest control group design with two interventions (one treatment and one placebo) was used in this investigation. The autogenic training group was compared separately with the self-relaxation placebo control group and no treatment control group on all three measures of stress.

Data analysis involved the use of t-test procedures to determine if significant differences occurred between treatment conditions on different measures of stress. Because multiple t-tests were used it is necessary to control the familywise error rate. This is done by dividing the conventional error rate (.05) by the number of comparisons. There are two families of comparisons in this study, pretest comparisons and difference/posttest comparisons. The familywise error rates are .016 and .008, respectively. This adjusts the overall error rate in making multiple comparisons.

CHAPTER FOUR

RESULTS

General Findings

The purpose of this investigation was to determine the effectiveness of short term autogenic training for the reduction of stress in hospitalized emotionally disturbed adolescents. Adolescents were randomly assigned to one of three treatment conditions. Subjects in the no treatment control group participated in the pre- and posttest measurements. Subjects in the self-relaxation (placebo) control group relaxed without training or assistance. The autogenic training subjects practiced the first two standard exercises promoting heaviness and warmth in the limbs.

Both physiological and psychological measure of stress were used to determine the effectiveness of each treatment condition. Skin conductance levels and peripheral skin temperature were physiological measures provided via biofeedback monitor. Skin conductance measures were reported in micro-ohms, with lower or decreasing scores associated with stress reduction (relaxation). Peripheral skin temperature was reported in degrees Fahrenheit with higher or increasing temperature associated with stress reduction (relaxation). A self-report anxiety scale was used as a

psychological (subjective) measure of stress. The STAI Form Y-1 was used to assess state anxiety with lower or decreasing scores representing stress reduction (relaxation). Means and standard deviations of pre-, posttest and difference scores from physiological and psychological measures of stress are presented for each treatment condition in Table 2. Individual raw scores of subjects on all three measures of stress are presented by treatment condition in Appendix B.

The following hypotheses were tested to determine the effectiveness of autogenic training as a psychophysiological stress reduction technique. The probability of Type 1 error was fixed at a conventional .05 level for significance. Exact probabilities were reported in the text.

Research Hypotheses

HO_1 Autogenic training subjects will demonstrate less stress reactivity than subjects in the self-relaxation placebo group or subjects in the no treatment control group as measured by changes in skin conductance levels.

HO_2 Autogenic training subjects will demonstrate less stress reactivity than subjects in the self-relaxation placebo group or subjects in the no treatment group as measured by changes in peripheral skin temperature levels.

HO_3 Autogenic training subjects will demonstrate less stress reactivity than subjects in the self-relaxation placebo control group or subjects in the no treatment control group as measured by changes in state anxiety levels.

The first hypothesis (HO_1) required separate comparisons of the autogenic training group with the self-relaxation placebo control group and no treatment control group on changes in the physiological variable of skin conductance. Pre-, posttest and difference scores were analyzed to determine the significance of effects.

No significant pretreatment differences in skin conductance levels were indicated (t_{28} -0.28, $p < .78$) between the autogenic training and self-relaxation treatment groups. A significant posttest difference in skin conductance levels was indicated t_{28} -2.88, $p < .008$. Autogenic training subjects demonstrated significantly lower skin conductance levels than the placebo control self-relaxation subjects. An examination of difference scores (posttest minus pretest) indicated autogenic training and self-relaxation subjects both lowered skin conductance levels. Significant treatment effects were indicated (t_{28} -5.03, $p < .001$) only for the autogenic training group.

Table 2 Means and Standard Deviations of Pre,- Posttest and Difference Scores from Physiological and Psychological Measures of Stress for Each Treatment Condition.

SKIN CONDUCTANCE LEVELS REPORTED IN MICRO-OHMS

		Pretest		Posttest		Difference	
Group	Number	Mean	SD	Mean	SD	Mean	SD
AT	15	5.89	2.35	3.83	1.63	-2.07	1.24
SR	15	6.11	1.86	5.71	1.95	-0.39	0.35
NT	15	6.79	2.42	6.31	2.26	-0.48	0.41

PERIPHERAL SKIN TEMPERATURES REPORTED IN DEGREES FAHRENHEIT

		Pretest		Posttest		Difference	
Group	Number	Mean	SD	Mean	SD	Mean	SD
AT	15	86.37	3.64	88.51	3.10	2.13	1.05
SR	15	85.85	7.01	86.61	6.43	0.77	0.82
NT	15	86.62	5.18	87.68	4.60	1.06	0.95

Table 2 Means and Standard Deviations of Pre-, Posttest and Difference Scores from Physiological and Psychological Measures of Stress for Each Treatment Condition. (Continued)

SELF-REPORT STATE ANXIETY REPORTED IN RAW SCORES

		Pretest		Posttest		Difference	
Group	Number	Mean	SD	Mean	SD	Mean	SD
AT	15	50.73	12.60	36.87	12.07	-13.87	12.49
SR	15	42.33	14.63	38.87	15.03	-3.46	3.02
NT	15	44.47	13.18	40.93	12.00	-3.53	4.41

AT = Autogenic Training Group
SR = Self-Relaxation Placebo Control Group
NT = No Treatment Control Group

An analysis of pretest measures revealed no significant pretreatment difference (t_{28} 2.35, $p < .31$) in skin conductance levels between the autogenic training and no treatment control groups. A significant posttest difference in skin conductance levels was indicated t_{28} -3.46, $p < .002$. An examination of difference scores (posttest minus pretest) indicated a reduction of skin conductance levels in both the autogenic training and no treatment control group. Significant treatments effects were indicated (t_{28} -4.71, $p < .0001$) only for the autogenic training group. A comparison of the effects of each treatment condition on the physiological variable of skin conductance is provided in Figure 1.

The second hypothesis (HO_2) required separate comparisons of the autogenic training group with the self-relaxation placebo control group and the no treatment control group on the physiological variable of peripheral skin temperature. Pre-, posttest, and difference scores were analyzed to determine significance of effects.

There was no significant pretreatment difference (t_{28} -2.6, $p < .80$) in peripheral skin temperature between the autogenic training and self-relaxation treatment groups. Also, the posttest difference in peripheral skin temperature between these two treatment conditions was not statistically significant, t_{28} -1.03, $P < .31$. An analysis of difference scores (posttest

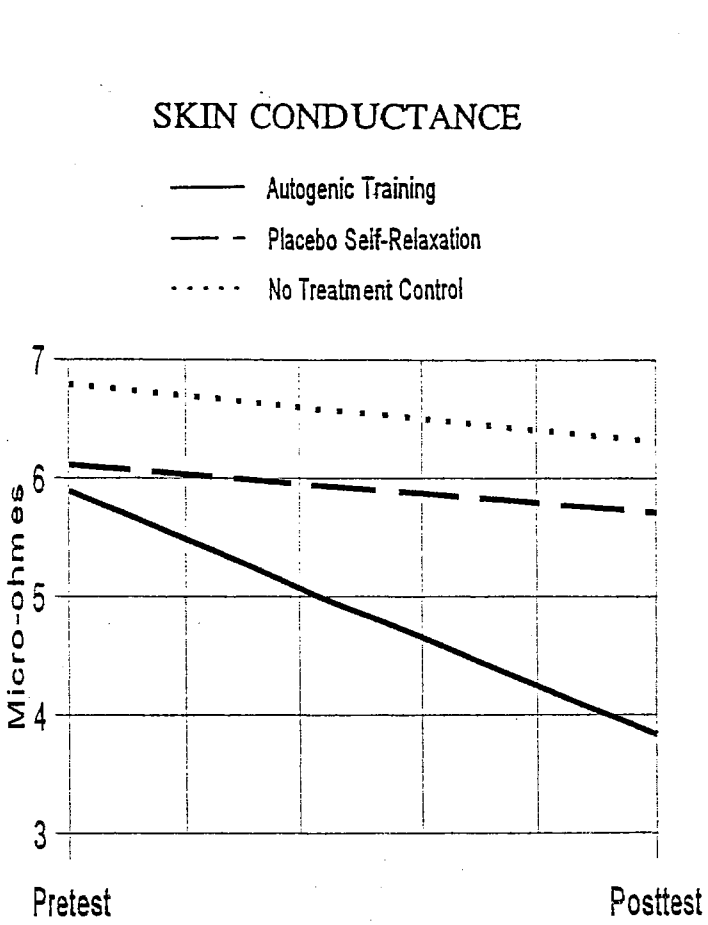


Figure 1: Pretest and Posttest Mean Scores for Each Treatment Condition on the Physiological Variable of Skin Conductance.

minus pretest) revealed that both autogenic training and self-relaxation subjects increased peripheral skin temperature. Treatment effects were significant (t_{28} -3.99, $p < .004$) only for the autogenic training subjects.

An analysis of pretest measures revealed no significant pretreatment difference (t_{28} -0.15, $p < .88$) in peripheral skin temperature between the autogenic training and no treatment control groups. Posttest differences in peripheral skin temperature were also not statistically significant t_{28} 0.58, $p < .57$. Differences scores (posttest minus pretest) revealed increases in

peripheral skin temperature for both groups. Significant treatment effects were indicated (t_{28} 2.94, $p < .007$) only for the autogenic training group. A comparison of the effects of each treatment condition on the physiological variable of peripheral skin temperature is provided in Figure 2.

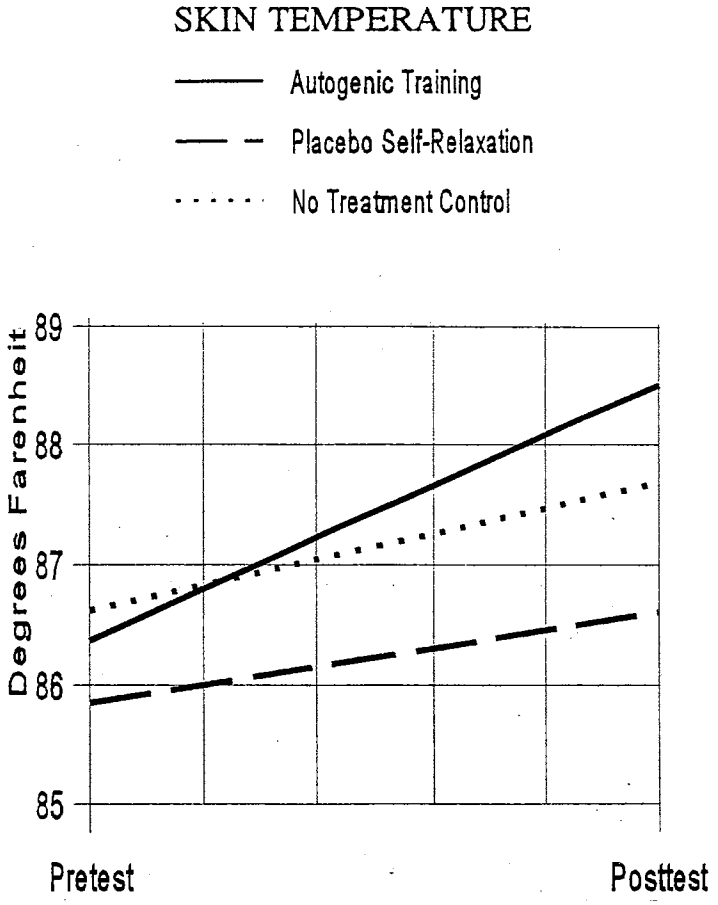


Figure 2: Pretest and Posttest Mean Scores for Each Treatment Condition on the Physiological Variable of Skin Temperature.

The third hypothesis (HO_3) involved separate comparisons of the autogenic training group with the self-relaxation placebo control group and the no treatment control group on a psychological (subjective) measure of

stress. An analysis of raw scores from pre- and posttest measures of the STAI Form Y-1, a measure of state anxiety, was used to determine the effectiveness of each treatment condition.

An analysis of pretest measures did not reveal significant pretreatment differences (t_{28} 1.68, $p < .10$) in state anxiety levels between the autogenic training and self-relaxation treatment groups. Posttest differences in state anxiety levels between the autogenic training and self-relaxation treatment groups were also not statistically significant t_{28} -0.40, $p < .69$. However, the state anxiety mean raw score for the autogenic training group was lower, in the intended direction, than the mean raw score for the self-relaxation group. An analysis of difference scores (posttest minus pretest) indicated that both autogenic training and self-relaxation subjects lowered state anxiety. Treatment effects were significant (t_{28} -3.13, $p < .004$) only for the autogenic training group.

An analysis of pretest measures did not reveal significant pretreatment differences (t_{28}, 1.33, $p < .19$) in state anxiety levels between the autogenic training and no treatment control groups. Posttest differences in state anxiety levels between the autogenic training and no treatment control groups were not statistically significant t_{28} -0.93, $p < .36$. However, the state anxiety mean raw score for the autogenic training group was lower

(in the intended direction) than the mean raw score for the no treatment control group. An analysis of difference scores (posttest minus pretest) indicated that both autogenic training and no treatment control group subjects lowered state anxiety scores. Treatment effects for only the autogenic training group were significant (t_{28} -3.02, $p < .005$. Figure 3 compares the effect of each treatment condition on the dependent variable of state anxiety.

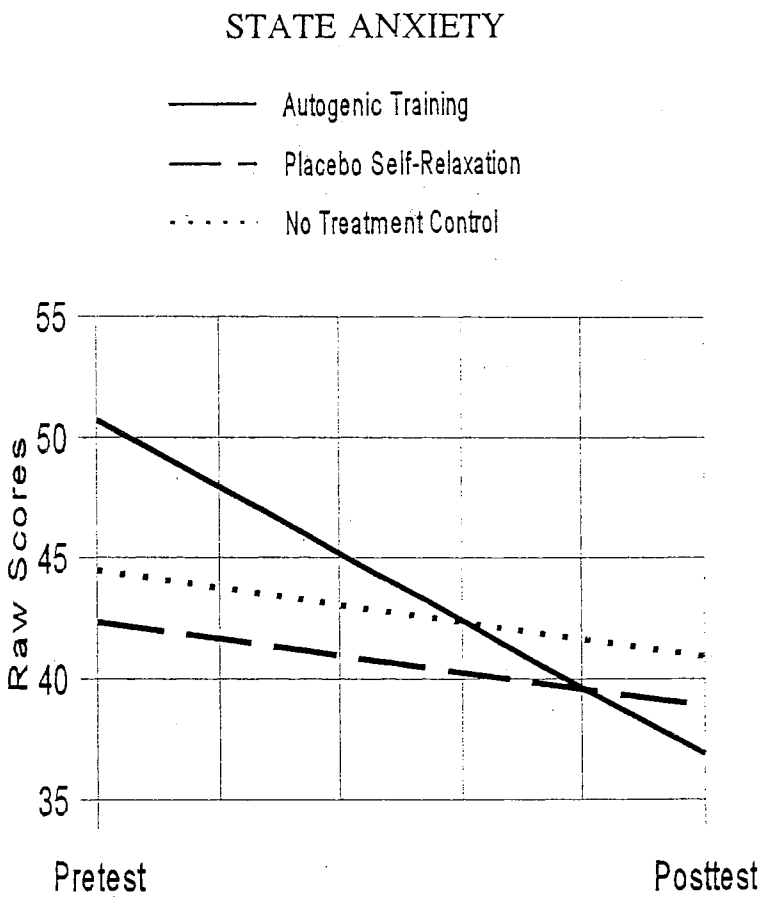


Figure 3: Pretest and Posttest Mean Scores for Each Treatment Condition on the STAI Form Y-1, a Self-Report Anxiety Scale.

Post Hoc Investigations

The same number of males and females participated as subjects in each of the three treatment conditions to account for any possible differences which could be attributed to gender. Eight males and 7 females were randomly assigned to each experimental group resulting in a total of 24 males and 21 females serving as subjects in the investigation.

Statistical analysis involved t-test comparisons across groups between males and females on each measure of stress. No significant differences were found between means on pretest, posttest and difference (posttest minus pretest) scores on all physiological and psychological measures of stress. Mean scores and standard deviations of pretest, posttest, and differences scores from physiological and psychological measures of stress are presented in Table 3 for male and female subjects across groups.

Post hoc evaluations included statistical comparisons between treatment conditions to determine if significant differences existed in measured intelligence, academic achievement and degree of emotional disturbance. Mean composite intelligence and grade level scores plus GAF mental health mean scores with respective standard deviations are provided for each treatment condition in Table 4.

Table 3 Mean Scores and Standard Deviations of Pre-, Posttest, and Difference Scores From Physiological and Psychological Measures of Stress Across Groups for Male and Female Subjects

SKIN CONDUCTANCE LEVELS REPORTED IN MICRO-OHMS

		Pretest		Posttest		Difference	
Gender	Number	Mean	SD	Mean	SD	Mean	SD
Female	21	6.29	2.21	5.30	2.00	-0.99	1.24
Male	24	6.24	2.26	5.26	2.40	-0.97	0.97

PERIPHERAL SKIN TEMPERATURE REPORTED IN DEGREES FAHRENHEIT

		Pretest		Posttest		Difference	
Gender	Number	Mean	SD	Mean	SD	Mean	SD
Female	21	85.97	4.78	87.34	4.24	1.37	1.11
Male	24	86.55	5.87	87.83	5.42	1.28	1.11

Table 3 Mean Scores and Standard Deviations of Pre-, Posttest, and Difference Scores From Physiological and Psychological Measures of Stress Across Groups for Male and Female Subjects

(Continued)

SELF-REPORT STATE ANXIETY REPORTED IN RAW SCORES

		Pretest		Posttest		Difference	
Gender	Number	Mean	SD	Mean	SD	Mean	SD
Female	21	44.10	13.44	36.62	12.32	-7.48	9.65
Male	24	47.38	13.97	40.88	13.36	-6.50	8.81

Table 4 Means and Standard Deviations by Treatment Conditions on Measures of Intelligence, Academic Achievement and Mental Health

KAUFMAN BRIEF INTELLIGENCE TEST (K-BIT)

Composite Standard Scores

Group	Number	Mean	SD
Autogenic	15	98.67	12.70
Self-Relaxation	15	91.80	18.12
Control	15	95.67	14.71

WECHSLER INDIVIDUAL ACHIEVEMENT TEST (WIAT)

Composite Grade Level Scores

Group	Number	Mean	SD
Autogenic	15	8.35	2.91
Self-Relaxation	15	6.67	2.51
Control	15	8.49	3.00

Table 4 Means and Standard Deviations by Treatment Conditions on Measures of Intelligence, Academic Achievement and Mental Health

(Continued)

GLOBAL ASSESSMENT OF FUNCTIONING (GAF)

Mental Health Scores

Group	Number	Mean	SD
Autogenic	15	33.67	5.09
Self-Relaxation	15	37.07	7.09
Control	15	39.93	7.80

An analysis of variance (ANOVA) did not reveal a significant difference between treatment conditions on composite intelligence scores derived from the K-BIT. Also, no significant difference was indicated by an ANOVA of WIAT Screener composite achievement scores.

An ANOVA (see Table 5) did indicate a significant difference in mean GAF scores (a measure of the severity of emotional disturbance) between treatment conditions. A Tukey's Studentized Range Test (see Table 5) revealed the difference between the autogenic training and no treatment control group was significant. Collectively, autogenic training subjects' GAF scores were significantly lower (indicating greater emotional

disturbance) than GAF scores provided no treatment control group subjects. The mean GAF score for the autogenic training subjects was also lower than the mean GAF score for the self-relaxation placebo control group.

Table 5 A Statistical Comparison of Mean Global Assessment of Functioning (GAF) Scores Between Treatment Conditions

Analysis of Variance Procedure (ANOVA)

Source	DF	Sum of Squares	Mean Square	F Value	P > F
Model	2	295.24	147.62	3.23	.05
Error	42	1917.20	45.65		

TUKEY'S STUDENTIZED RANGE TEST FOR GAF SCORES

Alpha = 0.05 df = 42 MSE = 45.65

Critical values of Studentized Range = 3.44

Minimum Significant Difference = 5.99

Group	N	Mean	Tukey Grouping
Control	15	39.93	A
Placebo	15	37.07	A B
Autogenic	15	33.67	B

Means with the same letter are not significantly different.

Observations of the Investigator

Subject motivation never appeared problematic as all 45 subjects in the investigation complied with all measurement and treatment demands. Subjects rarely required more than a few minutes to complete the STAI Form Y-1, the self-report state anxiety scale used as the psychological (subjective) measure of stress. The biofeedback measures of skin conductance and peripheral skin temperature were not perceived as particularly difficult to achieve or invasive by any subject.

Subject restlessness was the primary observation made with subjects practicing self-relaxation. Restless behavior occurred more frequently toward the end of a particular session. Several subjects expressed difficulty in having to remain in a horizontal position for even a short period of time (10 minutes or less). Certain statements made by subjects implied boredom may have been a factor; even more so if more than six sessions were required to complete the program.

Autogenic training subjects accepted the responsibility for their own treatment by practicing the prescribed standard exercises. Session notes involving autogenic training subjects were primarily concerned with autogenic discharge phenomena. Sensations of itching and involuntary muscle twitching were the most commonly experienced autogenic

discharges. Fleeting thoughts and visual images, not associated with the verbal formula, were ideational discharge phenomena frequently reported by subjects practicing autogenic training. Each subject reported experiencing some form of autogenic discharge activity. Short term training with just the first two autogenic standard exercises did not result in any autogenic discharge phenomena perceived as particularly unpleasant by subjects.

Summary of Results

The investigation of the first hypothesis (HO_1) required separate comparisons of the autogenic training group with the self-relaxation placebo control group and no treatment control groups on changes in skin conductance levels, a physiological measure of stress. Subjects practicing autogenic training were able to demonstrate less stress reactivity than subjects in either control group according to significant posttest differences in skin conductance levels. Comparisons of difference scores (posttest minus pretest) revealed significant treatment effects for the autogenic training group.

Separate comparisons of the autogenic training group with both the self-relaxation placebo and no treatment control groups on changes in peripheral skin temperature (a physiological measure of stress) were required in the investigation of the second hypothesis (HO_2). No

significant posttest differences were found in peripheral skin temperature between groups. However, autogenic training subjects demonstrated a higher mean skin temperature indicative of less stress reactivity than subjects in either control group. An analysis of difference scores revealed significant treatment effects for the autogenic training group.

The investigation of the third hypothesis (HO_3) involved separate comparisons of the autogenic training group with the self-relaxation placebo control and no treatment control groups on changes in self-report state anxiety, a psychological (subjective) measure of stress. No significant differences were found between group comparisons made of posttest scores from the STAI Form Y-1, a self-report state anxiety scale. However, a comparison of difference scores between groups revealed significant treatment effects for the autogenic training group. According to the results of this final comparison, autogenic training subjects were able to demonstrate less stress reactivity than subjects in either control group as measured by changes in state anxiety levels.

Post hoc investigations included an examination of the effect of gender across groups on all three measures used to assess stress reactivity. Significant differences were not found between male and female groups on pretest, posttest or difference scores on either measure of stress. Statistical

comparisons between treatment conditions did not reveal significant differences in measured intelligence or academic achievement across groups. A significant difference was revealed between the autogenic training group and no treatment control group on mean GAF scores, a measure of a subject's level of emotional disturbance. Collectively, autogenic training subjects were rated as more seriously emotionally disturbed than subjects in both control groups.

According to observations made by the investigator, all subjects maintained adequate motivation throughout the investigation as demonstrated by the completion of all measurement and treatment activities. Subjects did not report any adverse side effects as the result of their respective treatment or experimental condition. In particular, autogenic discharge activity was not viewed as a stressful or negative factor.

CHAPTER FIVE

DISCUSSION AND RECOMMENDATIONS

Summary

The purpose of the current investigation was to determine the effectiveness of short term autogenic training as a stress management intervention with hospitalized emotionally disturbed adolescents. The effects of the first two standard autogenic exercises (promoting the experience of heaviness and warmth in the arms and legs) were examined with the use of both physiological and psychological (subjective) measures of stress. Skin conductance and peripheral skin temperature biofeedback were used to assess arousal and level of relaxation achieved. A self-report anxiety scale, the State Anxiety Inventory (STAI Form Y-1), was utilized to evaluate each adolescent's subjective experience of stress.

Subjects were adolescents admitted to a psychiatric hospital who participated in a stress management program while enrolled in the inpatient school. Parental permission for each adolescent to participate in the stress management program was obtained at the time of admission. A signed participation contract was required from each adolescent before they could participate as a subject. Actively psychotic adolescents were excluded from

the investigation. Also, adolescents with reading skills determined to be below fourth grade level did not participate as subjects.

Subjects were randomly assigned to one of three experimental treatment conditions. Groups were equivalent as to the number of male and female participants. Autogenic training subjects practiced an abbreviated version of standard autogenic exercises involving the heaviness and warmth verbal formulas. Subjects in the self-relaxation placebo control group relaxed on their own without assistance. The no treatment control group subjects participated in only pre- and posttest measurements.

Pretest measurements were conducted in the same manner for all subjects at the beginning of the first stress management session. Each subject first completed the STAI Form Y-1, a self-report anxiety scale. Next, measurements of skin conductance and peripheral skin temperature were achieved via a biofeedback monitor with the assistance of the investigator.

Autogenic training and self-relaxation subjects participated in six short individualized practice sessions over a two-day period. Posttesting with the same measures was conducted in the morning of the third day, approximately 48 hours from the time of pretesting. Subjects comprising the no treatment control group completed pretesting the morning of the first

day and posttesting the morning of the third day consistent with the time span of the treatment groups.

The investigation of hypotheses required separate comparisons of the autogenic training group with the self-relaxation (placebo control) and the no treatment control groups on all three measures of stress. The statistical analyses of data involved t-test procedures comparing pretest, posttest and difference (posttest minus pretest) scores of the three treatment conditions.

All measures indicated short term autogenic training to be an effective stress reduction technique. There were significant posttest differences in skin conductance levels between the autogenic training group and both control groups. Reduction in skin conductance levels were indicative of a reduction in stress reactivity and enhanced relaxation. A comparison of difference scores (posttest minus pretest) between these same treatment conditions was significant indicating treatment was effective for the autogenic training subjects.

No significant posttest differences were found between the autogenic training group and either control group on the physiological measure of peripheral skin temperature. Changes in temperature were in the intended direction (stress reduction) for all treatment conditions. Statistical

comparisons or difference scores between conditions revealed significant treatment effects only for the autogenic training group.

Differences in posttest scores were not significant between the autogenic training group and either control group on the psychological variable of state anxiety. Changes in state anxiety scores were in the intended direction of stress reduction for all treatment conditions. Statistical comparisons of difference scores revealed significant treatment effects only for the autogenic training group.

In order to accommodate any difference due to gender the same number of male and female subjects were assigned to each of the three treatment conditions. Post hoc statistical analyses of pretest, posttest and difference scores on all three measures of stress did not reveal any significant difference specifically attributed to gender. In addition, post hoc comparisons were conducted to determine if there were significant differences between treatment conditions in selected demographic characteristics of subjects. No significant differences were found in composite intelligence or achievement levels of subjects between treatment conditions. However, GAF scores, a numerical measure of mental health (severity of emotional disturbance) were significantly lower for the autogenic training group when compared with the no treatment control

group. Autogenic training subjects as a group were rated more seriously emotionally disturbed than subjects in either control group.

Discussion

In this investigation short term autogenic training proved an effective method of stress reduction for hospitalized emotionally disturbed adolescents. Subjects practicing the heaviness and warmth autogenic standard exercises were able to demonstrate significant treatment effects on two physiological measures and one psychological (subjective) measure of stress.

Measures of skin conductance appeared most sensitive to physiological changes associated with either treatment condition. Significant posttest differences were evidenced between the autogenic training group and both the self-relaxation (placebo control) and no treatment control groups. Also, a comparison of difference scores revealed significant treatment effects for the autogenic training group.

Autogenic training was more effective than either control group in increasing peripheral skin temperature indicative of stress reduction. A comparison of temperature difference (posttest minus pretest) scores revealed significant treatment effects for subjects in the autogenic training group. However, posttest differences in peripheral skin temperature were

not significant between the autogenic training group and either control group. Peripheral skin temperature did not prove as definitive as skin conductance in demonstrating the effectiveness of autogenic training as a stress reduction technique.

Pretreatment peripheral skin temperature for all subjects ranged from 67.5 to 92.9 degrees Fahrenheit, a difference of 25.4 degrees. This wide range in temperature variability, which resulted in a higher standard deviation than evidenced in measures of skin conductance, made it necessary for greater differences in temperature between groups for findings to reach significance. Pretreatment differences in peripheral skin temperature were more likely related to innate biological factors than to the degree of stress and/or severity of emotional disturbance experienced by subjects. In this investigation skin conductance levels appeared more sensitive to sympathetic nervous system arousal associated with stress and the severity of emotional disturbance than peripheral skin temperature.

A comparison of difference (posttest minus pretest) scores revealed significant treatment effects for the autogenic training group as measured by the STAI Form Y-1, a self-report state anxiety scale. However, significant posttest differences were not found between the autogenic training group and either control group on this psychological (subjective)

measure of stress. A wide variation in pretreatment scores could be one reason why significant differences were not found on posttest measures. Pretest raw scores varied 53 points (21-74) across groups resulting in large standard deviations for all three experimental conditions. Due to this high degree of variability greater differences in scores were required between conditions for findings to be significant. Raw scores from the STAI Form Y-1 were used in this investigation because normative data for an emotionally disturbed adolescent population was not available.

A major problem reported in the literature with the use of self-report anxiety measures concerned the reliability of individuals to be objective about their own behavioral/emotional responses to stress (Chandler, 1981; Matthews, 1989). A number of subjects demonstrated they were either unaware of their feelings, possibly in denial of past experiences, and/or responded in terms of how they believed they were expected to respond. All subjects in the investigation were diagnosed with moderate to severe emotional problems; however, a number of subjects rated their anxiety levels quite low, below expected levels generally associated with normal adolescence. The STAI Form Y-1 did not appear as discriminating a measure of stress as did the physiological variable of skin conductance.

An analysis of raw score data revealed that changes in scores between pre- and posttesting on all three measures of stress for all subjects were in the direction associated with stress reduction/relaxation. Difference scores were small for many of the subjects in both control groups. Scores indicative of stress reduction for subjects in the no treatment control group could not be attributed to relaxation exercises.

The most plausible explanation for lower stress at posttesting for subjects in the no treatment control group would involve the adjustment of each subject to a new and understandably stressful institutional environment. Adjustment to this same environment assuredly influenced scores of subjects in both treatment groups as well. Not one subject described the initial measurement session (pretesting) as stressful. However, previous association with the measurement equipment and the investigator should have resulted in less stress for subjects at the time of posttesting influencing these measurements in the direction associated with stress reduction.

Subjects in the self-relaxation placebo control group were expected to demonstrate greater stress reduction/relaxation effects than control group subjects, who did not participate in any relaxation sessions. However, a comparison of mean difference (posttest minus pretest) scores indicated

self-relaxation subjects, collectively, were actually less effective in stress reduction than the no treatment control group subjects on all three measurements used to assess stress.

Subjects in the placebo control group were by design to benefit from a quiet environment and relaxed posture, two of the psychophysiological requirements necessary to elicit the relaxation response and to correctly practice autogenic training. However, no formalized relaxation exercises were initiated by subjects in the placebo control group. Subjects often appeared restless during the self-relaxation sessions. A few subjects expressed difficulty remaining in a horizontal position for even a few minutes. Boredom was expressed several times.

The practice of an ordered series of relaxation exercises did provide for more structure in the autogenic training sessions, as well as, to provide the remaining psychophysiological requirements of focused attention and passive awareness (concentration) necessary to elicit the relaxation response or to correctly practice autogenic training. The limited structure involved in the self-relaxation sessions may have been as conducive to eliciting a stress response as to promoting relaxation. This apparent lack of structure may account for placebo control group subjects demonstrating less stress reduction in comparison to other groups on all three measures of stress.

All four psychophysiological requirements appeared necessary to produce significant treatment effects (stress reduction) as was demonstrated with subjects practicing autogenic training.

Randomization procedures ensured an equal number of male and female subjects participated in each treatment condition. However, no significant differences were found in pretest, posttest and difference (posttest minus pretest) scores across groups between male and female subjects on any physiological or psychological (subjective) measure of stress. Gender alone was not a significant discriminating factor in the current investigation. Autogenic training did prove an effective stress reduction technique irrespective of gender.

K-BIT composite intelligence scores ranged from 72 to 113 (well below average to above average) for all subjects participating in the autogenic training group. Autogenic exercises proved an effective stress reduction technique even for those subjects with intellectual limitations. The applicability of autogenic training to adolescents with particularly severe intellectual deficits was not addressed in this investigation. Luthe (1977) expressed caution concerning the effectiveness of using autogenic training with mentally retarded individuals.

Composite achievement scores derived from the WIAT Screener ranged from 3.9 to 12.9 grade level for subjects in the autogenic training group. The results of this investigation indicated subjects with academic limitations were able to reduce stress through autogenic training. However, no conclusions could be drawn concerning the effectiveness of autogenic training with adolescents with more severe academic limitations. The requirement of a fourth grade reading level to ensure subjects could read items on the STAI Form Y-1, a state anxiety scale, eliminated subjects with particularly severe academic weaknesses, especially in reading.

GAF scores were used to indicate the degree of emotional disturbance of each subject in the investigation. Collectively, autogenic training subjects were rated significantly more emotionally disturbed than no treatment control group subjects. Also, the GAF scores of autogenic training subjects were lower than those for subjects in the self-relaxation placebo control group. Despite lower GAF scores, indicative of more serious levels of emotional disturbance, autogenic training subjects were able to demonstrate significant treatment effects (stress reduction) on all three measures of stress reactivity in comparison to both control groups.

Autogenic training has been an effective psychophysiological form of psychotherapy used in the treatment of numerous psychological disorders.

However, poor results with actively psychotic subjects has been reported Linden, 1990; Luthe, 1977).

Recommendations

The psychophysiological effects of autogenic training are known to be in direct opposition to the deleterious effects of stress (Luthe, 1977; Pelletier, 1992). The current investigation provides evidence that short term autogenic training is effective as stress reduction technique for an emotionally disturbed adolescent population. This investigation supports the proposed use of systematic autogenic training in the treatment of numerous stress related disorders and as an adjunct to more traditional forms of psychological treatment in use with emotionally disturbed children and adolescents (see also, Chang, 1991).

There are several definite advantages for the use of autogenic training in education and mental health settings. Autogenic exercises are applicable to most children and adolescents and can be specifically programmed for practically any physical or psychological disturbance. No harmful side effects are reported. One major advantage is that the practice of autogenic training is inexpensive, as costly equipment is not required.

Future investigations may wish to address the effectiveness of short term autogenic training as a stress reduction technique utilizing a larger

sample of emotionally disturbed adolescents. An increase in the number of subjects may allow for more precise statistical comparisons resulting in significant posttest differences between conditions on such measures as peripheral skin temperature or self-report state anxiety. Also, the use of different physiological indices such as plethysmographic readings, a quantitative measure of blood flow usually in a finger, may provide more precise data concerning the treatment effects of autogenic training with this population.

In the present investigation the residual effects of prior medication or illicit substances are unknown. However, at least for posttest analysis subjects had been in a controlled environment for a three-day period. In future studies the use of a drug screen (e.g., urine analysis) is recommended to determine the presence of these potentially confounding variables.

Subjective feedback of participants concerning autogenic training is not available in the current investigation. A rating scale evaluation completed by each subject providing objective feedback of the perceived effectiveness or value of autogenic exercises may be useful and should be considered in future studies.

The motivation to practice autogenic exercises may often be limited with an emotionally disturbed adolescent population. Problematic behavior

can range from oppositional/defiant to socially withdrawn behavior. Also, frequent mood swings are characteristic of this population which further decreases motivation for participation in autogenic exercises. To ensure participant compliance in future stress reduction research, the investigator/ autogenic trainer needs to be accomplished in establishing rapport with adolescents exhibiting emotional problems.

The effectiveness of short term autogenic training needs to be investigated with different student populations including adolescents in regular education programs on different special education placements (e.g., learning disabilities). Few of the subjects in the current investigation are from a minority background. Autogenic exercises need to be applied to student populations with more diversity in regard to race and culture. Luthe (1977) contends that the effectiveness of autogenic training is independent of culture, as it is known to be practiced in as many as 68 countries. An extension of the age range to include elementary age children from the aforementioned student populations is also recommended. Autogenic training has proven effective with children as young as six years old (Linden, 1990; Luthe, 1977).

The effectiveness of more long-term training to include the practice of all six standard exercises needs to be investigated with the

aforementioned student populations. Pikoff (1984) contends that autogenic training in its original form of six standard exercises has never been properly applied and tested in the United States. Also, special autogenic exercises which exist for use with specific problems upon mastery of the six standard exercises need to be evaluated. The use of standardized behavior rating instruments may prove useful in evaluating the effects of more long-term autogenic training. More definitive and beneficial psychophysiological changes are reported with the practice of long-term autogenic training (Luthe, 1977).

A review of the literature provides ample evidence that autogenic training has enormous potential as a self-directed intervention strategy for use with children and adolescents. Sufficient research has been completed so that intensive systematic autogenic training programs can be developed and implemented for use in diverse educational and mental health treatment settings. The systematic practice of autogenic exercises by students to reduce hyperactive (ADHD) behavior is one proposed educational application. The use of autogenic training as a treatment alternative to the pharmacological control of behavior is one suggested mental health application (see also, Chang, 1991). A continuation of empirical validation

is required to evaluate the effectiveness of each implemented autogenic training intervention program.

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APPENDIX A

INVESTIGATION CONSENT FORMS

LELAND WOLF SCHOOL
OKLAHOMA YOUTH CENTER
STRESS MANAGEMENT PROGRAM

Purpose of Stress Management

Adolescents participating in the stress management program learn relaxation exercises designed to reduce stress. Learned relaxation skills may allow these adolescents to more effectively cope with stress to gain maximum benefit from therapeutic and educational intervention.

Description of the Program

The Stress Management Program is conducted over a two-day period. Adolescents may participate in as many as six short relaxation sessions. Each adolescent participates in two measurements sessions involving both physiological and psychological measures of stress reactivity. Participants complete a self-report stress scale requiring only a few minutes to complete. The physiological measurement involves skin conductance readings taken by a sensor held in the hand. These measurements may be included in a research project conducted by the stress management instructor. All records are kept strictly confidential.

PARTICIPATION CONTRACT

I, _____ agree to participate in all stress
Adolescent

management measurement and relaxation sessions. I am aware that I may discontinue the program at any time without penalty.

_____
Signature

For additional information concerning the Stress Management Program contact:

Michael Lacy	Relaxation Trainer, OYC	(405) 364-9004
Dr. Joseph Pearl	ABSED Professor, OSU	(405) 744-6036
Jennifer Moore	University Research Services, OSU	(405) 744-5700

LELAND WOLF SCHOOL
OKLAHOMA YOUTH CENTER
STRESS MANAGEMENT PROGRAM

Purpose of Stress Management

Adolescents participating in the stress management program learn relaxation exercises designed to reduce stress. Adolescents admitted to the Oklahoma Youth Center need to more effectively cope with stress in order to gain maximum benefit from various therapeutic and educational interventions. Measurements of stress are used to assess the effectiveness of the program. These measurements may be included in a research project conducted by the stress management instructor. All records are kept confidential.

Description of the Program

The Stress Management Program is conducted over a two-day period. Adolescents may participate in as many as six short relaxation sessions. Each adolescent participates in two measurement sessions involving both physiological and psychological measures of stress reactivity. Participants complete a self-report stress scale requiring only a few minutes to complete. The physiological measurement involves skin conductance readings taken by a sensor held in the hand.

Participation Option: An adolescent can refuse to participate in the Stress Management Program at any time without penalty. Usually, participants view stress management as a useful and rewarding experience.

I, _____give permission for
(Signature of Parent/Guardian/Legal Custodian)

_____ to participate in the Stress Management
(Adolescent)

Program at the Oklahoma Youth Center. Date: _____

For additional information concerning the Stress Management Program contact:

Michael Lacy	Relaxation Trainer, OYC	(405) 364-9004
Dr. Joseph Pearl	ABSED Professor, OSU	(405) 744-6036
Jennifer Moore	University Research Services, OSU	(405) 744-5700

APPENDIX B

SUBJECT DEMOGRAPHICS

DEMOGRAPHIC DATA

Autogenic Training Group - Experimental Condition No.1

					K-BIT Standard Scores			WIAT Grade Scores				
No.	Subject	Race	Age	Grade	V	M	C	R	M	S	C	GAF scores
1	FS02	W	16-10	10	105	111	109	10.5	12.9	7.7	12.9	28
2	MS04	W	13-7	7	65	85	72	4.8	3.3	3.6	3.9	35
3	MS05	W	14-2	8	99	86	92	6.4	6.0	5.0	5.9	35
4	FS06	W	13-8	6	95	110	103	6.8	5.5	6.9	6.3	30
5	MS07	W	14-11	9	96	105	100	6.1	10.8	6.9	7.4	28
6	FS08	W	13-4	7	100	118	110	6.8	6.9	5.0	6.2	35
7	MS09	W	17-0	9	80	79	77	4.8	4.3	7.3	5.2	32
8	FS11	NA	15-0	9	100	113	107	7.8	12.9	6.5	8.7	30
9	FS12	W	17-10	12	118	100	110	12.9	12.9	12.9	12.9	36
10	MS13	W	14-11	8	86	88	86	9.7	4.0	9.2	7.2	32
11	FS16	W	17-11	9	120	104	113	12.9	12.0	12.9	12.9	48
12	MS18	W	14-8	8	94	84	88	5.5	5.8	11.8	6.8	36
13	MS19	NA	17-11	9	108	103	106	11.4	6.4	12.9	10.6	35
14	FS18	W	16-10	11	99	106	103	7.4	12.9	6.1	8.7	28
15	MS22	W	16-9	10	103	104	104	8.9	12.9	6.1	9.7	37

DEMOGRAPHIC DATA

Self-Relaxation Placebo Control Group - Experimental Condition No. 2

					K-BIT Standard Scores			WIAT Grade Scores				
No.	Subject	Race	Age	Grade	V	M	C	R	M	S	C	GAF scores
1	MS02	W	14-2	7	103	114	109	6.4	10.8	6.1	7.2	32
2	MS03	W	15-7	8	124	120	125	7.8	6.4	8.1	7.8	35
3	FS03	W	14-10	8	85	70	75	4.8	6.4	4.5	5.1	35
4	MS06	W	13-10	8	100	98	99	4.8	4.0	5.4	4.7	31
5	FS05	W	17-4	11	86	82	83	7.4	3.3	6.9	5.6	45
6	FS07	NA	13-2	7	106	84	84	8.9	4.3	6.9	6.5	28
7	MS10	W	16-6	11	102	110	107	10.5	7.3	6.1	7.9	41
8	FS10	W	14-2	8	99	111	105	5.5	6.9	6.1	6.0	45
9	MS12	B	17-2	12	101	76	87	12.5	6.0	12.9	10.9	45
10	MS15	W	14-11	8	83	81	80	5.5	8.3	5.0	6.0	50
11	MS16	W	17-2	10	86	47	63	4.0	2.9	2.3	3.0	38
12	FS14	B	17-2	10	71	65	65	6.4	4.3	5.7	5.4	28
13	FS19	W	15-9	9	95	110	103	7.4	5.8	6.5	6.6	28
14	FS20	AA	14-6	8	108	112	111	12.5	12.0	12.9	12.9	40
15	MS23	W	15-1	8	82	83	81	4.2	6.4	3.4	4.5	35

DEMOGRAPHIC DATA

No Treatment Control Group - Experimental Condition No. 3

					K-BIT Standard Scores			WIAT Grade Scores				
No.	Subject	Race	Age	Grade	V	M	C	R	M	S	C	GAF scores
1	MS01	W	17-0	9	81	76	76	7.0	5.8	5.0	5.9	45
2	FS01	W	16-4	9	99	106	103	9.7	7.3	12.9	9.9	51
3	FS04	W	15-8	9	85	63	71	6.1	4.6	4.8	5.1	35
4	MS08	W	15-0	9	84	104	93	4.5	7.3	4.8	5.3	35
5	FS09	W	17-2	11	91	110	100	9.7	8.3	9.2	9.9	38
6	MS11	W	16-9	10	97	104	100	8.9	12.0	8.1	9.9	50
7	FS13	W	17-7	12	112	107	110	12.9	12.9	12.9	12.9	38
8	MS14	W	14-0	8	72	66	66	4.0	3.3	2.5	3.2	45
9	MS17	W	14-6	8	106	90	98	7.0	10.8	6.1	7.6	40
10	FS15	W	16-11	11	111	99	105	11.4	12.0	12.9	12.9	55
11	MS20	W	14-5	9	109	104	107	10.5	6.0	11.8	9.1	40
12	FS17	B	15-1	9	82	92	86	4.9	4.0	5.4	4.8	32
13	MS21	W	16-1	10	107	116	113	12.5	7.3	8.1	9.7	28
14	FS21	W	15-11	10	86	106	96	11.4	8.3	9.2	10.6	32
15	MS24	W	17-1	9	103	117	111	8.9	12.9	7.3	10.6	35

APPENDIX C

RAW SCORE DATA

MEASUREMENT DATA
Autogenic Training Group - Experimental Condition No.1

		Physiological Data						Psychological Data		
		Skin Conductance (Micro-Ohms)			Temperature (Degrees F)			Anxiety (Raw Score)		
No.	Subject	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff
1	FS02	2.21	1.44	-0.77	87.6	88.2	0.6	59	48	-11
2	MS04	4.13	1.57	-2.56	82.0	85.2	3.2	53	43	-10
3	MS05	2.85	1.53	-1.32	90.2	91.4	1.2	50	41	-9
4	FS06	6.80	5.10	-1.70	86.5	89.0	2.5	44	27	-17
5	MS07	7.40	3.30	-4.10	89.1	92.4	3.3	42	33	-9
6	FS08	3.33	1.57	-1.76	86.9	89.6	2.7	27	26	-1
7	MS09	5.89	4.24	-1.65	80.2	83.2	3.0	68	54	-14
8	FS11	4.65	3.45	-1.20	84.2	86.0	1.8	38	32	-6
9	FS12	6.12	4.01	-2.11	86.1	89.2	3.1	60	39	-21
10	MS13	7.20	5.26	-1.94	90.0	91.2	1.2	64	61	-3
11	FS16	11.80	6.40	-5.40	87.9	90.2	2.3	36	22	-14
12	MS18	6.10	5.25	-0.85	88.2	88.6	0.4	40	32	-8
13	MS19	5.80	4.11	-1.69	88.1	89.3	1.2	50	48	-2
14	FS18	7.76	5.10	-2.66	78.4	82.1	3.7	64	24	-40
15	MS22	6.32	5.05	-1.27	90.2	92.0	1.8	66	23	-43

MEASUREMENT DATA
Self-Relaxation Placebo Control Group - Experimental Condition No.2

		Physiological Data						Psychological Data		
		Skin Conductance (Micro-Ohms)			Temperature (Degrees F)			Anxiety (Raw Score)		
No.	Subject	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff
1	MS02	6.11	6.10	-0.01	67.5	70.9	3.4	26	23	-3
2	MS03	5.47	4.00	-1.47	75.6	76.0	0.4	26	20	-6
3	FS03	4.00	3.15	-0.85	90.1	90.8	0.7	37	26	-11
4	MS06	4.25	4.12	-0.13	84.8	86.0	1.2	34	30	-4
5	FS05	6.93	6.74	-0.19	79.0	79.8	0.8	21	21	0
6	FS07	9.58	9.22	-0.36	87.1	87.8	0.7	74	68	-6
7	MS10	4.12	3.77	-0.35	91.8	92.1	0.3	46	46	0
8	FS10	6.29	5.82	-0.47	91.8	92.1	0.3	35	31	-4
9	MS12	5.42	5.13	-0.29	90.6	91.0	0.4	36	35	-1
10	MS15	9.82	9.42	-0.40	87.2	87.7	0.5	67	66	-1
11	MS16	4.60	4.20	-0.40	88.2	89.6	1.4	47	41	-6
12	FS14	8.10	7.84	-0.26	82.4	83.2	0.8	54	53	-1
13	FS19	6.42	6.22	-0.20	90.2	90.4	0.2	43	40	-3
14	FS20	6.10	5.85	-0.25	90.2	90.3	0.1	48	47	-1
15	MS23	4.40	4.14	-0.26	91.2	91.5	0.3	41	36	-5

MEASUREMENT DATA
No Treatment Control Group - Experimental Condition No.3

		Physiological Data						Psychological Data		
		Skin Conductance (Micro-Ohms)			Temperature (Degrees F)			Anxiety (Raw Score)		
No.	Subject	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff
1	MS01	5.56	5.24	-0.32	88.7	89.1	0.4	44	41	-3
2	FS01	3.16	2.82	-0.34	75.0	77.8	2.8	40	39	-1
3	FS04	7.76	7.01	-0.75	87.4	89.0	1.6	51	39	-12
4	MS08	5.11	5.00	-0.11	94.1	94.2	0.1	26	24	-2
5	FS09	6.01	5.84	-0.17	90.8	91.0	0.2	50	50	0
6	MS11	6.94	6.70	-0.24	92.9	93.1	0.2	28	28	0
7	FS13	5.90	5.71	-0.19	90.2	91.1	0.9	22	20	-2
8	MS14	10.25	10.10	-0.15	87.4	88.2	0.8	65	64	-1
9	MS17	10.02	9.30	-0.72	82.1	83.0	0.9	65	60	-5
10	FS15	4.80	4.63	-0.17	90.0	90.3	0.3	37	37	0
11	MS20	12.05	10.60	-1.45	85.3	87.5	2.2	58	43	-15
12	FS17	7.80	7.38	-0.42	78.2	80.2	2.0	47	45	-2
13	MS21	4.68	4.40	-0.28	84.7	84.9	0.2	54	49	-5
14	FS21	6.65	6.05	-0.60	85.4	86.0	0.6	39	35	-4
15	MS24	5.15	3.91	-1.24	87.1	89.8	2.7	41	40	-1

APPENDIX D

INSTITUTIONAL REVIEW BOARD APPROVAL

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 03-20-95 **IRB#:** ED-95-057

Proposal Title: THE EFFECT OF SHORT-TERM AUTOGENIC TRAINING ON THE STRESS REACTIVITY OF HOSPITALIZED EMOTIONALLY DISTURBED ADOLESCENTS

Principal Investigator(s): Joseph H. Pearl, Michael K. Lacy

Reviewed and Processed as: Expedited

Approval Status Recommended by Reviewer(s): Approved

APPROVAL STATUS SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING.
APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Provisions received and approved.

Signature: _____ Date: April 26, 1995
Chair of Institutional Review Board

v

VITA

Michael Keith Lacy

Candidate for the Degree of

Doctor of Philosophy

Thesis: THE EFFECT OF SHORT TERM AUTOGENIC TRAINING ON THE STRESS REACTIVITY OF HOSPITALIZED EMOTIONALLY DISTURBED ADOLESCENTS

Major Field: Applied Behavioral Studies

Area of Specialization: School Psychology

Biographical:

Education: Graduated from Shafter High School, Shafter, California in May 1965; received Bachelor of Science degree in Psychology and Master of Science degree in Educational Psychology with emphasis in School Psychology from Oklahoma State University, Stillwater, Oklahoma in May 1970 and May 1977, respectively. Completed the requirements for the Doctor of Philosophy degree with a major in School Psychology at Oklahoma State University in May 1996.

Experience: Employed as a school Psychometrist/Psychologist for the Regional Educational Service Centers in Guymon then Stillwater from 1975 to 1982; employed as a school psychologist with the Leland Wolf School, a residential school providing educational services for the Oklahoma Youth Center, an adolescent psychiatric hospital in Norman, Oklahoma, 1982 to present.

Professional Memberships: Oklahoma School Psychological Association; National Association of School Psychologists