SELF-MONITORING OF STRESSORS AS AN ADDITIVE COMPONENT TO A STRESS MANAGEMENT TRAINING PROTOCOL

DISSERTATION

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Several stress management groups were compared in their effectiveness of reduction of depression, state and trait anxiety, as well as enhancement of self-efficacy, using college students as subjects. The five groups included were: (1) relaxation training plus self-monitoring of stressors (RSMS), (2) relaxation training plus self-monitoring of pleasant activities (RSMP), (3) relaxation training alone (RT), (4) self-monitoring of stressors alone (SMS), and (5) a waiting-list control group (WLC). All groups, except for the WLC group, met once a week for five weeks. The primary hypothesis which stated that the RSMS group would experience a greater reduction in depression (on the Beck Depression Inventory), state and trait anxiety (on the State-Trait Anxiety Inventory), and enhancement in self-efficacy (on the General Self-efficacy Scale) than all other groups, was not supported. Rather, the RSMP group consistently experienced more change on each measure in the desired direction than the other groups, although the differences between groups reached significance in only a few instances. The RT group consistently reported more

change in the desired direction on all measures than the RSMS, SMS and WLC groups. Possible explanations offered for the failure to confirm the primary hypothesis included discussion that possibly self-monitoring of one's stressors causes a feeling of being overwhelmed and powerless in the face of many of life's stressors. Whereas, providing oneself with a mental diversion from the daily stressors appears to have an additive effect on the positive benefits of relaxation training.

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CHAPTER I

INTRODUCTION

The experience of stress in daily life is inescapable. As human beings we always have and always will be challenged by various stressors in our environment. However, as modern life becomes more technologically advanced and the pace and competition in the work environment more intense, the amount of stress experienced by most individuals appears to be on the rise. Health risks such as hypertension and coronary disease which were uncommon only half a century ago are increasing dramatically in frequency (Woolfolk & Richardson, 1978). However, stress cannot and should not be entirely avoided. Selye (1974) points out that "complete freedom from stress is death." However, when stress begins to erode an individual's psychological and physical health, it becomes clear that strategies and techniques to decrease the harmful effects of stress need to be learned and applied.

Stress has been linked with a variety of physical and psychological problems. For example, evidence has developed supporting a relationship between excessive stress and coronary heart disease (Glass, 1977; Haggerty, 1977; McCalister, Farquhar, Thoresen, & Macroby, 1976), high serum cholesterol (Friedman, Rosenman, & Caroll, 1958), high blood

pressure (Friedman, 1969; Rosenman & Friedman, 1974), and disruptions within the immune system (Solomon, Amkraut, & Kasper, 1974). In the realm of psychological disturbance, relationships have been found between stress and depression (Stewart & Salt, 1981), life dissatisfaction (Burke & Weir, 1980; Coburn, 1975), and inability to cope effectively at work (Burke, 1976; Ferguson, 1973).

Various models of stress have evolved incorporating the physiological components (Cannon, 1932; Selye, 1956; Wolff, 1968) as well as the psychological components (Cox, 1978; Coyne & Lazarus, 1980; French, Rodgers, & Cobb, 1974; Lazarus, 1966, 1981b; Lazarus, Kanner, & Folkman, 1980; Lazarus & Launier, 1978; Mason, 1975; McGrath, 1970) of the stress response. Researchers and clinicians have developed and studied a wide variety of stress management techniques and strategies for reduction of the deleterious effects of the stress response. These techniques have included cognitive restructuring (Decker, Williams, & Hall, 1982; Long, 1988), relaxation training (Bohachick, 1984; Higgins, 1986), biofeedback (Credidio, 1980; Jacobs, 1987), hypnosis (Field & Olsen, 1980; Swirsky, Sacchetti, & Margolis, 1986), problem-solving (Hawkins, Catalano, & Wells, 1986; Telch & Telch, 1986), communication skills (Norvell, Belles, Brody, & Freund, 1987), exercise (Bruning & Frew, 1987; Holmes & Roth, 1988), time-management (Higgins, 1986; King, Winett, & Lovett, 1986), anxiety management training (Hart, 1984; van

Hassel, Bloom, & Gonzalez, 1982), social support groups (Hawkins et al., 1986; Norvell et al., 1987) and others.

Many studies have been done in which a variety of stress management techniques were included but not evaluated for their unique contribution to a stress management package. For example, Matheny, Aycock, Pugh, Curlette, & Canella (1986) found in a meta-analysis of the stress management/coping literature that their categories of social skills training, wellness, problem-solving, positive and negative diversion were rarely, if ever examined independently from other treatment techniques.

Self-monitoring of stress has also been included in some studies as either a component of a treatment package (Greene & Hiebert, 1988; Norvell et al., 1987; St. Lawrence, McGrath, Oakley, & Sult, 1983) or as a no-treatment/control group (Borkovec, Grayson, & Cooper, 1978). However, no studies to date have examined the unique contribution of this component to the overall effectiveness of a treatment package.

Self-monitoring, an essential component of many behavioral therapies, can be viewed as a technique which increases the individual's focus of attention on problem cues and behaviors that interfere with successful accomplishment of the goal (Pomerleau & Rodin, 1986). In spite of questions about the accuracy and reliability of self-monitoring (Ciminero, Nelson, & Liponski, 1977b;

Kazdin, 1974; Mahoney, 1977), it has remained one of the most important and convincing measures of change (Lambert, Shapiro, & Bergin, 1986). This technique has been applied effectively in the treatment of addictive behavior, migraine headaches, compulsive behaviors, study behavior, classroom performance, and a variety of negative habits. The possible usefulness of self-monitoring in the treatment and modification of dysfunctional thoughts in the realm of cognitive therapy requires further study but is becoming popular (Hollon & Kendall, 1981).

The stress management literature has developed to the point that further refinement and precision in studying the unique effectiveness of various stress management techniques is needed. Self-monitoring of daily stress as a potential component of an effective stress management treatment package needs to be examined for its contribution to treatment. The purpose of this study is to explore the unique contribution self-monitoring of stress contributes to the overall effectiveness of a relaxation training stress management protocol.

Early Studies of Stress

Stress was first defined and studied by Hans Selye in 1926. He observed that individuals suffering from a variety of physical problems all appeared to have a common group of symptoms including loss of appetite, loss of weight, decreased muscular strength, and loss of ambition (Selye,

1974). This observation led Selye to label this syndrome with common clustering of symptoms as "the syndrome of just being sick" (Selye, 1956).

In 1936, this stereotyped syndrome presented itself to Selye again, this time in laboratory studies with rats. The animals were injected with various impure and toxic gland preparations (Selye, 1974). Regardless of the tissue from which they were derived or their hormone constituency, the injections produced a common cluster of symptoms in the rats characterized by enlargement and hyperactivity of the adrenal cortex, atrophy of the thymus gland and lymph nodes, and the appearance of gastrointestinal ulcers. These same changes were also found to be induced by cold, heat, infection, trauma, hemorrhage, nervous irritation, and many other stimuli. This syndrome was later labeled as the general adaptation syndrome (G.A.S.) or the biological stress syndrome and was defined as having three stages: (1) the alarm reaction, (2) the stage of resistance, and (3) the stage of exhaustion. Animal experiments demonstrated that various stressors could be withstood just so long. In other words, the body's "adaptation energy" is finite.

During the General Adaptation Syndrome stages, specific physiological events occur in the body. In the Alarm Stage, the following responses may occur: sympathetic nervous system arousal, anxiety, adrenal medullary stimulation, the release of ACTH, cortisol, growth hormone, and prolactin,

increased thyroid activity, and increased gonadotropin activity. During the "stage of resistance" homeostatic mechanisms are engaged, and adrenal cortical and sympathetic nervous system activity is reduced. Finally, during the exhaustion stage, enlargement of lymphatic structures occurs, target organ disease/dysfunction develops, increased vulnerability to opportunistic disease occurs, psychological exhaustion involving depression develops, and physiological exhaustion with disease and possible death ensues (Everly, 1989).

Although Selye's model involving nonspecificity of the stress response discussed above is a useful one, others have argued that the psychophysiology of stress may be highly specific (Everly, 1972; Humphrey & Everly, 1980; Mason, 1971; Mason, Maher, Hartley, Mougey, Perlow, & Jones, 1976) with different individuals experiencing specific responses to stress. Prior to 1950, the "nonspecificity theory" of stress held more popularity than it does today. The study of endocrine regulation until 1950 was based largely on relatively indirect and nonspecific methods such as glandular histology, glandular weight, and the metabolic effects of hormones (Mason, 1971). After 1950, the measurement and study of endocrine functions became more precise allowing for development of other theories of stress. Mason (1968, 1971, 1974, 1975a, and 1975b) has

presented a series of arguments that question the validity of the "non-specificity theory" of Selye.

Models of Stress

Stress has been conceptualized in a variety of ways with little consensus as to the best way to define it. Three basic models have been used to conceptualize it as either a stimulus, a response, or a transaction (Matheny, Aycock, Pugh, Curletti, & Cannella, 1986). According to the stimulus model, stress is the psychosocial or environmental demand which causes personal strain or tension (Anderson, 1978; Hall & Mansfield, 1971; Holmes & Rahe, 1967; Shinn, Rosario, Morch, & Chestnut, 1984). Stimulus models look at major life events and study the relationship between the cummulation of such events and subsequent illness often using the Schedule of Recent Experience (SRE) developed by Holmes and Rahe (1967).

Response models of stress view stress as a physiological response to demands made upon the individual (Cannon, 1932; Selye, 1956; Wolff, 1968). Selye (1974) has defined stressors as "stress-producing factors" while stress is the body's response to a stressor. He stated that stress is the nonspecific response of the body to a demand (stressor) placed on it. He advocated that the body has a predictable set of hormonal and neurological reactions to stimuli that disturb homeostasis including overgrowth of the

adrenal glands, atrophying of the thymus gland and lymph nodes, and ulceration in the gastrointestinal tract.

Transactional models view stress as an interaction between the person and the environment (Cox, 1978; Coyne & Lazarus, 1980; French, Rodgers, & Cobb, 1974; Lazarus, 1966, 1981b; Lazarus, Kanner, & Folkman, 1980; Lazarus & Launier, 1978; Mason, 1975; McGrath, 1970). These models emphasize the role cognitions and appraisal play in mediating the individual's response to demands. Lazarus (1966, 1981a) delineates two appraisal processes which occur in an individual in response to a demand: primary appraisal of the seriousness of the demand and secondary appraisal of the individual's resources to meet the demand.

All three models of stress include a precipitant, a perceptual component, and a physiological response, although emphasis is placed on different components in each of the models. Each component is vital and, therefore, in this paper stress is viewed as including (a) internal or external demands on the individual (stressor), (b) appraisal of both the seriousness of the demands and individual's resources to deal with the demands, and (c) the stress response.

Linking Stressors to the Physiological Experiences of Stress: A Six-Step Model

The human stress response involves a series of steps leading to the physiological effects of stress. The

elements of this process include the following (Everly, 1989): (a) stressor events, (b) cognitive evaluation and affective response, (c) neurologic triggering mechanisms (e.g., locus coeruleus, hypothalamic nuclei, limbic nuclei), (d) the stress response, (e) target-organ activation, and (f) coping behavior.

Stressor Events

Stressors can be classified as being in one of two categories: (a) psychosocial stressors and (b) biogenic stressors (Girdano & Everly, 1986). Psychosocial stressors are events, either real or imagined, that must be interpreted and evaluated by the individual cognitively before they cause physiological changes. Biogenic stressors (e.g. amphetamines, caffeine, nicotine, pain, and extreme heat or cold) directly affect the affective and neurologic triggering nuclei and do not require cognitive appraisal processes to cause a stress response. However, the majority of stressors fall into the psychosocial category (Everly, 1989).

Cognitive Appraisal and Affective Integration

Once an individual has been exposed to a potential psychosocial stressor (biogenic stressors will skip these first several steps in the stress process) the individual will cognitively evaluate the situation. He or she will assign meaning to the potential stressor according to his or her own biological predispositions (Millon & Everly, 1985;

Strelau, Farley & Gale, 1985), learning history (Lachman, 1972), personality traits (Millon, 1981), and available resources for coping (Everly, 1989; Lazarus & Folkman, 1984; Ray, Lindop, & Gibson, 1982). Substantial evidence exists which supports the cognitive primacy hypothesis which proposes that cognition determines affect (Arnold, 1970, 1984; Cassel, 1974; Ellis, 1973; Everly, 1989; Gellhorn & Loofbourrow, 1963; Lazarus, 1982; Meichenbaum, 1985; Selye, 1976). Based upon this model of cognitive primacy, if the cognitive appraisal of a situation is ultimately one of threat, challenge, or aversion, an emotional (affective) response will follow.

Neurological Triggering Mechanisms

The next step in the stress response involves the neurological triggering mechanisms which respond to emotional arousal and set into motion the visceral and somatic stress response (Everly, 1989). These structures consist of the locus ceruleus, the hippocampus, the septal-hippocampal-amygdaloid complexes, and the anterior and posterior hypothalamic nuclei (Everly, 1985b; Nauta & Domesick, 1982; Reiman, Raichle, Robins, Butler, Herscovitch, Fox, & Perlmutter, 1986). These structures may become hypersensitive and stimulated through a positive feedback loop in such a manner that a self-perpetuating state of physiological arousal develops. This state has been labeled "ergotropic tuning" (Gellhorn, 1957), "limbic

hypersensitivity" (Everly & Benson, 1988), and a "charged arousal system" (Weil, 1974).

The Stress Response

At this point in the stress response, the body has three known pathways by which to affect the target organ: (1) the neural axes, (2) the neuroendocrine axis, and (3) the endocrine axes (Everly, 1989). These will each be discussed in turn.

The Neural Stress Axes

The neural stress pathways consist of the sympathetic, parasympathetic, and neuromuscular nervous systems. These pathways are completely neural in nature and are therefore the quickest and most direct of all stress pathways (Everly, 1989).

Following the cognitive and limbic (affective) integration in response to a potential stressor which has been interpreted as threatening, the sympathetic neural impulses descend to the posterior hypothalamus through the thoracic and lumbar areas of the spinal cord, and through the sympathetic chain of ganglia. The sympathetic nerves then innervate the end organs. The parasympathetic pathways descend to the anterior hypothalamus through the cranial and sacral spinal cord areas to then innervate the end organs (Everly, 1989).

The sympathetic nervous system primarily uses the neurotransmitter norepinepherine (but in some areas

acetylcholine) to activate the target organs while the parasympathetic nervous system uses acetylcholine. The sympathetic nervous system typically activates and arouses the end organs while the parasympathetic generally slows and inhibits the end organs.

The skeletal musculature is also a target for activation during the experience of stress and emotional arousal (Gellhorn, 1958a, 1958b, 1964b, 1967; Malmo, 1975; Williams, 1986). Such activation can lead to a variety of neuromuscular dysfunctions, as well as heightened limbic activation (Gellhorn, 1958b; Malmo, 1975; Weil, 1974). However, neuromuscular excitation is time-limited in its effects due to the limited ability of the sympathetic telodendria to continue to release neurotransmitters under chronically high stimulation (LeBlanc, 1976). Therefore, to cause a more prolonged response to stressors, the neuroendocrine axis must be activated.

The Neuroendocrine Axis

The neuroendocrine axis was labeled the "fight or flight" response axis by Cannon in 1926. Cannon described the "fight or flight" response as a mobilization of the body for muscular action in reaction to a perceived threat. This pathway allows the organism to fight or flee from the perceived threat (Cannon, 1953).

The primary organ involved in this stress axis is the adrenal medulla. This axis can be mediated by a variety of

psychological stimuli including psychosocial stressors (Ametz, Fjellner, Eneroth, & Kallner, 1986; Froberg, Karlsson, Levi & Lidberg, 1971; Levi, 1972; Mason, 1968a, 1972; Roessler & Greenfield, 1962).

After the cognitive and affective integration involving the perception of a threat has occurred, the dorsomedial-amygdalar complex is activated (Lang, 1975; Roldan, Alvarez-Palaez de Molina, 1974). Neural impulses then travel to the lateral and posterior hypothalamic areas (Roldan et al., 1974). The neurons send impulses down through the thoracic spinal cord, converge at the celiac ganglion, and finally innervate the adrenal medulla. The adrenal medulla produces catecholamines, namely norepinephrine (noradrenalin) and epinephrine (adrenalin), which are released when the adrenal medulla is innervated by the above described pathway. These catecholamines then increase generalized adrenergic somatic activity (Folkow & Neil, 1971; Maranon, 1924; Wenger, Clemens, Coleman, Cullan, & Engel, 1960). The effects of these catecholamines is similar to that of direct sympathetic innervation, except that the medullary catecholamines require a 20- to 30-second delay of onset for effect and cause a tenfold increase in effect duration (Usdin, Kretnansky, & Kopin, 1976). The medullary catecholamines also prolong the duration of the adrenergic sympathetic response.

Some researchers have viewed the "fight or flight" response as an "active coping" system and have labeled this neuroendocrine axis the "sympatho-adrenomedullary system" (SAM) (McCabe & Schneiderman, 1984). Effects of the adrenal medullary axis innervation include increases in arterial blood pressure, blood supply to the brain, heart rate, cardiac output, stimulation of skeletal muscles, plasma free fatty acids, triglycerides, and cholesterol, and release of endogenous opioids. In addition, this axis causes decreases in blood flow to the kidneys, gastrointestinal system, and skin. Excessive stimulation of this axis also causes increased risk of hypertension, thrombosis formation, angina pectoris attacks (in individuals prone to these), arrhythmias, sudden death from lethal arrhythmia, myocardial ischemia, myocardial fibrillation, or myocardial infarction (Ametz et al., 1986; Axelrod & Reisine, 1984; Brod, 1959, 1971; Everly, 1989; Froberg et al., 1971; Henry & Stephens, 1977; McCabe & Schneiderman, 1984).

The Endocrine Axes

The endocrine axes, the third type of physiological stress axes, are the most chronic and prolonged somatic responses to stress (Mason, 1968b), but also require the strongest intensity of stimulation to activate (Levi, 1972). The stress response has been linked with four endocrine axes: (1) the adrenal cortical axis, (2) the somatotropic axis, (3) the thyroid axis, and (4) the posterior pituitary

axis. These axes, like the others discussed, can be stimulated by a variety of psychological stimuli including a host of psychosocial stimuli (Axelrod & Reisine, 1984; Levi, 1972; Makara, Palkovits & Szentagothal, 1980; Mason, 1968c, 1972; McCabe & Schneiderman, 1984; McKerns & Pantic, 1985; Selye, 1976).

The adrenal cortical axis. The adrenal cortical axis begins its activation at the septal-hippocampal complex (Henry & Ely, 1976; Henry & Stephens, 1977) from which neural impulses are sent to the median eminence of the hypothalamus. The median eminence neurosecretory cells secrete corticotropin releasing factor (CRF) into the hypothalamic-hypophyseal portal system (Rochefort, Rosenberger, & Saffran, 1959). The CRF travels down the infundibular stalk to the cells of the anterior pituitary which then releases adrenocorticotropic hormone (ACTH) into the bloodstream. Simultaneously, the precursor to the endogenous opioids is released (Everly, 1989; Rossier, Bloom, & Guillemin, 1980).

ACTH is carried through the bloodstream to the adrenal cortex where it stimulates the release of the glucocorticoids cortisol and corticosterone into the bloodstream. The effects of the glucocorticoids include increased glucose production, exacerbation of gastric irritation, increased susceptibility to atherosclerotic processes, suppression of immune mechanisms, exacerbation of

herpes simplex, appetite suppression, associated feelings of depression, hopelessness, helplessness, and a loss of control, as well as other effects (Everly, 1989; Henry & Stephens, 1977; Makara, Palkovitz, & Szentagothal, 1980; McCabe & Schneiderman, 1984; Selye, 1976; Yates & Maran, 1972; Yuwileer, 1976).

ACTH also stimulates the release of the mineralocorticoids aldosterone and deoxycorticosterone from the adrenal cortex into the bloodstream. Aldosterone causes an increase in the absorption of sodium and chloride by the renal tubules and a reduction in their excretion by the salivary glands, sweat glands, and gastrointestinal tract. As a result, the body will retain fluid. Although cortisol does cause some of these same effects, it is not nearly as potent as aldosterone as an electrolyte effector. Aldosterone also causes increased glycogen deposits in the liver and a decreased number of circulating eosinophils (Everly, 1989). Excessive stimulation of mineralocorticoid release in humans has been related to development of Cushing's syndrome (hyperadrenocorticism) (Gifford & Gunderson, 1970) and to high blood pressure and myocardial necrosis (Selye, 1976; Everly, 1989).

Various authors have given the adrenal cortical stress axis the name hypothalamic-pituitary-adrenal cortical system (HPAC) (e.g., McCabe & Schneiderman, 1984). The hopelessness/helplessness depression syndrome, passivity,

the perception of no control, immunosuppression, and gastrointestinal symptomatology have been related to the activation of this system. Thus, it has been labeled the "passive coping" system. It appears to be activated when active coping is not possible (Everly, 1989). Comparing the HPAC system with the SAM axis, Frankenhauser (1980) has stated that in situations involving effort without distress, the SAM system is activated. The HPAC system is activated when the situation arouses distress without effort being possible. However, when a situation arises in which both distress and effort are involved, the body activates both the SAM and the HPAC systems.

The somatotropic axis. Like the adrenal cortical axis, the somatotropic axis has the same physiological mechanisms from the septal hippocampal complex through the hypothalamic-hypophyseal portal system. However, the somatotropin releasing factor (SRF) stimulates the anterior pituitary which then responds by releasing growth hormone (somatotropic hormone) into the bloodstream (Everly, 1989; Makara et al., 1980; Selye, 1976).

The role of growth hormone is not clearly understood but it has been linked to the release of the mineralocorticoids (Selye, 1956). Some researchers have suggested that the growth hormone causes a diabetic-like-insulin-resistant effect in addition to mobilization of fat stores in the body with the results being an elevated

concentration of free fatty acids and glucose in the blood (Everly, 1989; Yuwiler, 1976).

The thyroid axis. The thyroid axis is another stress-related response mechanism which has been linked to psychosocial stimuli (Levi, 1972; Makara et al., 1980; Yuwiler, 1976). Thyrotropin releasing factor (TRF) is released by the median eminence of the hypothalamus and carried by the infundibular stalk to its target, the anterior pituitary. The anterior pituitary then releases thyroid stimulating hormone (TSH) into the bloodstream. TSH causes the thyroid gland to release two thyroid hormones, triiodothyronine (T3) and thyroxine (T4) into the bloodstream. While in the systemic circulation system, these hormones are bound to specific plasma protein carriers, primarily thyroxin binding globulin (TBG). However, a small amount of the thyroid hormones remain unbound and therefore metabolically active at the target-cell level. T3 and T4 hormones suppress their own secretion through a negative feedback loop (Everly, 1989).

The thyroid hormones have been found to cause an increased general metabolism, heart rate, heart contractility, peripheral vascular resistance (thus increasing blood pressure), and the sensitivity of some tissues to catecholamines (Levi, 1972). Depressive episodes have been related to hypothyroidism. Levi concludes that the

thyroid axis could be an important mechanism in the human stress response.

The posterior pituitary and other phenomena. The posterior pituitary has been implicated in the stress response, as well. The supraoptico nuclei of the hypothalamus sends neural impulses to the posterior pituitary (neuro-hypophysis) which causes release of the hormones vassopressin (antidiuretic hormone, ADH) and oxytocin into the bloodstream. ADH then causes water retention by increasing the permeability of the collecting ducts which lie near the distal ascending tubules within the glomerular structures of the kidneys (Everly, 1989). Evidence has been found linking increased ADH levels with psychosocial stress (Makara, Paekovits, & Szentagothal, 1980). Oxytocin, also released by the posterior pituitary gland, may be involved in psychogenic labor contractions (Omer & Everly, 1988) and premature birth (Everly, 1989). Several other hormones have been explored in relation to the stress response including testosterone, luteinizing hormone and prolactin (Everly, 1989; Makara et al., 1980; Sowers, Raj, Hershman, Carlson, & McCallum, 1977; Williams, 1986).

Target-Organ Activation

Everly (1989) uses the term "target-organ activation" to signify the phenomenon where the neural, neuroendocrine, and endocrine stress response axes described above either activate, increase, or inhibit normal activation or

catabolize some organ system in the body. The target-organs may include the cardiovascular system, the gastrointestinal system, the skin, the immune system, as well as others. Individuals appear to display a response mechanism stereotypy which involves a preferential pattern of stress-related psychophysiological activation on the various axes described above (Sternbach, 1966). When such activation is consistent over time, disease or dysfunction is more likely to develop (Stoyva, 1977). Everly (1986) has labeled the term "target-organ specificity" to refer to a predisposing vulnerability of the target organ to experience pathogenic arousal. Various stimuli and physiological information contribute to such a predisposition including genetic, prenatal, neonatal, and traumatic stimuli.

No one has yet determined how much of this preferential pattern of stress-related psychophysiological activation is learned and how much is genetically predetermined. However, awareness seems to only occur at the beginning and end steps in this pattern. In other words, one can have awareness of one's cognitive and affective responses to a stressor, as well as awareness of the end result of the psychophysiological arousal (via neural, neuroendocrine, or endocrine pathways), when one experiences the physical symptoms of the arousal (such as a headache, tense muscles, racing heart, or high blood pressure). Only through

awareness of these components can an individual begin to control the stress reaction process.

Coping

> Lazarus and Folkman (1984) have defined coping as: efforts, both action-oriented and intrapsychic, to manage (that is, master, tolerate, reduce, minimize) environmental and internal demands, and conflicts among them, which tax or exceed a person's resources. Coping can occur prior to a stressful confrontation, in which case it is called anticipatory coping, as well as in reaction to a present or past confrontation with harm. (p. 141)

According to the 6-step model described above and outlined by Everly (1989), coping is an attempt to reestablish physiological homeostasis. Within Everly's model, anticipatory coping (as defined by Lazarus & Folkman, 1984) is part of the cognitive/affective component.

Coping may further be classified as adaptive or maladaptive (Girando & Everly, 1986). Adaptive coping techniques decrease target-organ activation, re-establish homeostasis, and improve long-term health. In contrast, maladaptive coping strategies may decrease stress in the short-run, but tend to activate target-organs and negatively impact health in the long run (Everly, 1979a, 1989).

The six-step model of stress then provides a framework for understanding how the initial stressor can cause the

physiological and psychological effects on the body. Through the cognitive evaluation and affective response, the body begins converting an external event into a physiological reaction. The neurological triggering mechanisms set into action the various stress responses along the three primary pathways: the neural, the neuroendocrine, and the endocrine axes. Once a target organ has been activated, coping strategies can be used to reestablish homeostasis.

Stress Management

In response to the research and findings on stress and its potential effects, researchers and clinicians began developing a variety of stress management approaches. Some of the techniques used in stress management protocols have included: (1) relaxation training (involving one or a combination of techniques including deep breathing strategies, meditation, progressive muscle relaxation, and imagery) (Berger, Friedman & Eaton, 1988; Bohachick, 1984; Bruning & Frew, 1987; Helin & Hanninen, 1988; Higgins, 1986; Holmes & Roth, 1988; Irvin, Johnston, Jenner & Marie, 1986; Johnston, 1987; Long & Haney, 1988a and b; Longo, Clum & Yaeger, 1988; Norvell et al., 1987; Rose, Tallant, Tolman & Subramanian, 1986); (2) cognitive restructuring (including Stress Inoculation Training; Meichenbaum, 1974) (Decker, Williams & Hall, 1982; Deffenbacher & Hahnloser, 1981; Field and Olsen, 1980; Higgins, 1986; Jenni & Wollersheim, 1979;

Long, 1988; Moses & Hollandsworth, 1985; Norvell, Belles, Brody & Freund, 1987; Wernick, 1984; Whitney & Rose, 1989); (3) biofeedback (Credidio, 1980; Hudesman, Beck & Smith, 1987; Jacobs, 1987; Keefe, Surwit & Pilon, 1981; Murphy, 1983; Pelletier & Shealy, 1979; Shellenberger, Turner, Green & Cooney, 1986; Thompson, Griebstein & Kuhlenschmidt, 1980; Valdes, 1985); (4) hypnosis (Field & Olsen, 1980; Swirsky & Margolis, 1986) (5) problem-solving (Hawkins, Catalano & Wells, 1986; Kirkham, Schilling, Norelius & Schinke, 1986; Lindquist, Telch & Taylor, 1983; Norvell et al., 1987; Telch & Telch, 1986) (6) communication skills (Kirkham et al., 1986; Lindquist et al., 1983; Norvell et al., 1987); (7) exercise (Berger et al., 1988; Bohachick, 1984; Bruning & Frew, 1987; Helin & Hanninen, 1988; Holmes & Roth, 1988; Irvine et al., 1986; Kruse, Peterson, Poulos & Creticos, 1985; Long, 1988; Long & Haney, 1988a, 1988b); (8) time-management (Higgins, 1986; King, Winett & Lovett, 1986); (9) assertiveness training (Courtney & Escobedo, 1990; Drob, Bernard, Lifshutz & Nierenberg, 1986; Hawkins et al., 1986; Higgins, 1986; Tallant, Rose & Tolman, 1989; Whitney & Rose, 1989); (10) anxiety management training (developed by Suinn, 1977) (Cragan & Deffenbacher, 1984; Hart, 1984; Hutchings, Denney, Basgall & Houston, 1980; van Hassel, Bloom & Gonzalez, 1982); (11) social support groups (Berger et al., 1988; Hawkins et al., 1986; King et al., 1986; Kirkham et al., 1986; Longo et al., 1988; Norvell et al., 1987; Richman

& Rosenfeld, 1987; Rose et al., 1986; Zarit, Anthony & Boutselis, 1987); (12) medications (Kruse et al., 1985); (13) organizational interventions (Jaffe, Scott & Orioli, 1986); and (14) environmental interventions (Suedfeld, Roy & Landon, 1982), as well as others.

These various techniques may be roughly classified in terms of their point of intervention in the 6-step stress response model described above (Everly, 1989). For example, the first step in the stress response model involves introduction of a stressor (either biogenic or psychosocial in nature). This stressor may be eliminated through stress management interventions including problem-solving, organizational or environmental modifications, behavioral changes (e.g., reduction of caffeine intake), and time management techniques, to name a few. The next step in the stress response model involves cognitive appraisal and affective integration. This step may be impacted primarily through cognitive restructuring techniques. The third and fourth steps involving the neurologic triggering mechanisms and the physiological stress response (either involving the neural axes, neuroendocrine axis, or the endocrine axes) may be circumvented through such techniques as relaxation training, biofeedback, and exercise.

The target-organ activation stage, or fifth stage in the stress response model might be best addressed through the use of properly prescribed medications aimed at reducing

the physiological effects on the target organ. Medications would include psychotropic drugs for treatment of such stress related symptoms as anxiety, depression, and psychotic thought processes. Medications often impact the physiological stress response, as well (the fourth step of the model).

Stress management approaches focused on the final step involving coping behaviors, might include such interventions as support groups (e.g., to help identify stressors, stress reactions, and new coping patterns), assertiveness training, or again problem-solving techniques. Self-monitoring of one's physiological responses to stressors might also be defined as a coping behavior in that self-monitoring can then lead to implementation of various other stress management strategies such as relaxation exercises, problem-solving, time management, or a variety of others.

The Potential Impact of Self-monitoring on the Psychophysiological Response to Stress

In self-monitoring of one's own physiological response to stress, an individual can become aware of the various signs and symptoms that he or she is responding in a maladaptive manner. For example, if one notices a rapid respiratory or heart rate, or tense, tight muscles, this is a signal that the body is responding to stress with increased sympathetic nervous system activity and/or neuromuscular arousal. If an individual is experiencing a

more severe, chronic medical problem such as high blood pressure, arrhythmia, myocardial ischemia, or other serious problems, then it is highly probable that he or she is experiencing chronic stress. Such an individual will need to become more aware, through self-monitoring, of their stressors and how they respond to these stressors cognitively, emotionally, and physiologically. This is the first step towards reducing the stress response. However, this is not to say that young, healthy individuals who are not experiencing severe physical problems as a result of stress should not also learn to self-monitor their stressors and reactions to these stressors. Learning to self-monitor stressors before significant ill-effects of stress have developed can be viewed as a preventative approach to illness. In taking charge of their health and response to stressors, people should experience such benefits as an increased sense of control over their lives, thus reducing the activation of the HPAC system which is activated when individuals experience themselves as having limited control.

Linking the Neurophysiology of Stress and the Relaxation Response

Based on research by Selye (1976), Gellhorn (1967), Gray (1982), and Post (Post & Ballenger, 1981), researchers have proposed a new taxonomic perspective for viewing various anxiety and stress-related diseases (Everly, 1985b, Everly & Benson, 1989). Evidence has accumulated supporting

the conceptualization of a wide variety of disorders as "disorders of arousal."

The hypothesized disorders of arousal in the psychiatric realm include anxiety disorders (Carr & Sheehan, 1984; Gray, 1982; Mefferd, 1979), and stress related syndromes, affective disorders (Post, 1985; Post & Ballenger, 1981; Post, Uhde, Putnam, Ballenger, & Berrettini, 1982), functional psychoses, personality disorders, post-traumatic reactions, addictive disorders, and withdrawal syndromes (Monroe, 1970, 1982; Post, 1985; Post & Ballenger, 1981; van der Kolk, Greenberg, Boyd, & Krystal, 1985). A variety of somatic disorders have also been related to an excessive arousal component such as ventricular fibrillation (Verrier & Lown, 1984), psychophysiological essential hypertension (Eliot, 1979; Gellhorn, 1964c; Henry & Stephens, 1977), coronary artery disease (Corley, 1985; Henry & Stephens, 1977), migraine headaches and Raynaud's disease (Suter, 1986), peptic ulcers (Wolf, 1985), irritable bowel syndrome (Latimer, 1985), and other gastrointestinal disorders (Dotevall, 1985). In sum, a wide variety of psychiatric and somatic disorders appear to be related to pathogenic hypersensitivity within the limbic system.

The disorders of arousal are characterized by a limbic-system-based neurological hypersensitivity with three main mechanisms of action (Everly, 1989): (1) Increased catecholamine activity within the limbic system (Black,

Adler, Dreyfus, Friedman, Lagamma, & Roach, 1987; Mefferd, 1979; Post, 1985; Post & Ballenger, 1981; Post, Rubinow & Ballenger, 1986); (2) increased activation of neuromuscular efferents with consequential proprioceptive excessive arousal of the limbic system (Gellhorn, 1958a, 1964, 1968; Malmo, 1975; Weil, 1974); and (3) repetitive cognitive arousal (Gellhorn, 1964, 1968; Gellhorn & Loofbourrow, 1963; Post, Rubinow, & Ballenger, 1986). These mechanisms seem to be reactive to environmental, psychosocial, pharmacological, and/or electrical stimulation.

An anti-arousal therapy targeted at neurological desensitization is represented in the "relaxation response" (Benson, 1975, 1985; Benson, Beary, & Carol, 1974). Many techniques exist for elicitation of the relaxation response including progressive relaxation, meditation, breathing exercises, autogenic suggestion, and presuggestion hypnosis.

Taylor (1978) suggests that the relaxation response involves a reduction in the arousability of the central nervous system. Specific studies have found that elicitation of the relaxation response causes reduced oxygen consumption and carbon dioxide elimination, reduced heart rate, respiratory rate, and arterial blood lactate (Benson, 1983, 1985). All of these changes are consistent with reduced central and peripheral adrenergic excitation (Benson, 1985; Delmonte, 1984). The relaxation response appears to work through a mechanism involving an adrenergic

end-organ blocking agent (Benson, 1983, 1985; Everly, 1989; Lehmann, Goodale, & Benson, 1986).

Researchers have proposed that a second mechanism through which the relaxation response works involves reductions of neuromuscular tone (Everly, 1989). This reduction in tone would serve to reduce abnormal states of limbic sensitivity and excitation (Gellhorn, 1958a, 1958b, 1964b; Weil, 1974). A third mechanism elicited by the relaxation response involves a reduction in cognitive arousal which then causes reduced ergotropic tone and a neurological desensitization effect, as well as decreased dysphoric psychological states (Benson, 1985; Everly, 1989; Klajner, Hartman, & Sobell, 1984; Kutz, Borysenko, & Benson, 1985; Lavey & Taylor, 1985; Shapiro & Giber, 1978).

Current research fails to find one best way to elicit the relaxation response. Furthermore, the relaxation response has been found to be useful with treatment of a variety of diverse diseases (Benson, 1985; Everly, 1989; Lavey & Taylor, 1985; Murphy & Donovan, 1986; Shapiro & Giber, 1978).

Disregulation Theory and Self-monitoring of Stress

Schwartz (1979) discusses a "disregulation" theory which can be related to the detrimental effects of stress and the need for self-monitoring of stress. He describes the process of "disregulation" as the conditions under which normally integrated, self-regulatory systems (including

biological and social systems) may become imbalanced in relation to the positive and negative feedback loops. If disregulation occurs in a physiological system, it is frequently labeled a "disease."

Schwartz (1979) proposes that "disattention" is the psychological process which causes a disconnection within the human organism. Disattention then can cause a neuropsychological disconnection between the brain and the body leading to disregulation and eventually disease. However, when an individual attends to the peripheral organs (thereby connecting the brain and body), self-regulation and health are the end result.

The theory also advocates that all the individual needs to do is attend to the feedback (Schwartz, 1979). Once the brain-body connection is made, the self-regulatory effects of the feedback loop should be automatically initiated by the body. Schwartz proposes that this concept of disregulation can be applied to a wide range of different mechanisms whereby disconnections between individuals and the environment, as well as between various systems among people, can contribute to disorder and disease.

Schwartz (1983) advocates self-monitoring as a way to engender self-regulation. However, he warns that self-monitoring may actually make some individuals more anxious and distressed. At the very least, self-monitoring by itself has not been found to decrease an individual's

experience of stress (Borkovec, Grayson, & Cooper, 1978; Greene & Hiebert, 1988). Rather, self- monitoring should be viewed as the first step towards identifying stressors, and one's reactions to them so that other stress management techniques can then be applied to self-regulate the body. Schwartz (1983) states that self-monitoring of distress may be a prerequisite for successful clinical treatment and compliance.

A Coping/Stress Management Model

Matheny, Aycock, Pugh, Curletti, & Cannella (1986) discuss a model of coping which may be helpful in conceptualizing the various stress management approaches. Their article is a landmark publication because it is based on a thorough review of the literature and meta-analysis of the coping and stress management literature. A meta-analysis allows an "analysis of analyses" (Smith, Glass, & Miller, 1980, p. 80) and refers to a set of quantitative procedures that can be used to evaluate an area of literature. The model of coping presented by Matheny et al. (1986) is divided into preventive and combative strategies for coping, although some strategies appear to be both.

Preventative Coping Strategies

Matheny et al. (1986) define four types of preventive strategies: (a) avoiding stressors through life changes, (b) adjusting demand levels, (c) modifying stress-enhancing behavior patterns, and (d) building coping resources. The

first general class of preventive coping strategies involves avoiding stressors through such approaches as ending a stressful relationship, or changing jobs when the job is not suitable for oneself in terms of interests or aptitude.

The second preventive strategy (Matheny et al., 1986) involves adjusting the demand levels in one's environment. When the individual experiences a mismatch between the demands of the environment and his or her resources, stress is likely to result. Perhaps a change in job responsibilities, for example, would be classified as a type of demand level adjustment.

Modifying stress-increasing behavior patterns is the third type of preventive strategy delineated (Matheny et al., 1986). The authors discuss the "anxious reactive" personality defined by Girdano and Everly (1979) as one example of a stress-inducing behavior pattern. Individuals with this personality tendency habitually are hypersensitive to cognitive, visceral, and musculoskeletal feedback mechanisms which occur during the stress reaction. This causes further arousal and therefore an automatic feedback loop which perpetuates and feeds into the stress response. Another behavior pattern which the authors offer as an example in this category of modifiable behavior patterns is Type A behavior pattern (Friedman, Thoresen, Gill, Ulmer, Thompson, Powell, Price, Elek, Rabin, Breall, Piaget, Dixon,

Bourg, Levey, & Tasto, 1982) with its hostility, excessive competitiveness, and time urgency.

The fourth category of preventive coping strategies cited by the researchers (Matheny et al., 1986) involves developing one's resources. This may include physiological assets which might involve wellness factors, for example: psychological assets such as self-confidence, a sense of control, or self-esteem; cognitive assets such as beliefs, time-managment skills, or academic skills; social support assets/resources; and financial resources.

Combative Coping Strategies

The authors (Matheny et al., 1986) outline five combative coping strategies: (1) monitoring stressors and stress symptoms, (2) marshaling one's resources, (3) acting to decrease or eliminate stressors, (4) tolerating stressors one cannot change, and (5) decreasing stressful arousal. "Stress monitoring," the first combative coping strategy (Matheny et al., 1986), is important for the timely use of the other coping techniques. When individuals monitor their own stress, they can then initiate coping strategies before the stress builds. However, monitoring of one's stress without knowledge of strategies to reduce the stress is counterproductive according to the findings of the authors (Effect size of -.33). But when used in combination with other treatments, stress monitoring is helpful (Effect size of .62). Effect size measures allow reporting of results of

different outcome measures on a common scale. The effect size measure used by Matheny et al. (1986), was the difference between the sample means of the experimental group and the control group divided by a sample standard deviation.

The second set of combative coping strategies (Matheny et al., 1986) was labeled as "marshaling one's resources." This involves identifying, organizing, and planning the use of one's coping strategies.

Acting in ways to eliminate or reduce the stressor is the third strategy listed by the authors (Matheny et al., 1986) for combative coping. This strategy may require problem-solving skills with the goal of defining the problem, seeking relevant information, challenging unnecessarily limiting assumptions, identifying alternatives, putting into effect the most promising alternative, and modifying the choice of alternatives if necessary. The researchers also suggest using assertiveness skills as one way to reduce certain types of interpersonal stressors, such as refusing requests and delegating responsibilities.

The fourth type of combative coping strategy is (Matheny et al., 1986) label "tolerating stressors" that one cannot eliminate. They suggest several approaches which can be used to aid in tolerating stressors including cognitive restructuring. This approach focuses on reframing the

perceived seriousness of demands and the adequacy of one's resources. "Stressful mental sets" such as self-critical evaluations or exaggeration of potential painful experiences can cause much unneeded physiological arousal. Cognitive reframing seeks to reframe the perceived seriousness of such threats, demands and the limitations of one's resources.

The second approach to aid in tolerating stressors which cannot be eliminated is through the process of denial (Matheny et al., 1986). However, the researchers suggest that this approach is often ill-advised and should be used sparingly and only in certain situations where it can be helpful. For example, critically injured individuals whose physical condition might worsen significantly if they were to go into shock, might increase their chances of surviving major surgery by denying the seriousness of their condition.

A third strategy highlighted by the authors (Matheny et al., 1986) for tolerating stressors involves focusing on the sensations triggered by the stressor rather than on one's emotional responses. This approach allows oneself to experience a psychological distance between the stressor and oneself.

"Lowering arousal" is the fifth and final combative approach to reducing stress as discussed by the authors (Matheny et al., 1986). Lowering arousal can reduce painful emotional experiences, allow more accurate processing of information, and decrease the risk of psychophysiological

symptoms. Tension reduction can be accomplished through such approaches as exercise, deep muscle relaxation, breathing exercises, meditation, withdrawal from the stressful situation, distraction, hobbies, and other recreational activities. The authors also discuss self-disclosure as a potential strategy for reducing arousal. They cite the most direct approach to arousal reduction as being medication aimed at tranquilizing the autonomic nervous system. However, the addictive qualtities of many of these medications brings their frequent use under scrutiny.

Some techniques fit more than one category of preventative and combative coping strategies. This may be interpreted as meaning that these techniques can be applied for various purposes in coping and are therefore more versatile than other techniques. However, the model presented by Matheny et al. (1986) is formulated based the authors' perceived categories of coping and stress which are not necessarily circumscribed or definitive in nature. Therefore, the repetition of certain techniques in several categories is expected due to the lack of definitive boundaries between categories.

Self-monitoring, one of the above described combative coping techniques (Matheny et al., 1986), might enhance the effectiveness of other stress management techniques. Heightening awareness of excessive arousal would seem to

allow one to more effectively recognize sources of stress and detect stress build-up, and therefore would encourage more immediate application of stress management techniques.

Effectiveness of Stress Management Approaches

The various stress management techniques discussed above vary widely in their effectiveness and frequency of inclusion in research studies (Matheny et al., 1986). The effectiveness of these various techniques will be described to provide justification for the choice of techniques chosen for this current study. The Matheny et al. (1986) meta-analysis involves obtaining an effect size for the various stress management strategies. Effect size (ES) measures allow reporting of results of different outcome measures on a common scale. In their meta-analysis, each treatment group/comparison group/outcome measure combination was labeled as a subanalysis (SA).

One way to interpret an effect size is to make the somewhat questionable assumption of a normal distribution for effect size estimates and look up the effect size value in a table of normal distribution (Matheny et al., 1986). Therefore, an effect size of .57, for example, for a particular stress-coping treatment would suggest that the average person receiving the treatment is at the 72nd percentile of subjects in comparison groups. A negative effect size for a particular stress-coping treatment is interpreted as having a negative effect on coping outcome.

The researchers evaluated several different treatment strategies including relaxation training and cognitive restructuring (Matheny et al., 1986). The "relaxation" category was defined as including techniques which lower physiological arousal and tension such as progressive relaxation, breathing exercises, and meditation. "Cognitive restructuring" as a category was defined as involving reframing of situations, traits, or events such that they might be experienced in a less stressful manner. The reframing might be focused upon either the meaning of the demand or capacity for coping with it through one's resources.

The results of the meta-analysis indicated that relaxation and cognitive restructuring were the most widely used single-treatment domains with identical effect sizes (.62 ES for each) (Matheny et al., 1986). Their effect sizes were slightly higher than the overall effect size for the study (.57 ES) and were somewhat lower when used in combination with other techniques than when used alone (.58 ES and .62 ES for relaxation and .54 ES and .62 ES for cognitive restructuring).

"Stress monitoring" was included in the meta-analysis and involved studies which included one or more of the following forms of awareness: (a) awareness of tension build-up, (b) awareness of situations, events, and thoughts that are likely to prove stressful, and (c) awareness of

one's optimal stimulation range (Matheny et al., 1986). When used alone, stress monitoring had a negative effect on coping outcome (-.33 ES, 3 SA), possibly indicating that self-monitoring of stressors without learning treatment approaches can sensitize individuals to stressors. However, when used in combination with other treatment approaches, stress monitoring appeared helpful (.62 ES, 169 SA).

Several other domains were also evaluated for effectiveness in the meta-analysis (Matheny et al., 1986) including wellness, social support, social skills training, problem solving, positive diversions, negative diversions, and self-reference. The wellness domain included studies which focused on one's overall health and wellness and included physical fitness, proper weight control, high energy levels, and the absence of negative behaviors such as smoking and excessive drinking. This domain had the lowest overall effectiveness when used alone (-.88 ES) and when combined with other treatments (.20 ES).

The "social support" domain included articles which focused on networking of supporting friends and relatives (Matheny et al., 1986). Like the stress monitoring domain, social support was found to be most effective when used in combination with other treatments (.69 ES) than when used alone (.23 ES).

The "social skills" domain included articles which studied the effects of improving social skills through

training in assertiveness, self-disclosure, or other techniques (Matheny et al., 1986). In contrast to the stress monitoring and social support domains, social skills training had outstanding effectiveness when used alone (1.28 ES) but less effectiveness when used in combination with other treatments (.61 ES).

The "problem-solving" category included articles which studied effects of reducing the stressfulness of a stressor by strategies such as changing jobs if the stress of the job is nonnegotiable (Matheny et al., 1986). This approach was highly effective when used in combination with other treatment approaches (.74 ES) but was not evaluated by itself in any study reviewed.

Articles included in the "positive diversion" domain included strategies for dissociation from stressors such as hobbies, escape reading, and strolls (Matheny et al., 1986). In all the studies evaluated, this domain was always used in combination with other treatment approaches and had an overall effect size of .20.

The "negative diversion" category included articles which studied strategies involving the dissociation from stressors through the use of tranquilizers, alcohol, barbiturates, psychodelics, and so on (Matheny et al., 1986). The studies included in the meta-analysis always used this domain alone rather than in combination with other

treatment approaches. The overall effect size was modest (.34 ES).

Finally, a domain labeled "self-reference" involved treatment which focused on, for example, confidence building, self-esteem, and control (Matheny et al., 1986). This treatment domain was never used by itself, but always in combination with other techniques and had a slightly above average effect size (.61 ES) compared to the average effect size of the treatments evaluated in the study (.57 ES).

Overall, several of the techniques discussed above were never examined independently from other techniques (problem-solving, positive diversion, self-reference) and therefore, their contribution to the effectiveness of a stress management protocol is not known (Matheny et al., 1986). The only domain which exceeds cognitive restructuring and relaxation in overall effectiveness is the social skills training domain when used alone (1.28 ES for social skills, .62 ES for cognitive restructuring and .62 ES for relaxation). When combined with other treatment modalities the three techniques are approximately equal in effectiveness (.61 ES for social skills, .54 for cognitive restructuring, and .58 for relaxation). These results for social skills training, however, are based on a very small number of subanalyses (7 SA) as compared to cognitive restructuring and relaxation which have been studied

independently from other treatment modalities far more frequently (54 SA and 57 SA, respectively).

Effects of Stress

Stress has been linked to a variety of subjective experiences, health problems, behavioral problems, and organizational effects (Cox, 1980). Cox lists the potential subjective effects of stress as including the following: anxiety, aggression, apathy, depression, and inability to concentrate and make decisions. Health effects of stress include the following: asthma, chest and back pain, coronary heart disease, diarrhea, headaches, and migraine, insomnia, psychoses, diabetes mellitus, skin rash and ulcers. Stress has been related to behavioral problems including accident proneness, drug taking, emotional outbursts, excessive eating or loss of appetite, excessive drinking and smoking, excitability, impulsive behavior, restlessness and trembling. The organizational effects of stress include absenteeism, poor industrial relations, poor productivity, high accident rate, high turnover, low morale and job dissatisfaction. Although stress is not the sole contributor to these problems, it has been found to be related. Therefore, we can conclude that stress has widespread effects and efforts need to be made to reduce the intensity of the stress individuals experience in their daily lives.

Self-Monitoring

Self-monitoring has been defined as a two-step process: (a) the individual perceives the occurrence of a behavior and then (b) systematically records the observation (Thoresen & Mahoney, 1974). Kopp (1988) describes the multi-faceted effects of self-monitoring as including the following: (a) promoting the collection of accurate information about a behavior or problem, including relevant thoughts and feelings; (b) highlighting the environmental events related to a problem; (c) building awareness and insight in the individual; (d) providing information to help in development of treatment goals; and (e) developing individual participation and power in the treatment process (Kopp, in press).

Self-monitoring began as a behavioral technique but has been expanded into the cognitive realm and has been applied to a broad range of problems. For example, self-monitoring has been used in the treatment of a variety of problems including the following: (a) inappropriate behaviors in a delinquent male in residential treatment (Champagne, Ilk, McLaughlin, & Williams, 1980), (b) obesity in children (Epstein, McCurley, Wing, & Valoski, 1990), (c) bulimia (Gray & Hoage, 1990; Griffiths, 1989; Vanderlinden & Vandereychen, 1990), (d) depression (Hollon & Garber, 1990; Usaf & Kavanagh, 1990), (e) aphasia (Whitney & Goldstein, 1989), (f) headaches (Winkler, Underwood, Fatovich, & James,

1989), (g) articulation problems in children (Koegel, Koegel, Van-Voy, & Ingham, 1988), (h) panic attacks (Klosko & Barlow, 1987), (i) generalized anxiety disorder (Hunsley, 1988), (j) insomnia (Mangioni, 1986), (k) reduction of demoralization in parents with handicapped children (Singer, Irvin, & Hawkins, 1988), (l) and to enhance parent training programs (Sanders & James, 1982). In most of these studies, self-monitoring has been used in conjunction with other treatment approaches as part of a treatment protocol. Thus, self-monitoring of behaviors, thoughts, and feelings appears to be a useful technique when used as one component of a treatment protocol for treatment of a broad range of problems.

In the meta-analysis study of coping and stress management discussed above (Matheny et al., 1986), the authors label "stress monitoring as involving several forms of awareness including awareness of increasing tension, awareness of events, situations, and self-talk that is likely to cause stress, and awareness of one's optimal stress level. The researchers advocate that the monitoring of stress and its effects on oneself is important for knowing when to apply other stress management strategies. They propose that those individuals with well-developed "stress monitoring" skills will be more likely to notice increases in stress and tension early on, such that they can then begin using adaptive stress management techniques.

Their findings support the theory which will be more fully investigated in this study that self-monitoring (which Matheny et al. call stress monitoring) by itself is not an effective stress management technique (-.33 ES), but that when combined with other techniques self-monitoring enhances reduction of stress (.62 ES).

Possible reasons for the believed (but not yet proven) efficacy of self-monitoring of behaviors have been suggested by a variety of researchers and clinicians. Focusing an individual's attention on the behavior to be changed has been hypothesized to increase motivation for change (Best & Best, 1975). However, in a thorough review of the self-monitoring literature, Kopp (1988) concludes that neither motivation nor a desirable target behavior are necessary for reactivity to self-monitoring. Change was found to occur in both motivated and unmotivated subjects alike during the periods of self-monitoring. In addition, change occurred in both desirable and undesirable behaviors as a result of self-monitoring. Kopp (1988) also found that both positive- and negative-valued behaviors changed more if the target behavior was monitored rather than a competing response. She suggests that the possible explanations for the reactive effects of self-monitoring include: (a) change is reinforcing: (b) directing awareness cues individuals to controlling factors and offers an opportunity to change them

and; (c) directing awareness in and of itself has a modifying effect in a desireable direction.

Client-monitored data have been found to be fairly reliable (70 percent and higher) without incentives and obtrusive reliability checks (Thomas, 1976). However, accuracy has not been found to be critical for reactivity to occur (Broden, Hall, & Mitts, 1971; Hayes & Cavior, 1977; Kopp, 1988; Lippinski & Nelson, 1974; Ladouceur & Mercier, 1984; Peterson, House, & Alford, 1975).

As stated by Best and Best (1975), self-monitoring is being frequently used by clinicians and researchers. However, direct evidence for the contribution of self-monitoring is still needed.

Immediate and Long-term Effects of Self-monitoring

Kopp (1988) found that in almost all the studies of self-monitoring reviewed, change occurred within the first three weeks of monitoring, in motivated and unmotivated subjects alike. However, because most describe only brief monitoring periods (up to 4 weeks), it is not clear whether change would continue or weaken across longer periods of time in response to self-monitoring.

The data on long-term maintenance of change effects after self-monitoring is discontinued are sparse (Kopp, 1988). However, the available data is encouraging (Baldwin & Hattersley, 1984; Hallahan & Sapona, 1983; Kneedler & Hallahan, 1981). Overall, the studies found that

maintenance of change is more likely if clients are motivated.

Review of Self-Monitoring Studies in Stress Management Literature

Many studies in the area of stress management have included some form of a self-monitoring activity of the daily stressors experienced or stress management techniques used by the subjects. However, none of these studies have specifically measured the effectiveness of this self-monitoring component of their stress management treatment package.

At least five studies have been done which have included self-monitoring in the treatment protocol without examining its contribution to the treatment package. One such study which included a self-monitoring log of daily activities and use of stress management techniques was done with law students (St. Lawrence, McGrath, Oakley, & Sult, 1983). In this study, the students volunteered to participate in a stress management seminar focusing on self-relaxation training, schedule planning, priority setting, leisure time planning, and cognitive modification techniques. Throughout the training, the training group students completed daily summaries of their daily activities including time spent each day engaging in leisure time, exercise, work, or practicing the relaxation training exercise. Control group students completed the forms at the

beginning and end of treatment. The training group subjects showed pre- to post-treatment improvement on a variety of measures. Specifically, in the areas included in the daily activity records, the treatment group demonstrated increases in frequency of daily relaxation periods and daily exercise, as well as decreased ratings of daily stress. The control group demonstrated no such changes. Although this study is impressive in its breadth of stress management techniques taught and the effectiveness of the interventions, no conclusions can be drawn regarding the effectiveness of the self-monitoring logs on the outcome of the study.

A second study including a self-monitoring component to a stress management program without evaluating its contribution was done with parents of children with severe handicaps (Singer, Irvin, & Hawkins, 1988). In this study, the participants self-monitored stressful events and their physiological reactions to them. The stress management program also included progressive muscle relaxation, use of relaxation as an active coping skill, and cognitive reframing. This treatment group was compared to a waiting list control group. The treatment group was found to have significantly lower depression, as well as trait anxiety (as measured by the State-Trait Anxiety Inventory) (Spielberger et al., 1970). However, the contribution made by self-monitoring to the treatment package was not evaluated.

Another study was done in which all groups participating completed a self-monitoring log (Greene & Hiebert, 1988). In this study, 24 college students were assigned to either a meditation or a cognitive self-observation group. In the meditation group, the subjects were taught "mindfulness of breathing" exercises in which they focused primarily on their breathing for 30 minutes a day. They were also taught a "mindfulness of thinking" exercise in which they were taught to simply observe the thoughts that passed through their minds as they did the breathing exercises. Homework involved recording of their subjective experience and any thoughts that had occurred while they were practicing. The cognitive training group was modeled after the initial stages of Rational-Emotive Therapy (RET) (Ellis, 1973). Homework involved the subjects recording significant self-thoughts in their daily logs. Both groups showed significant increases in several dimensions of self-actualization (measured by the Personal Orientation Inventory; Shostrum, 1974) and decreases in stress-related symptoms (measured by the Symptoms of Stress Inventory; Leckie & Thompson, 1979). Although these results are interesting, no control group was included for comparison with the treatment groups. In addition, the importance of self-monitoring as a contributor to change was not examined.

Another study which included self-monitoring as part of the stress management treatment protocol, without exploring the unique contribution made by the self-monitoring exercise, was done with respiratory therapists (Norvell, Belles, Brody, & Freund, 1987). The researchers conducted eight weekly group sessions including topics focusing on team building exercises which involved exploration of the expectations and perceptions of group members regarding stress management and identification of the stressors that they believed were job-related. Other topics included in the eight weekly group sessions involved education about stress, deep muscle relaxation training, cognitive-behavioral exercises, communication skills, importance of social support networks, training in problem-solving skills, importance of physical fitness, good nutrition, and weight management, and specific behavioral techniques such as self-monitoring and behavioral contracting for modification of various health-related behaviors. The wait-list control group was assessed at the beginning and end of the study, but received no treatment intervention.

Compared to the wait-list control group, the treatment group demonstrated significant improvements in intensity of hassles experienced (using the Hassles Scale; Kanner, Coyne, Schaefer, & Lazarus, 1981) and intensity of emotional exhaustion (on the Maslach Burnout Inventory; Maslach & Jackson, 1981) (Norvell et al., 1987). Again, however, the

unique contribution of self-monitoring to these results was not studied, nor was self-monitoring as a cause of change examined by itself.

Telch and Telch (1986) also included self-monitoring as an active component of a stress management treatment package in a study done with cancer patients. The goal of the treatment was to enhance the patients' adjustment to their disease. The researchers compared a comprehensive group coping skills training group and a supportive group therapy group with a no-treatment control group. The support group sessions were nondirective and focused on the mutual sharing of feelings and concerns. The coping skills training group involved instruction in (a) relaxation and stress management, (b) assertive communication, (c) cognitive restructuring and problem-solving, (d) feeling management, and (e) pleasant activity planning. Self-monitoring was included in group coping skills treatment as one of several behavioral strategies to help in implementing the various skills. The results indicated that the group coping skills treatment was more effective in improving psychological adjustment than the supportive group therapy on a variety of measures. The no-treatment control group showed significant deterioration in psychological functioning. This study, as well as the others reviewed above, indicates that self-monitoring may be an active and effective treatment component of a stress management package. However, the

unique contribution of self-monitoring to the treatment was not examined in any of these studies.

A study was done in which self-monitoring was included as part of both the treatment and control groups as a measure of change (Woolfolk, Lehrer, McCann, and Rooney, 1982). In this study, subjects were recruited from advertisements in local newspapers and were placed in either a meditation, progressive relaxation, or self-monitoring control group. All three groups monitored their stress symptoms and mood states on a daily basis. The stress symptom questionnaire included items measuring somatic and cognitive arousal (Davidson and Schwartz, 1976) and mood state was measured with a 28-item Adjective Checklist adapted from Gough and Heilbrum (1965). All three groups were given the SCL-90 (Derogotis, 1977), the IPAT anxiety inventory and the Lehrer-Woolfork Anxiety Symptom Questionnaire (Lehrer and Woolfolk, 1982) as pre- and post-measures.

Interestingly, the self-monitoring group showed a significant reduction on the Apprehension scale (subscale O) of the IPAT (Woolfolk et al., 1982). The meditation and PMR groups showed significant changes on several subscales of the IPAT and SCL-90. However, as with the previous study discussed, this study did not compare the effects of self-monitoring in combination with stress management techniques with the effects of the stress management techniques alone.

However, since they did find that the group which did daily self-monitoring experienced changes in apprehension as measured by the IPAT, the study indicates that self-monitoring alone may produce some change.

Another study was done in which self-monitoring of stressors was included in both the treatment and control groups and used as a measure of change. Federer (1984) conducted a study of job stress in which she compared cognitive-behavioral treatment, an educational-motivational program, and a waiting list control group in changing subjects psychological, physiological, and perceptions of their behavioral reactions to job stress. The cognitive-behavioral treatment group included components of progressive relaxation, assertiveness training, cognitive-restructuring, and specific behavioral techniques such as modeling, role playing, and self-monitoring of behavior. The educational-motivational treatment program taught subjects about stress and its harmful effects. A motivational component was also included to increase committment of subjects to modify their stress-producing behavior. The waiting list control group was assessed with the various measures but not given any treatment.

The self-monitoring component for the measurement of change in the groups involved assessing the number of stressful experiences the participants encountered at work (Federer, 1984). They were also asked what happened

immediately before and after the stressful event. The subjects were asked to self-monitor one week prior to treatment, during the week immediately following treatment, and during a week three months after treatment. The average frequency of stressful experiences for each of the weeks was used for the group means.

The Cognitive-Behavioral Group was superior to the Educational-Motivational Group in changing their perceptions of stressful experiences at work (as measured by a self-report of number of stressful experiences encountered at work) (Federer, 1984). The Educational-Motivational Group actually increased in their perception of stressful experiences at work. Federer concludes that merely providing knowledge about stress is insufficient in helping an individual to change his or her reaction to stress.

Self-monitoring was studied in a no-treatment group to evaluate for change due to demand or suggestion in an unusual study by Borkovec, Grayson, and Cooper (1978). In this study, the authors compared the effects of a no-treatment condition or demand/suggestion on the self-monitoring of daily tension to four subsequent sessions of progressive relaxation in overly tense college students. Unlike the studies previously discussed by Norvell et al. (1987) and St. Lawrence et al. (1983) self-monitoring was considered a noninfluential component of the no-treatment condition. Subjects in the demand wait-list group were told

that research had shown self-monitoring of a problem to result in a reduction of the problem and that they could expect such a reduction to occur in their tension level and severity. Subjects in the no demand wait-list group were given no such suggestion. The results revealed no effects due to demand or no-treatment factors. The study found that regardless of whether or not subjects were in the no-treatment condition or the demand/suggestion condition of the waiting group component, their daily tension percentage and severity was unaffected by self-monitoring. These results conflict in their conclusions with those found by Woolfolk et al. (1982) whose subjects in the self-monitoring wait-list group demonstrated a reduction on the Apprehension scale of the IPAT. However, the difference in measures used to assess for change may account for the difference in results.

In contrast to these previous studies discussed, this current study explored the possibility that when paired with active stress management techniques, self-monitoring of stressors and individual responses to stress becomes an active treatment component which adds to the effectiveness of a stress management package. However, by itself, self-monitoring was not hypothesized to be an effective stress management technique. Self-monitoring of stressors and one's reaction to these stressors seem to be the two most commonly used self-monitoring approaches (Borkovec et al.,

1978; Federer, 1984; Norvell et al., 1987; Singer et al., 1988; Woolfolk et al., 1982). A third approach (discussed by Matheny et al., 1986) involving awareness of one's optimal stimulation range is difficult to measure and was not included in this study.

Relaxation Training for Stress Management

Various forms of relaxation training have been studied in relation to stress reduction. Techniques which have been used successfully have included Jacobsonian progressive muscle relaxation, breathing exercises, autogenic training, meditation and guided imagery. Relaxation techniques have been used for treatment of general "stress" as well as for more specific problems such as anxiety, migraine headaches, cardiology-related problems, and others.

Several studies have been done examining the effects of relaxation training on general "stress reduction" as measured by a variety of measures. One such study was done comparing meditation and progressive muscle relaxation with a self-monitoring control (Woolfolk et al., 1982). Subjects in the progressive relaxation group were trained using a procedure adapted from Jacobson's (1964) manual. Each of the five sessions focused on teaching about relaxation in one portion of the body. The meditation group was taught the basic Clinically Standardized Meditation (CSM) technique (Carrington, 1977) in addition to several types of mantra meditation. The self-monitoring control group completed

daily records of their stress symptoms and mood states, as did the treatment groups. However, the self-monitoring control group received no treatment, but participated in the pre-testing and post-testing sessions.

The two treatment groups experienced significantly reductions in depression, anxiety, and global symptom indices (as measured by the SCL-90) (Woolfolk et al., 1982). The Progressive Muscle Relaxation group also reported significant reductions in hostility and obsessive-compulsive symptoms (as measured by the SCL-90) while the Meditation group experienced significantly decreased tension, apprehension and overt anxiety (as measured by the IPAT anxiety inventory). The self-monitoring control group showed significant reductions in apprehension (according to the IPAT), but showed no other significant reductions on the IPAT or SCL-90. Overall, the researchers concluded that the treatments demonstrated few differential effects.

Another study targeted at general "stress reduction" was done comparing relaxation training to a control group (Elkins, Anchor, & Sandler, 1978). The treatment group received training in progressive deep-muscle relaxation which included muscle tensing and autogenic training. The control group recieved no experimental treatment. The results indicated that the relaxation training group experienced a significant reduction in both EMG and STAI (State-Trait Anxiety Inventory; Spielberger et al., 1970)

scores compared to the control group. This study provides additional support for the use of relaxation training as an effective stress management technique for reduction of muscle tension and anxiety.

Relaxation training was compared to cognitive coping and to a combination of relaxation and cognitive coping treatment in another study focusing on "stress reduction" (Hillenberg & Collins, 1986). The relaxation training group received training in progressive relaxation training. The cognitive coping group was given homework assignments involving the self-monitoring of negative self-statements and stress responses, and the monitoring of coping self-statements and responses. The combined treatment group received both types of training. These three treatment groups were compared to a delayed treatment group. The results indicated that all three treatment groups were significantly lower than the delayed treatment control at post-treatment on the Trait Anxiety Scale of the STAI (Spielberger et al., 1970). This study supports the idea that both procedures, relaxation training and cognitive interventions, either individually or in combination produce similar improvements in functioning.

In a study focusing on reduction of work-related stress, progressive relaxation was compared to aerobic exercise (Long & Haney, 1988a). Both treatments were found to reduce trait anxiety (as measured by the Trait Anxiety

Scale of the STAI; Spielberger et al., 1970) and increase self-efficacy (as measured by the General Self-Efficacy Scale; Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs, & Rogers, 1982) from pre- to post-treatment and these effects were maintained at a 14-month follow-up (Long & Haney, 1988b). This study supports the notion that relaxation training is equally effective as aerobic exercise in stress reduction. However, this study has a methodological weakness in that no control group was included for comparison thus making it difficult to draw definite conclusions about the causes of the changes experienced by the treatment groups.

Another study focusing on the reduction of work-related stress was done comparing relaxation training (RT), a multicomponent stress management group (MSM), and an education/social support group (ES) (Sallis, Trevorrow, Johnson, Hovell, & Kaplan, 1987). The participants in the RT group were taught 16 muscle group progressive muscle relaxation, four muscle group relaxation, total body relaxation, deep breathing relaxation, and mental imagery. The subjects were given audiotapes with instructions for home practice. Subjects in the MSM group were presented with various topics including identifying stress responses, using social support, cognitive restructuring, changing Type A behavior, selecting coping strategies, becoming appropriately assertive, and maintaining effective coping

habits. These subjects were also taught the relaxation strategies that the RT group received. The emphasis in the ES group was education about the deleterious effects of stress. These subjects received presentations on life events, interpersonal stress, work stress, physiology of stress, and stress and heart disease. The benefits of social support were also highlighted. However, behavioral suggestions for managing stress were not provided as they were in the RT and MSM groups.

The results indicated that no group was more effective than the others (Sallis et al., 1987). Anxiety (as measured by the STAI; Spielberger et al., 1970) decreased significantly in all groups from baseline to follow-up. Depression (as measured by the Beck Depression Inventory; Beck, Ward, Mendelsohn, Mock, & Erbaugh, 1961) and hostility (as measured by the MMPI Hostility subscale; Cook & Medley, 1954) were significantly lower than baseline in all groups at post-test and follow-up. Based on the results of this study, relaxation training again appears to be as effective as other forms of stress management. However, like the study discussed above by Long and Haney (1988a, 1988b), no control group was included in this study. Therefore, no firm conclusions can be drawn based on these results.

Several studies have examined the effects of relaxation training on specific stress-related disorders and symptoms. In a study examining the effects of relaxation training on

anxiety, Cragan and Deffenbacher (1984) compared Anxiety Management Training (AMT) and Relaxation as Self-Control (RSC) in reducing stress in a group of generally anxious medical outpatients to a waiting-list control group. The AMT group received training based on Suinn's (1977) model involving relaxation training, visual imagery of moderate- and high-stress situations, and use of coping skills to then reduce arousal. These subjects also completed homework involving real-life applications of relaxation training. The RSC subjects received relaxation training following the four-phase model of Deffenbacher and Snyder (1976). The model involved the learning of relaxation as an active coping skill. Subjects were taught to become aware of internal cues of the stress response, kept a stress log, and tracked tension within sessions. The participants were trained in progressive relaxation with Goldfried's (1971) modifications for a self-control emphasis and three types of relaxation training: (a) cue-controlled relaxation, (b) deep-breathing procedures, and (c) relaxation without tension. Homework involved application of coping skills to everyday life. The waiting-list subjects were told that treatment would be delayed 3 months but were asked to complete questionnaires periodically.

At post-treatment and follow-up assessments, the AMT and RSC groups reported experiencing significantly less trait anxiety, state anxiety (as measured by the STAI,

Spielberger et al., 1970), stress reactivity in two stressful situations, general physiological arousal (as measured by the Anxiety Symptom Checklist; Edie, 1973), person-specific anxiety symptoms, depression, and anger (as measured by the MAACL; Zuckerman & Lubin, 1965) than the control group (Cragan & Deffenbacher, 1984). Only one difference was found between the AMT and RSC groups at post-treatment. The AMT group reported significantly less trait anxiety than the RSC group. However, at follow-up this difference disappeared. No between group differences were found on systolic or diastolic blood pressure or in resting heart rate post-treatment. However, at follow-up, the RSC group had a significantly lower heart rate than the control group. This study supports the effectiveness and long-term durability of effects of relaxation training.

Bohachick (1985) examined the effects of progressive relaxation training as a stress management technique for cardiac patients who were receiving treatment in a cardiac exercise program. One group received three weeks of relaxation training in addition to their exercise therapy. A control group was not taught the relaxation techniques, but received the regular exercise program. Results indicated that at post-treatment, the treatment group experienced significantly lower anxiety (as measured by the Anxiety State Scale of the State-Trait Anxiety Inventory, Spielberger et al., 1970, and the Anxiety symptom dimension

of the SCL-90-R, Derogatis, 1977), somatization, interpersonal sensitivity, and depression (as measured by the SCL-90-R) than the control group. However, the treatment group did not experience significant reductions in the obsessive-compulsive or hostility dimensions (SCL-90-R), as had been expected. Bohachick suggests that possibly other stress management techniques other than relaxation training might be necessary to reduce these symptoms.

A variety of other studies have been done examining the effectiveness of relaxation training on general "stress reduction," as well as on more specific stress-related disorders and symptoms. Although not all studies have found relaxation training to be superior to other stress management techniques (Deffenbacher & Hahnloser, 1981; Hutchings, Denney, Basgall, & Houston, 1980), the meta-analysis done by Matheny et al. (1986) provides support for the overall consistency of effectiveness of relaxation training for stress management.

Biofeedback Versus Relaxation Training

Various forms of biofeedback training have been evaluated in comparison to relaxation training without biofeedback. However, many studies have found relaxation training without biofeedback to be as effective as relaxation training with biofeedback in the treatment of such problems and disorders as migraine headaches (Holmes & Burish, 1983), anxiety (Ricklin, Onoda, & Doyle, 1982),

hypertension (Stambrook, Hoffman, & Benson, 1983), psychiatric and psychosomatic disorders (Rickles et al., 1982). In this study, relaxation training was not supplemented with biofeedback training.

Self-Efficacy

Bandura (1977) proposes that all behavior change is mediated through changes in self-efficacy. He defines self-efficacy as the belief that one has the ability to behave in such a way as to produce desireable outcomes.

Bandura's theory (1977) states that self-efficacy expectancies may vary on three dimensions. First, the magnitude or level of efficacy refers to an individual's degree of possible performance of a given behavior. Secondly, the strength of the efficacy is defined as the person's confidence that he or she can perform at a given level. Thirdly, the individual's efficacy expectations can differ in generality. Some experiences develop specific, circumscribed mastery experiences, while others develop a more generalized sense of efficacy which extends beyond the specific situation. When an individual's experience of self-efficacy is enhanced he or she will be more likely to engage in coping behavior, he or she will exert more effort in doing so, and will sustain his or her effort for longer periods of time in the face of obstacles and adverse experiences. According to Bandura's model (1977) expectations of personal efficacy are obtained from

performance accomplishments, vicarious experience, verbal persuasion, and physiological states.

A variety of studies have been done suggesting that self-efficacy predicts behavior across a wide variety of behaviors (Litt, 1988). The behavioral areas which have been examined include specific phobias (Bandura, Adams, Hardy, & Howells, 1980; Biran & Wilson, 1981), social skills (Kazdin, 1979; Lee, 1984), vocational choice (Betz & Hackett, 1981), recovery from heart attacks (Bandura, 1982), smoking cessation (Condiotti & Lichtenstein, 1981), sports performance (Feltz, Landers, & Raeder, 1979; Lee, 1982), depression (Davies & Yates, 1982; Kanfer & Zeiss, 1983), motivation (Bandura & Cervone, 1983), achievement behavior (Bandura & Schunk, 1981; Collins, 1982; Schunk, 1984), and pain experience and management (Manning & Wright, 1983; Neufeld & Thomas, 1977)

Stress management is an area in which researchers have begun to examine the relationship between changes in self-efficacy and successful stress reduction. One commonly used measure of self-efficacy used in the area of stress management is the General Self-Efficacy Scale (Sherer et al., 1982). This scale consists of 17 items each with a 14-point Likert scale where high scores indicate high self-efficacy.

One study providing support for Bandura's theory of self-efficacy and using the General Self-Efficacy Scale

(Sherer et al., 1982) was conducted by Long and Haney (1988a). This study evaluated the effects of aerobic exercise versus progressive relaxation on self-efficacy, as well as other measures. The 61 stressed sedentary working women used as subjects were treated over eight sessions with either aerobic exercise or progressive relaxation. A control group was not included in the study. The General Self-Efficacy Scale (Sherer et al., 1982) was administered at the beginning of the first treatment session, at the end of treatment, and eight weeks later. A no-show/dropout group was also evaluated on the measures at the beginning of the study. Compared to treatment groups, this group's mean score for self-efficacy was considerably higher at the initiation of the study than the treatment group's score. These results indicate that the no-show/dropout group was possibly more self-efficacious than the treatment group. For the treatment groups, self-efficacy increased in both groups over treatment and did not change from post-test to follow-up. The two treatment groups did not appear to differ in the degree of change in self-efficacy indicating that relaxation training and aerobic exercise were equally effective in increasing self-efficacy.

Several other studies have used the Self-Efficacy Scale developed by Coppel (1980). One such study was conducted by Long (1984) in which community residents participated in a study comparing the efficacy of a jogging program (aerobic

conditioning) with stress-inoculation training and a waiting list control in the treatment of chronic intermittent stress. The subjects were given the Self-Efficacy Scale (Coppel, 1980), as well as other pre-, post-measures and were assessed at a 3-month follow-up to the 10 weeks of therapy. Both treatment groups resulted in significantly increased perceived self-efficacy from pre- to post-testing and from post-testing to follow-up.

A follow-up study was done by Long (1985) with the subjects in her 1984 study 15 months after termination of treatment. Both groups experienced increased perceptions of self-efficacy at 15 month follow-up as compared to post-treatment measures. This was true for the aerobic conditioning group in spite of the fact that only 40% of the retained subjects in the aerobic group were still regularly jogging an average of three times per week. Long concludes that the subjects in the aerobic group, whether they continued to jog regularly or not, had developed a sense of mastery or a belief in their coping skills through earlier participation in the group.

Another study using Coppel's Self-Efficacy Scale (1980) was done by Smith and Nye (1989). This study also found support for Bandura's self-efficacy theory and the positive relationship between stress management training and increased self-efficacy. In this study, undergraduates with high levels of test anxiety were taught cognitive-

behavioral coping skills involving either covert rehearsal or induced affect. The training programs combined elements from stress inoculation training (Meichenbaum, 1977, 1985) and cognitive-affective stress management training (Smith, 1980). The treatments involved three major phases: (1) a conceptualization phase, (2) a coping skills acquisition phase, and (3) a rehearsal phase during which the skills were practiced. The two treatment groups differed only in the rehearsal phase during which either the covert-rehearsal or the induced-affect procedure was used to practice the cognitive and somatic coping skills. The Self-Efficacy Scale (Coppel, 1980) was used as a generalized measure of self-efficacy. The two groups showed greater improvements in self-efficacy than the control group but did not differ significantly from one another. This study provides further support for Bandura's theory (1977) and also provides support for the theory of Goldfried and Robins (1982) which suggests that generalized efficacy expectations may be fostered by cognitive behavioral programs that teach coping skills under conditions that encourage self-attributed mastery experiences.

Other studies have used unique self-efficacy measures often developed for a particular target problem in measuring change. One such study was done with speech-anxious students who received either stress inoculation treatment (modeled after format developed by Meichenbaum, 1977),

participant modeling (modeled the format suggested by Bandura, Jeffery, and Gajdos, 1975), or no treatment (Altmaier, Leary, Halpern, & Sellers, 1985). Post-treatment assessment indicated that subjects in the stress inoculation group experienced higher levels of confidence (self-efficacy) as measured through number of confident thoughts (measured through inductive thought listening; Caccioppo & Petty, 1981) than those in the participant modeling treatment or subjects receiving no treatment. The students in the participant modeling group experienced more confident thoughts than did students receiving no treatment. When confidence (self-efficacy) was measured with a 20-item self-report confidence inventory (focusing on confidence or a lack thereof during a speech) before their post-treatment speech, treatments resulted in equivalent levels of confidence. This study provides further support for the hypothesis that self-efficacy is enhanced by the training of stress management techniques.

Another study using a specific measure of self-efficacy developed by the authors to evaluate the effectiveness of the treatment programs was done with insomniacs (Kirmil-Gray, Eagleston, Thoresen, & Zarcone, 1985). Brief consultation and stress management techniques were evaluated in their effectiveness at helping insomniacs withdraw from sleep medication. The brief consultation program consisted of education about medication withdrawal procedures and

brief consultations with a project therapist for questioning about their medication withdrawal and sleep patterns. The stress management treatment involved training in specific skills to reduce physical tension and mental arousal, as well as group meetings and peer support for behavior change. The self-efficacy measure required the subjects to decide if they could perform each of a series of increasingly difficult behaviors related to reduction of medications and sleep patterns. All 12 subjects successfully withdrew from sleep medication and showed a number of improvements independent of the treatment received including increased self-efficacy.

A specific measurement of self-efficacy was developed by the authors and included in a study of women from dual-earner families who participated in a stress management study comparing time-management training and social support (King, Winett, & Lovett, 1986). The participants were assigned to either time management plus group support, time management only, group support only, or a delayed-treatment control condition. Self-efficacy was measured using a 55-item efficacy expectation rating form based on Bandura's self-efficacy theory (Bandura, 1977) and focusing on the respondents' ability to cope with the dual-earner pattern. The women receiving time-management instruction reported significant increases in self-efficacy relative to the women in the support only or delayed-treatment control conditions.

As discussed in these studies, support has been found for the hypothesis that self-efficacy is enhanced by stress management techniques. Therefore, one can conclude that learning stress management techniques increases people's sense that they can successfully accomplish their goals. Self-efficacy was further examined in this current study as a target for change by stress management techniques, self-monitoring most specifically.

Stress and Anxiety

As discussed above, anxiety is a common symptom of stress. A variety of stress management techniques have been applied specifically to the treatment of anxiety such as anxiety management training (Suinn, 1976), cognitive restructuring (Deffenbacher & Hahnloser, 1981; Hillenberg & Collins, 1986), aerobic exercise (Long & Haney, 1988a and 1988b), and relaxation training (Bohachick, 1984; Hutchings et al., 1980). A variety of anxiety measures have been used, as well, such as the Taylor Manifest Anxiety Scale (Taylor, 1953), the Multiple Affect Adjective Checklist (Zuckerman & Lubin, 1965), and the Profile of Mood State (McNair, Lorr, & Droppleman, 1971). However, the measure which has probably been used the most frequently in the stress management literature as a measure of anxiety is the State-Trait Anxiety Inventory (STAI; Spielberger et al., 1970).

The STAI is divided into two separate self-report scales, measuring "state anxiety" (A-State) conceptualized as a transitory emotional condition, and "trait anxiety" (A-Trait), a relatively stable disposition to perceive situations as dangerous. Each scale is composed of 20 items, each item with a 4-point scale. The reliabilities and validities of these scales are well established, and the scales are widely used.

Single-Modal Treatment Approaches

One of the studies previously discussed (Long, 1984) used the STAI (Spielberger et al., 1970) as an outcome measure for the treatment interventions which included an aerobic conditioning program (AC), stress-inoculation training (SIT), and a waiting list control (WL) in the treatment of chronic stress. The STAI was administered at pre-test, post-test, and 3-month follow-up. Both the AC and SIT groups experienced significantly reduced state and trait anxiety when tested at the end of treatment. The subjects maintained these reductions in anxiety at the 3-month follow-up.

A follow-up study was done by Long (1985) of her 1984 study in which subjects were reassessed 15 months after the conclusion of the study. Long found that both treatment groups maintained their reductions in both state and trait anxiety.

A somewhat similar study to the ones discussed above (Long, 1984 and 1985) in the inclusion of an aerobic training treatment and follow-up study was done by Long and Haney (1988a) (discussed above). This study also included the Trait Anxiety Inventory of the STAI (Spielberger et al., 1970) as an outcome measure of the effectiveness of aerobic exercise and progressive relaxation training. Both treatment groups showed significant reductions in trait anxiety from pre- to post-treatment and maintained these reductions at 8-week follow-up.

A follow-up study was done by Long and Haney (1988b) 14 months after treatment. The researchers found that the participants in both the aerobic exercise and the progressive relaxation groups were maintaining treatment effects on self-efficacy, with even further decreases in trait anxiety from post-test to follow-up.

Some studies using the STAI (Spielberger et al., 1970) as a measure of change have been done with specific target symptoms. One such study was done by Bosley and Allen (1989) with hypertensives. The subjects were assigned to one of the following groups: cognitive self-management training (CSM), attention placebo control (APC), or current clinic conditions control. Both the cognitive self-management training and attention placebo control groups met for eight weekly 45-minute sessions in groups of three to six members. Subjects in the current clinic conditions

control group received only regular clinic care. The results of the study indicate that the CSM group experienced significant reductions in state anxiety compared to the two control groups whose means were virtually equal and unchanged. However, the CSM group did not demonstrate significant changes in trait anxiety, inconsistent with the prediction made.

The authors suggest that the length of time between pre- and post-testing was too brief for subjects to alter their characterization of themselves in terms of trait anxiety (Bosley & Allen, 1989). However, other studies have had shorter or identical pre- to post-testing periods and have found significant reductions in trait anxiety (Cragan & Deffenbacher, 1984; Holtzworth-Munroe, Munroe, & Smith, 1985; Hutchings, Denney, Basgall, & Houston, 1980; Long and Haney, 1988a,1988b; West, Horan, & Games, 1984; Woods, 1987; Yorde & Witmer, 1980). However, these studies typically included a wider age range of subjects with younger subjects included, thus leading to possible hypotheses that the limited age range of subjects (ages 41-68) included in the Bosley and Allen (1989) study may be related to the failure to find significant reductions in trait anxiety.

Another study targeting a specific problem and using the STAI (Spielberger et al., 1970) as an outcome measure was done by Smith and Nye (1989). The study involved the comparison of the effectiveness of the cognitive-behavioral

coping skills of covert rehearsal to induced affect in reduction of test anxiety also included the STAI (Spielberger et al., 1970) as an outcome measure. The results of this study indicate that covert rehearsal caused reductions in trait but not state anxiety. In the induced-affect treatment group, improved test performance (measured with Sarason's Test Anxiety Scale; 1978) was highly correlated with reductions in state anxiety. The authors concluded that the two rehearsal techniques may cause acquisition and utilization of different types of coping skills.

Like the study discussed above by Smith and Nye (1989), a study by van Hassel, Bloom and Gonzalez (1982) also targeted a specific treatment group, namely schizophrenic outpatients. They compared the effectiveness of Anxiety Management Training (Suinn & Richardson, 1971) to Applied Relaxation Training in the reduction of generalized anxiety. A non-treated wait-list control group was also included in the study. The results indicated that the treatment groups were equally effective in reducing generalized anxiety as measured by the STAI (Spielberger et al., 1970) in contrast to the wait-list control group.

Similarly to the study by van Hassel et al. (1982) discussed above, a study by Cragan and Deffenbacher (1984) compared the effectiveness of Anxiety Management Training (AMT) (Suinn, 1977) and a relaxation treatment group (which

they called Relaxation as Self-Control; modeled after Deffenbacher and Snyder's technique, 1976) with a waiting-list control group in the reduction of anxiety. The participants were generally anxious medical outpatients and were assessed with a variety of measures including the STAI (Spielberger et al., 1970). At post-test and four-week follow-up, both the AMT and RSC treatment groups demonstrated significantly reduced state and trait anxiety as compared to the control group.

Similarly to the last two studies discussed (van Hassel et al., 1982; Cragan & Deffenbacher, 1984), a study was done with generally anxious subjects in which anxiety management training (AMT) (modeled after Suinn's protocol, 1977), applied relaxation training (ART), relaxation-only (RO), placebo (PL), and untreated control (UTC) groups were compared in effectiveness with the use of the STAI (Spielberger et al., 1970), as well as other measures (Hutchings, Denney, Basgall, & Houston, 1980). The AMT group included instruction in relaxation training, relaxation homework assignments, structured rehearsal (which involved visualizing an anxiety provoking scene, then switching it off, and practicing relaxing away the anxiety), and in vivo application. The ART group was similar to the AMT group but omitted structured rehearsal, substituting more elaborate relaxation instructions in its place. The RO group was similar to the ART group, except that there was no

structured rehearsal or in vivo application. The PL groups were shown videotapes dealing with psychological topics and were told that subliminal frames had been implanted in the tapes and would unconsciously extinguish the subjects' anxiety. The NTC group completed the assessment batteries but did not receive any intervention.

The results revealed that the AMT group scored significantly lower on the trait form of the STAI than the RO, PL, and UTC groups and the ART group scored significantly lower on trait anxiety than the UTC group (Hutchings et al., 1980). The AMT and ART groups also scored significantly lower on state anxiety than the UTC group.

A study was done using the Trait Anxiety Scale of the STAI (Spielberger et al., 1970) as a measure of outcome and in which cognitive therapy (Rational-Emotive Therapy; Ellis, 1962) was the primary treatment component involved in a stress management workshop (Woods, 1987). The participants were employees of a large department in a corporation and were not volunteers. They were trained in a lecture/discussion format with the focus of the training on RET concepts and their application to the reduction of stress. The results indicated that the participants experienced a significant reduction in trait anxiety as measured by the STAI (Spielberger et al., 1970).

Multimodal Treatment Approaches

Unlike the previous studies discussed, a study by Holtzworth-Munroe, Munroe, and Smith (1985) used a multicomponent treatment approach (as opposed to a single component treatment approach) and compared this with a control group using medical school students as subjects. The STAI (trait anxiety) (Spielberger et al., 1970) was used as a measure of change. The treatment group consisted of training in progressive muscle relaxation, cognitive techniques for changing maladaptive cognitions, and a meditation technique for reduction of general stress levels. The treatment group met for six weekly meetings each lasting for one hour. The results indicate that, at the ten-week follow-up, the subjects in the treatment group experienced lower levels of trait anxiety (although not reaching the significance level) than the control group.

Like the study discussed above by Holtzworth-Munroe et al. (1985), another was done by Allen and Blanchard (1980) using a multimodal treatment approach for stress reduction and using the STAI (Spielberger et al., 1970) as an outcome measure. However, unlike the studies mentioned above, this one did not find significant results. In this study, middle-level business managers were taught EMG biofeedback, progressive relaxation and breathing exercises, cognitive stress management, and generalization techniques. Participants in the control groups were either given the

assessment procedures only or the assessment procedures with six once-weekly discussions of stress on both an individual and group basis. However, no specific techniques for stress reduction were taught in this discussion group.

The results as measured by the STAI as well as a wide variety of other measures did not indicate any significant advantage for the treatment group (Allen & Blanchard, 1980). The authors suggested several possible reasons for the lack of consistent, significant effects including the idea that perhaps there may be limits on the potential for stress management training to change characteristic work behavior, largely due to the fact that the reward system in a large organization is based upon productivity and hard work. They also suggested that possibly biofeedback-based stress management training may be more effective with certain individuals than with others. For example, they suggested that perhaps biofeedback-based stress management training may be effective in the treatment of psychophysiological disorders but not effective in general stress reduction. They base these suggestions upon anecdotal information received from participants in the study.

Like the previously discussed study by Allen and Blanchard (1980), a study by Yorde and Witmer (1980) also included a multicomponent treatment approach and a biofeedback treatment component for stress reduction. The STAI (Spielberger et al., 1970) was used as an outcome

measure in comparing the treatment groups which included a lecture-discussion format presenting cognitive and relaxation skills, a biofeedback training treatment group, and a combination of these treatment approaches. As indicated by the STAI (both state and trait components), the lecture-discussion format was effective in reducing stress. However, similarly to the study by Allen and Blanchard (1980), EMG biofeedback training was not found to contribute to the reduction of stress.

A study by Keller, Guzman and Culen (1985) also included a multimodal treatment package for stress reduction. Adults with cystic fibrosis participated in a six-week treatment program involving training in relaxation, cognitive techniques, and discussion on life-style (including the topics of drug and alcohol abuse, leisure, and nutrition). Assessment with the use of the STAI (Spielberger et al., 1970) was done before and after a six-week non-intervention control period and after a six-week training program. The results revealed significant decreases in both state and trait anxiety from pre- to post-test assessment.

Another multimodal treatment approach was used by West, Horan and Games (1984) using the STAI (Spielberger et al., 1970) as a measure of change. This study examined the contribution of the components of a stress inoculation approach to occupational stress reduction in nurses working

in an acute care hospital setting. The nurses were assigned to one of four active treatment groups or to a no treatment group (NT). The four treatment groups consisted of stress inoculation training (SIT) (consisting of education, coping skills training, and exposure to simulated stressors), coping skills training (CS) (which consisted of relaxation training, assertiveness training, cognitive restructuring, and time management instruction), exposure to simulated stressors (Ex), and education (Ed). The SIT and CS groups were found to have significantly lower levels of both state and trait anxiety than the other treatment and no- treatment groups when measured at post-test and four-month follow-up, suggesting that SIT may be an effective treatment, and coping skills training may be its principal ingredient.

These previously discussed studies provide support for the hypothesis that stress management techniques may reduce state and/or trait anxiety in many subjects. The stress management techniques included in these studies must then have in common an excessive arousal reducing component, since anxiety appears to be a disorder of excessive arousal. This current study also included an excessive arousal reducing component, namely relaxation training. The State-Trait Anxiety Inventory (Spielberger et al., 1970), a popular and robust measure of state and trait anxiety as discussed above, was included in this current study as a

dependent measure of the effectiveness of stress management techniques on anxiety.

Stress and Depression

Stress has been linked to depression through the adrenal cortical stress axis (hypothalamic-pituitary-adrenal cortical system) as described above. When active coping is not possible, and the individual perceives a lack of control over their situation, this stress axis is activated (Everly, 1989; Frankenhauser, 1980; McCabe & Schneiderman, 1984).

A variety of stress management techniques have been applied with measurement of changes in depression as a dependent variable. For example, Bohachick (1984) studied the effects of progressive relaxation training (PMR) as a stress management technique for cardiac patients who were participating in a cardiac exercise program. The treatment group received three weeks of PMR training while the control group received only the cardiac exercise program. On the depression scale of the SCL-90-R (Derogatis, 1977), the treatment group scored significantly lower than the control group at post-test.

Another study, this one using the Cornell Index (Weider, Wolfe, Brodman, Mittelmann, & Wechsler, 1948) as a measure of depression, taught stress management skills to women on public assistance (Tableman, Marciniak, Johnson, & Rodgers, 1982). The women were taught stress management strategies including relaxation training, redefining the

situation, and positive self-talk. They were also taught self-esteem enhancement and life planning during the 10-week training program. The treatment group demonstrated significant reductions in depression compared to a no-treatment control group.

Depression was measured using the Profile of Mood States (McNair et al., 1971) in a stress management training study with multiple sclerosis patients (Crawford & McIvor, 1987). The patients were taught relaxation, cognitive, and behavioral strategies for stress management. Compared to a control group who received no training, the treatment group reported significantly less depression (as measured by the POMS) at the conclusion of the 13-week study.

A 12-week study with insomniacs used the Depression subscale of the MMPI as a dependent variable (Kirmil-Gray, Eagleston, Thoresen, & Zarcone, 1985). Subjects were taught relaxation and cognitive skills to reduce stress, improve sleep, and decrease reliance on medication. Treatment subjects were compared to a control group who received only brief consultation which simulated the amount and type of attention a physician might offer patients in clinical practice. Subjects in the stress management training group demonstrated significantly lower ($p < .10$) depression than those in the brief consultation group.

A popular and robust measure of depression which has been used frequently in the stress management literature is

the Beck Depression Inventory (BDI) (Beck, Ward, Mendelsohn, Mock, & Erbaugh, 1961) and a new, revised version (Beck, Rush, Shaw, & Emery, 1979). One study to use the BDI involved stress management training for parents of children with severe handicaps (Singer, Irvin, & Hawkins, 1988). In this study, parents were taught self-monitoring of stress, progressive muscle relaxation, use of relaxation as an active coping skill, and cognitive reframing. Compared to a waiting-list control group, the treatment group showed significant reductions in depression as measured by the BDI.

A cognitive retraining stress management program focusing on Rational-Emotive Therapy with employees in a large corporation also used the Beck Depression Inventory (Beck et al., 1961) as a measure of depression (Woods, 1987). This 4-week treatment program did not include a control group, a weakness of the study. However, the treatment group did demonstrate a significant reduction in depression on the BDI from pre- to post-test.

Another study using the BDI (Beck et al., 1961) also involved training of employees in stress management skills (Sallis, Trevorrow, Johnson, Hovell, & Kaplan, 1987). Subjects were randomly assigned to one of three treatment groups for eight weeks of training: (a) relaxation training, (b) a multicomponent stress management group (involving relaxation training, identifying stress responses, using social support, cognitive restructuring,

changing Type A behavior, selecting coping strategies, becoming appropriately assertive, and maintaining effective coping habits), and (c) an educational/social support group. Similarly to the study by Woods (1987) discussed above, no control group was included, a weakness of this study, as well. However, all three treatment groups showed significant reductions in depression (as measured by the BDI) from pre- to post-test and from pre-test to 3-month follow-up.

Other studies have been done examining the effects of stress management on depression and have found significant results (Brems, Amodei, & Scott, 1989; Brown & Munford, 1983-84; Cooper, Sadri, Allison, & Reynolds, 1990; Ganster, Mayes, Sime, & Tharp, 1982; Kahn, Kehle, Jenson, & Clark, 1990). Other stress management studies specifically using the BDI and finding significant reductions in depression have also been done (Halonen & Passman, 1985; Michelson, 1986; Turner, 1982). Based on the variety of stress management approaches and measures of depression, we can conclude that stress management training can have a significantly positive effect on the reduction of depression.

Summary and Purpose

The purpose of this study was to examine whether or not self-monitoring of stressors and physiological response to stressors enhances the effectiveness of a stress management

technique, specifically relaxation training. Previous research has often included self-monitoring of stress as a component of a treatment program, but no studies to date have evaluated how the self-monitoring component affects the impact of the stress management package.

This study compared the following groups: (a) a relaxation group receiving instructions to self-monitor stressors (RSMS), (b) a relaxation group receiving instructions to self-monitor pleasurable activities (RSMP), (c) a relaxation training group alone (RT), (d) a self-monitoring of stressors group alone (SMS), and (e) a waiting-list control group (WLC). The component involving self-monitoring of pleasurable activities was included as a "dummy variable" to evaluate whether or not adding any additional component to relaxation training would enhance its effectiveness. Addition of pleasurable activities to a stress management program has not been found to be an effective technique (Matheny et al., 1986).

A five-week length of treatment (with five meetings total meeting once a week) was chosen for practical purposes and potential difficulty obtaining subject compliance with longer treatment periods. A variety of studies have found significant results with stress management groups of five-week duration or less (Greene & Hiebert, 1988; Smith & Nye, 1989; West et al., 1984; Woods, 1987; Woolfolk et al., 1982;

Yorde & Witmer, 1980), thus supporting the length of treatment chosen for this current study.

The specific hypotheses to be tested in this study are the following:

Primary Hypotheses

1. The RSMS group will be superior to all other groups in reduction of state and trait anxiety (as measured by the STAI; Spielberger et al., 1970; see Appendix A) at the conclusion of a five week treatment program.

2. The RSMS group will be superior to all other groups in increasing general self-efficacy (as measured by the General Self-efficacy Scale; Sherer et al., 1982; see Appendix B) at the conclusion of a five week treatment program.

3. The RSMS group will be superior to all other groups in reduction of depression (as measured by the BDI; Beck et al., 1979; see Appendix C) at the conclusion of a five week treatment program.

Secondary Hypotheses:

1. The RT group will not be significantly different from the RSMP group in state and trait anxiety (as measured by the STAI; Spielberger et al., 1970) at the conclusion of a five week treatment program.

2. The RT group will not be significantly different from the RSMP group in general self-efficacy (as measured by

the General Self-efficacy Scale; Sherer et al., 1982) at the conclusion of a five week treatment program.

3. The RT group will not be significantly different from the RSMP group in reduction of depression (as measured by the BDI; Beck et al., 1979) at the conclusion of a five week treatment program.

4. The SMS group will not be significantly different from the WLC group in state and trait anxiety (as measured by the STAI; Spielberger et al., 1970) at the conclusion of a five week treatment program.

5. The SMS group will not be significantly different from the WLC group in general self-efficacy (as measured by the General Self-efficacy Scale; Sherer et al., 1982) at the conclusion of a five week treatment program.

6. The SMS group will not be significantly different from the WLC group in depression (as measured by the BDI; Beck et al., 1979) at the conclusion of a five week treatment program.

7. The RSMP and RT groups will be superior to the SMS and WLC groups in reduction of state and trait anxiety (as measured by the STAI; Spielberger et al., 1970) at the conclusion of a five week treatment program.

8. The RSMP and RT groups will be superior to the SMS and WLC groups in increasing general self-efficacy (as measured by the General Self-efficacy Scale; Sherer et al., 1982) at the conclusion of a five week treatment program.

9. The RSMP and RT groups will be superior to the SMS and WLC groups in reduction of depression (as measured by the BDI; Beck et al., 1979) at the conclusion of a five week treatment program.

CHAPTER II

METHODOLOGY

In this study, college students were randomly assigned to one of five groups: (a) relaxation training plus self-monitoring of stressors (RSMS), (b) relaxation training plus self-monitoring of pleasurable activities (RSMP), (c) relaxation training alone (RT), (d) self-monitoring of stressors alone (SMS), and (e) a waiting-list control (WLC) group. They were given three measures at both pre- and post-treatment: (a) the State-Trait Anxiety Inventory (Spielberger et al., 1970; see Appendix A), (b) the General Self-efficacy Scale (Sherer et al., 1982; See Appendix B), and (c) the Beck Depression Inventory (Beck et al., 1961; See Appendix C).

A one-way factorial design was used. The study used an experimental design with four treatment groups and one control group. Pre- to post-treatment effects and comparisons between groups were done using a ANCOVA design. Although follow-up measurements have been done in many studies discussed above and provide valuable information regarding long-term effects of treatment, a follow-up was not done in this study because of the potential difficulty in compliance with the subjects.

One primary prediction of the study was that the group receiving relaxation training plus self-monitoring of stressors would be superior to all other groups in reduction of state and trait anxiety (as measured by the STAI; Spielberger et al., 1970), reduction of depression (as measured by the Beck Depression Inventory; Beck et al., 1979), and in increased general self-efficacy (as measured by the General Self-efficacy Scale; Sherer et al., 1982) at the conclusion of a five week treatment program (with four weeks of actual treatment). Another hypothesis was that the RSMP and RT groups would be approximately equal to one another but superior to the WLC and SMS groups in the reduction of state and trait anxiety (as measured by the STAI), in the development of general self-efficacy (as measured by the General Self-efficacy Scale), and in reduction of depression (as measured by the Beck Depression Inventory; Beck et al., 1979) at the conclusion of a five week treatment program.

Subjects

The subjects were college students from an Eastern college enrolled in psychology courses. Initially, 81 subjects were included in the study with 14 to 19 subjects assigned to each group. However, 29 subjects either dropped out or were excluded from the study due to inconsistent attendance of groups or incomplete logs or measures. Any subject who missed more than one group out of the five was

excluded from the study. In the final analysis, 51 subjects were left in the study with 8 to 12 subjects left in each group. Of these 51 remaining subjects, 74.5% were female and 25.5% were male, while 96.1% were caucasian and 3.9% were oriental. All of the subjects were single and 98% had no children (1 subject had 3 children).

They either received extra credit for or class credit for participation in research (one of several options). Therefore, their participation in this study was fully voluntary, and they were permitted to drop out of the study at any time. Although this study used primarily young, healthy subjects who may not yet be experiencing severe, debilitatating symptoms which are stress-related, teaching healthy subjects stress management techniques can be viewed as a preventative approach to the ill-effects of stress.

The study required that the subjects not have prior training in stress management (including relaxation training) and not be currently receiving psychotherapy (P. J. Young, personal communication, September 9, 1991). In addition, individuals with prior psychotic or dissociative states were excluded from the study (Everly, 1989). The subjects were screened for moderate to severe depression using the Beck Depression Inventory (Beck et al., 1979). Those scoring 20 or higher on the Beck Depression Inventory (in the moderate-severe or severe range) were excluded from the study (2 students were excluded on this basis) due to

the problem that some individuals who are depressed and practice the relaxation exercises may experience themselves as becoming more depressed according to P. J. Young (personal communication, September 9, 1991). However, through an oversight involving a student who completed the Beck Depression Inventory on the first day of the actual study rather than during the regular screening procedure, one student was included with a Beck Depression Score in the moderate to severe range. However, this subject's depression score dropped significantly during the course of the study and no apparent ill effects were experienced by the subject.

Several subjects failed to turn over the State-Trait Anxiety Inventory to complete the Trait Scale on the other side. Therefore, several students had missing data on the Trait Scale, reducing the power of the analyses done on this measure.

In addition to the above mentioned restrictions, any subjects taking medications, particularly anticonvulsants, insulin, sedatives, hypnotics, hypertension, or cardiovascular medications were excluded from the study due to the fact that relaxation training can intensify the effects of medication (Everly, 1989; P. J. Young, personal communication, September 9, 1991). Although exclusion of a number of potential subjects may change the subject pool in a variety of ways, the screening procedures were done for

the safety and well-being of the subjects. However, the potential dangers of participation in the study by any subject were extremely minimal and ill-effects due to participation in relaxation training are highly unusual.

The subjects were given a brief description of the study with the various restrictions included (see Appendix I). The instructor went to Psychology classes (with permission of the professors) to ask for student participants.

Instructor

The instructor was a graduate student in Education at a local university who was paid for his help with the study. He was fully trained in administration of the relaxation techniques and the procedures required for the completion of the various logs, forms, and measures by the study author. For all groups and procedures which the instructor performed, the author modeled the training procedures and the instructor then practiced the procedures. Then he was given feedback by the author. However, the instructor was blind to the purpose of the study.

Procedure

Before beginning the study, the subjects had completed the consent form (see Appendix A) and the Beck Depression Inventory (Beck et al., 1979). The first week, all subjects completed the STAI-State and Trait Scales (Spielberger et al., 1970) and the General Self-Efficacy Scale (Sherer et

al., 1982). At the beginning of the first session, all four treatment groups were given a general introduction to the study and were told that they would be receiving training in stress management (see Appendix I). The SMS and RSMS groups were given instructions for completing the "self-monitoring of stressors" logs (See Appendix J). On these logs they were asked to identify two stressors that occurred that day. Then they were asked to briefly describe the physiological reaction they had to the stressors. They were asked to record when the stressor occurred and when they recorded the event and reaction. They were to record the event within an hour after it occurred to aid in the accuracy of the report. The SMS group was asked to turn in their self-monitoring logs weekly and met for a discussion of the various physiological responses that an individual may have to stressors.

The SMS group met for the same length of time as the other treatment groups. However, instead of receiving relaxation training, they were taught about the physiological pathways and corresponding reactions to the stress response axes (see Appendix H).

The stress management intervention involving engagement in pleasurable activities has been found to have minimal effectiveness (effect size = .20) when combined with other treatments according to the meta-analysis discussed above (Matheny et al., 1986). According to the literature, this

intervention has not been used by itself. Self-monitoring of pleasurable activities was included in this study as a "dummy variable" to counteract the addition of a second component, self-monitoring of stressors, to the other relaxation group. This group was given instructions to engage in some form of pleasant activity (e.g., a hobby, exercise, reading, watching TV) once a day and to log the activity (See Appendix K). They were asked to turn in the logs weekly.

The relaxation training groups received training in deep breathing exercises during session I (see Appendix L for outline of relaxation training). The relaxation exercises involved training in the exercises described by Everly (1989, pp. 207-209). Session II of the relaxation training involved training in "neuromuscular relaxation" (similar to progressive muscle relaxation) as described by Everly (1989, pp. 190-198) and review of the breathing exercises taught in Session I. During Sessions III, IV, and V, the subjects reviewed the breathing exercises and neuromuscular relaxation. At the end of Session V, the subjects completed the STAI (Spielberger et al., 1970), the General Self-efficacy Scale (Sherer et al., 1982), and the Beck Depression Inventory (Beck et al., 1979), once again.

The subjects receiving relaxation training were asked to practice the breathing techniques at least ten to twenty times a day throughout the day for approximately one minute

each time. They were also asked to practice the neuromuscular relaxation exercises once a day for approximately 5 to 10 minutes and were asked to complete a "relaxation training log" (see Appendix M) each time they practice the technique. The relaxation report form was collected weekly at the weekly session.

Although no clear evidence exists supporting the efficacy of including more than one relaxation technique in a training program, a variety of studies have included more than one approach with good success (Cragan & Deffenbacher, 1984; Elkins et al., 1978; Sallis et al., 1987; Woolfolk et al., 1982). Therefore, in this study both breathing techniques and neuromuscular relaxation techniques were taught.

The waiting-list control group only met the first and fifth weeks of the study to complete the questionnaires. They were told that their group had been postponed for a period of five weeks but would reconvene at that time. At the conclusion of the study, the WLC group received relaxation training and self-monitoring of stressors. The SMS group also was offered relaxation training plus self-monitoring of stressors.

All subjects participating in the relaxation training were cautioned that if they had any nerve problems, weak or damaged muscles, or skeletal problems they should avoid tensing muscles in the area of the damage during the

neuromuscular relaxation training so that no further damage will be done (Everly, 1989). The subjects were also cautioned to avoid clenching their teeth during the neuromuscular relaxation exercises to eliminate the danger of them breaking their teeth during the exercises (M. Beyerlein, personal communication, October 31, 1991).

At the conclusion of the study, all subjects were debriefed as to the purpose of the study. Any questions that they have about the study were answered at that time. In addition, they were asked if they are experiencing any problems due to participation in the study. However, it was not anticipated that participation in the study would cause any individual harm in any way and no subjects reported experiencing any distress related to participation in the study. Rather, all subjects should have benefited from the study, particularly after participation in relaxation training.

All subjects also were asked to complete an evaluation of their instructor (see Appendix N). The results of the instructor's evaluations are reported.

At the conclusion of the study, all subjects were debriefed as to the purpose of the study (see Appendix O). At this point, subjects in the SMS and WLC groups were offered relaxation training.

Measures

Several measures were used in this study as dependent variables and indicators of change from pre- to post-test. The measures included the State-Trait Anxiety Inventory (Spielberger et al., 1970), The General Self-efficacy Scale (Sherer et al., 1982), and the Beck Depression Inventory (Beck et al., 1979).

The State-Trait Anxiety Inventory. The State-Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch, & Lushene, 1970) is divided into two separate self-report scales measuring "state anxiety" (A-state) and "trait anxiety" (A-trait). The A-state scale is designed to measure transitory, subjective feelings of tension and apprehension. The A-trait scale measures trait anxiety, a relatively stable disposition to perceive situations as dangerous. Each scale is composed of 20 items, each item with a 4-point scale. Those individuals high on the A-trait scale exhibit A-state elevations more frequently than those low in A-trait (Spielberger, 1966).

The STAI scales have been found to be reliable measures (Spielberger et al., 1970). Test-retest reliabilities for the Trait-anxiety scale range from r = .65 to .86 and from r = .16 to .62 for the State-anxiety scale on the test-retest interval ranging from one hour to 104 days. As expected, the magnitude of the reliability coefficients decreases as a function of interval length. The low level

of stability for the State-anxiety scale is justified since responses to the items on this scale are believed to reflect the transient situational factors present at the time of testing. Thus, the STAI's stability of measurement is relatively high for trait anxiety and low for state anxiety, reflecting the hypothesized dispositional nature of trait anxiety and transient nature of state anxiety.

Concurrent validity for trait anxiety has been found through a correlation (r = .75) with the IPAT anxiety scale (Cattell & Scheier, 1963), and a correlation (r = .79) with the Taylor Manifest Anxiety Scale (Taylor, 1953). Construct validity has been examined by testing college students under normal conditions (Mean = 40: state anxiety) and exam conditions (Mean = 55: state anxiety). In addition, the state and trait anxiety scales were positively correlated ($55 < r < 85$) with specific scales of the MMPI including the Hs, D, Pd, Pa, Pt, and Sc scales (Dahlstrom & Welsh, 1960) thus providing support for convergent validity with a measure of emotional disturbance and psychopathology. Thus, the STAI may be considered a valid and reliable measure of both situational (state) and long-standing (trait) anxiety.

Self-efficacy Scale. Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs, and Rogers (1982) developed a self-efficacy scale designed to be a measure of self-efficacy that is not tied to specific situations or behaviors (see Appendix B). However, factor analysis yielded two

subscales: a General Self-efficacy subscale and a Social Self-efficacy subscale.

The measure has 23 items each on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree." The General Self-efficacy subscale is comprised of 17 of these items with the Social Self-efficacy subscale containing the remaining six items. The General Self-efficacy subscale was used in this study.

The General Self-efficacy Scale was found to have Cronbach alpha reliability coefficients of .86 (Sherer et al., 1982). To obtain information about construct validity, the General Self-efficacy Scale was correlated with several instruments measuring personality characteristics that are related to personal efficacy although not synonymous with self-efficacy (Sherer et al., 1982). For example, the Self-efficacy Scale scores were correlated with the Internal-External Control Scale (I-E) (Rotter, 1966). Since low scores on the I-E scale indicate an internal orientation, the negative correlation ($\underline{r}$ = - .287) which was found between the General Self-efficacy Scale and the I-E scale provides support for the construct validity of the General Self-efficacy Scale. As predicted, the General Self-efficacy Scale was also negatively correlated ($\underline{r}$ = .355) with the Personal Control subscale of the I-E scale which assesses the extent to which one believes one controls one's own life (Gurin et al., 1969).

Further support for the construct validity of the General Self-efficacy Scale has been found through correlations with the D, Pt, and Si scales on the MMPI (r = -.32, -.35, and -.44 respectively) (Sherer & Adams, 1982). In addition, the General Self-efficacy Scale has been correlated with the Rathus Assertiveness Schedule (Rathus, 1973) (r = .41), a measure of individuals' willingness to take initiative in social situations.

Evidence for the criterion validity of the General Self-efficacy Scale was found through correlations with educational, vocational, and military success (Sherer et al., 1982). As predicted, individuals with high scores on General Self-efficacy were more likely to be employed (r = .278), to have quit fewer jobs (r = -.240), and to have been fired fewer times (r = -.226) than individuals with low scores. High scorers also had higher educational levels (r = .268) and military rank (r = .218). Thus, the General Self-efficacy Scale has been found to be a reliable and valid measure of self-efficacy.

Beck Depression Inventory. The Beck Depression Inventory is a 21-item multiple choice test with four possible choices for each item (Beck et al., 1979) (see Appendix C). Each choice is assigned a weight of zero, one, two, or three points. This version was revised from an earlier version (Beck et al., 1961) in which selections for each item varied from four to seven choices. The test is

designed for use with adolescents and adults. Each of the items relates to a specific category of depressive symptom and/or attitude. The rank ordering of the four choices for each item reflects the range of severity of the symptom from neutral to extreme severity.

Subjects are asked to select the statement that best describes them during the past week. The scores range from normal (0-9), to mild (10-15), mild-moderate (16-19), moderate-severe (20-29), and severe depression (30-63).

Many studies of BDI reliability have been conducted with psychiatric inpatients. Test-retest reliability has been studied and changes in BDI scores were found to parallel changes in the clinical reading of depression (Beck, 1970). The reliability figures in this study were above .90. Item analysis also found a positive correlation (significant at the $p < .001$ level) between individual items of the BDI and the total score. Internal consistency studies found a correlation coefficient of .86 for the test items and a .93 for the Spearman-Brown correlation for the reliability of the BDI.

More recently, a meta-analysis was done (Beck, Steer, & Garbin, 1988) on psychometric properties of the BDI reviewing studies from 1961 through June, 1986. The meta-analysis of the BDI's internal consistency estimates found a mean coefficient alpha of .86 for psychiatric patients and .81 for nonpsychiatric subjects.

The internal consistencies of the 1961 (Beck et al., 1961) and 1978 (Beck et al., 1979) versions of the BDI were compared in two samples of psychiatric patients (Beck & Steer, 1984). The alpha coefficient for the 1961 version for inpatients and outpatients was .88. Outpatients took the 1978 version and had a .86 alpha coefficient. The authors concluded that the internal consistencies of both versions were comparable. In a study with undergraduate college students (Gould, 1982), the internal consistency reliability of the 1961 version (Beck et al., 1961) was found to be .82. Zimmerman (1986) found the one-week test-retest reliablity of the 1978 (Beck et al., 1979) version with a college population to be .64, thus providing further support for the reliability of the BDI.

To measure concurrent validity, the BDI has been correlated (r = .77) with psychiatric ratings using university students as subjects (Bumberry, Oliver, & McClure, 1978). Beck (1970) found similar correlation coefficients of .65 and .67 when comparing the BDI with psychiatric ratings. The BDI has also been correlated with other measures of depression to determine concurrent validity. For example, it has been found to correlate .66 with the Depression Adjective Check List (Beck, 1970) and .75 with the MMPI Depression Scale.

The meta-analysis (Beck et al., 1988) done on the psychometric properties of the BDI found the concurrent

validities of the BDI with respect to clinical ratings and the Hamilton Psychiatric Rating Scale for Depression (Hamilton, 1969) were .72 and .73 respectively for psychiatric patients and .60 and .74 for nonpsychiatric subjects. The BDI was also correlated with the Zung Self-Reported Depression Scale (Zung, 1965) to obtain a mean correlation coefficient of .76 for the psychiatric patients and .71 for the nonpsychiatric samples.

The meta-analysis (Beck et al., 1988) found further support for the concurrent validity of the BDI through the mean correlation coefficient with the MMPI Depression Scale (MMPI-D) of .76 for the psychiatric samples and .60 for the nonpsychiatric samples. The correlation coeffients for the BDI with the Multiple Affect Adjective Checklist Depression Scale (MAACL-D; Zuckerman & Lubin, 1965) were reported to be .66 and .59 for the two studies done with psychiatric samples. The one study done with a nonpsychiatric sample correlating the BDI and the MAACL-D found a .63 correlation. Thus, overall the BDI appears to be both a reliable and valid measure of depression.

Demographic Information

All subjects were asked provide the following demographic information about themselves during the initial session of the study (see Appendix P): (a) age, (b) gender, (c) race (caucasian, black, oriental, American Indian, or other), (d) college status (freshman, sophomore, junior,

senior, other), (d) marital status (single, married, divorced, widowed, or separated), (e) number of children you have, (f) number of hours employed per week, and (g) number of hours spent in class and studying per week. Descriptive statistics were computed for each of these demographic variables.

Compliance with Logs

The subjects' compliance with completion of the various logs was measured. An average percentage compliance for completion of each log was reported for each treatment group. The number of incomplete and complete logs for each group was calculated and the percentage complete was reported.

Design

The subjects were randomly assigned to the five groups by the following procedure. When a subject was called to set up their group assignment, the author of the study chose a number (1 through 5) randomly from a box corresponding to a particular group and time for the group. The subject was told the group time and asked if he or she could attend a group at that time. If not, the number was placed back in the box and a new number chosen. This procedure was repeated until a group time was found which the subject could attend.

The subjects were randomly assigned to one of five groups: (a) relaxation plus self-monitoring of stressors

and their physiological reaction to the stressors (RSMS) (see Appendix E), (b) relaxation plus self-monitoring of pleasurable activities (RSMP) (see Appendix F), (c) relaxation training alone (see Appendix G), (d) self-monitoring of stressors and physiological reactions alone (SMS) (see Appendix H), (d) waiting-list control group (WLC). The groups met once per week for five weeks, with the exception of the WLC group which only met to complete the questionnaires (the STAI, the General Self-efficacy Scale, and the Beck Depression Inventory).

To evaluate whether or not self-monitoring of stressors enhanced the effectiveness of relaxation training in reducing symptoms of state and trait anxiety, depression or in increasing general self-efficacy, subjects were randomly assigned to cells in a one-way factorial design. The study used an experimental design with four treatment groups and one control group. Approximately 8 to 12 subjects were assigned to each cell. The independent variable, group assignment, involved either relaxation training plus self-monitoring of stressors, relaxation training plus self-monitoring of pleasurable activities, relaxation training alone, self-monitoring of stressors alone, or a waiting-list control group. The post-treatment measurement was used as the criterion variable with the pre-treatment measure as the covariate.

Statistical Analysis

An Analysis of Variance (ANCOVA) was used to evaluate whether or not the various treatment interventions had different or similar effects on each dependent measure. The four dependents measures were the: (a) State and (b) Trait portions of the State-Trait Anxiety Inventory (Spielberger et al., 1970), (c) the General Self-efficacy Scale (Sherer et al., 1982), and (d) the Beck Depression Inventory (Beck et al., 1979). Gender was excluded as an independent variable because of the insignificant correlations between gender and the dependent variables, and because of the few number of males in many of the cells. The instructor was evaluated for effectiveness and clarity of presentation by the subjects (see Appendix N) and these evaluations of the instructor were reported. The subjects' compliance with completion of the various logs was also reported. Descriptive statistics were computed for all demographic variables including means, standard deviations, and Pearson correlations.

CHAPTER III

RESULTS

The percentages and frequencies for each of the demographic variables were obtained and Pearson correlation coefficients were run for all of the demographic variables and dependent variables with one another. The subjects compliance with the various logs was also computed and percentage compliance for each group with their corresponding logs was reported. Analyses of Covariance were run for each of the dependent variables with group included as an independent variable and the pre-test measure as a covariate in a single-factor analysis.

Descriptive Statistics

Of the 51 subjects who remained in the study, 74.5% were female and 25.5% were male, while 96.1% were caucasian and 3.9% were oriental. All of the subjects were single and 98% had no children (1 subject had 3 children). The majority of the subjects were 18 years old (41.2%) and were Freshmen in college (58.8%). The majority of them worked 40 or more hours per week (56.9%) and spent 16 to 30 hours a week studying and in school (52.9%) (see Table 1 for further information).

Table 1

Frequency and Percentage of Demographic Information of Subjects

Category	Frequency	Percentage
Age		
17	2	3.9
18	21	41.2
19	17	33.3
20	3	5.9
21	8	15.7
College		
Freshman	30	58.8
Sophomore	11	21.6
Junior	2	3.9
Senior	8	15.7
Hours Work Per Week		
1-10	11	21.6
11-20	10	19.6
21-30	1	2.0
31-40	0	0.0
>40	29	56.9
Hours in School and Studying Per Week		
1-15	2	3.9
16-30	27	52.9
31-45	17	33.3
46-60	4	7.8
>60	1	2.0

The means and standard deviations for each of the dependent variables at pre-test and post-test were obtained for all the groups combined, as well as for the individual groups. Refer to Tables 2 and 3 for this information. Several subjects in both the RSMS and SMS groups experienced an increase in symptoms of depression on the Beck Depression Inventory, causing the means and standard deviations to increase from pre- to post-test. Several subjects in the RSMS and SMS groups experienced large increases in symptoms on the Beck, thus accounting for the increase in the standard deviation from pre- to post-test, particularly in the RSMS group. The mean on the State Scale of the STAI also increased from pre- to post-test in the SMS and WLC groups and on the Trait Scale of the STAI for the SMS group. On the Self-efficacy Scale, the mean for the RSMS group decreased from pre- to post-test, an additional unexpected finding. The RSMP group showed a significant decrease in state anxiety from pre- to post-test, a much larger decrease than any other group.

Pearson Correlations

Pearson correlation coefficients were obtained for all the pre-test and post-test measures with one another, as well as with the demographic variables. The Beck Depression Inventory pre-test was significantly correlated with the pre-test State Scale ($r = .66$, $p < .0001$) and pre-test Trait Scale ($r = .68$, $p < .0001$) of the State-Trait Anxiety

Table 2

Overall Means and Standard Deviations for each of the Dependent Variables at Pre-test and Post-test

Dependent Variable	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD	Sample Size
Beck	7.22	4.98	8.14	6.12	51
State	41.23	11.45	40.76	12.84	51
Trait	41.59	9.79	40.45	10.77	44
Self	63.22	10.12	65.27	10.94	51

Beck = Beck Depression Inventory; State = State Scale of the STAI; Trait = Trait Scale of the STAI; Self = Self-efficacy Scale

Inventory. The pre-test State Scale of the STAI was significantly correlated with the pre-test Trait Scale of the STAI (r = .76, p < .0001). The pre-test Trait Scale was significantly, negatively correlated with the pre-test Self-efficacy Scale (r = -.65, p < .0001). A variety of other post-test scales were significantly correlated with one another and with pre-test scores, as well. Several interesting correlations emerged from the demographic variables with the dependent variables. The number of hours subjects worked each week was positively correlated with the pre-test and post-test State Scale of the STAI (r = .29, p

Table 3

Means and Standard Deviations for Dependent Variables at Pre-test and Post-test by Group

Group	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD	Sample Size
		Beck Depression Inventory			
RSMS	7.38	1.92	10.38	6.25	8
RSMP	7.27	6.90	4.91	5.22	11
RT	7.55	4.44	6.63	6.15	11
SMS	5.77	5.21	10.00	6.73	9
WLC	7.83	5.22	9.59	5.65	12
		State Scale of State-Trait Anxiety Inventory			
RSMS	42.00	6.28	41.00	10.35	8
RSMP	44.64	15.94	34.55	9.42	11
RT	38.18	9.20	37.27	13.63	11
SMS	40.67	13.29	49.44	13.17	9
WLC	40.83	10.61	43.00	13.68	12
		Trait Scale of State-Trait Anxiety Inventory			
RSMS	42.67	5.99	40.33	7.97	8
RSMP	39.50	12.95	37.75	11.04	11
RT	42.10	9.41	38.60	11.40	11
SMS	41.56	9.46	43.67	9.60	9
WLC	42.09	10.98	41.54	13.07	12

(Table Continues)

Group	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD	Sample Size
		Self-efficacy Scale			
RSMS	58.38	8.23	57.00	10.58	8
RSMP	68.00	6.77	69.27	10.07	11
RT	63.09	13.55	67.73	9.73	11
SMS	60.78	8.98	63.56	11.00	9
WLC	64.00	10.46	66.17	11.47	12

Note. RSMS = Relaxation Training plus Self-Monitoring of Stressors Group; RSMP = Relaxation Training plus Self-Monitoring of Pleasant Activities Group; RT = Relaxation Training Alone Group; SMS = Self-Monitoring of Stressors Group; WLC = Waiting-List Control Group.

< .05; r = .33, p < .05, respectively), as well as with the post-test of the Trait Scale of the STAI (r = .34, p < .05), indicating that the more hours an individual worked each week, the higher their state anxiety was likely to be. Interestingly, there were no significant correlations between gender and any of the other variables. See Table 4 for further information. The demographic variables of race, marital status, and number of children were not included in the correlation matrix because of the lack of variance within these variables.

Table 4

Pearson Correlation Coefficients for Pre-test and Post-test Dependent Variables and Demographic Variables

	Age	Gender	College	Work	School	Beck1	Beck2	State1	State2	Trait1	Trait2	Self1	Self2
Gender	-0.02	1.00											
College	0.91**	-0.08	1.00										
Work	-0.24	0.02	-0.18	1.00									
School	-0.05	-0.09	0.02	0.22	1.00								
Beck1	-0.01	-0.19	0.05	0.01	-0.08	1.00							
Beck2	0.04	-0.13	0.03	0.18	-0.22	0.53**	1.00						
State1	-0.07	-0.10	-0.05	0.29*	-0.06	0.66**	0.43**	1.00					
State2	-0.09	0.18	-0.13	0.33*	-0.21	0.38**	0.62**	0.44**	1.00				
Trait1	-0.09	-0.15	-0.08	0.21	-0.05	0.68**	0.62**	0.76**	0.60**	1.00			
Trait2	-0.05	-0.03	-0.05	0.34*	-0.09	0.58**	0.77**	0.73**	0.79**	0.85**	1.00		
Self1	0.03	-0.27	0.09	-0.19	0.23	-0.26	-0.41**	-0.24	-0.45**	-0.65**	-0.70**	1.00	
Self2	0.07	-0.05	0.18	-0.05	0.22	-0.40**	-0.70**	-0.38**	-0.61**	-0.64**	-0.71**	0.58**	1.00

*p < .05 **p < .01

Note. Gender: 0 = female, 1 = male; College = Year in College (1 = Freshman, 2 = Sophomore; 3 = Junior; 4 = Senior; 5 = Other); Work = Number of Hours Worked per Week (1 = 1-10; 2 = 11-20; 3 = 21-30; 4 = 31=40; 5 = >40); School = Number of Hours in School and Studying per Week (1 = 1-15; 2 = 16-30; 3 = 31-45; 4 = 46-60; 5 = >60); Beck1 and Beck2 = Beck Depression Inventory Pre-test and Post-test, respectively (Sample Size = 51); State1 and State2 = State Scale of the State-Trait Anxiety Inventory Pre-test and Post-test, respectively (Sample Size = 51); Trait1 and Trait2 = Trait Scale of the State-Trait Anxiety Inventory Pre-test and Post-test, respectively (Sample Size = 44); Self1 and Self2 = Self-efficacy Scale Pre-test and Post-test, respectively (Sample Size = 51).

Logs

Compliance with completion of the various logs was evaluated for each group. The compliance rates ranged from 77% to 100% with the highest rates of compliance in the groups only required to complete one log (See Table 5). Samples of comments made in the logs are included in Appendix Q.

Analysis of Covariance

Individual Analysis of Variances's (ANCOVA's) using the General Linear Models Procedure were run for each dependent variable using the post-test measure as the dependent (or criterion) variable, the group assignment as the independent (or predictor) variable, and the pre-test score of that particular dependent variable as a covariate. Gender was excluded as a predictor variable, since it was not significantly correlated with any of the dependent variables. The statistical tests of difference in group means were carried out using the Tukey studentized range test. This test was chosen, because it is a well-accepted and stringent test which has a lower Type I error rate than most other approaches (Winer, 1971).

The ANCOVA using the Beck Depression Inventory Post-test as the dependent variable, group as the independent variable, and the pre-test measure of the State scale as the covariate, showed a significant main effect, $F(4,45) = 6.73$, $p < .01$. However, the Tukey Test revealed no significant

Table 5

Percent Compliance in Completion of Logs by Group

Group	SMS Log	SMPA Log	RT Log
RSMS	88%	N/A	79%
RSMP	N/A	77%	79%
RT	N/A	N/A	97%
SMS	100%	N/A	N/A

Note. RSMS = Relaxation plus Self-monitoring of Stressors; RSMP = Relaxation plus Self-Monitoring of Pleasant Activities; RT = Relaxation Training; SMS = Self-Monitoring of Stressors.

differences between groups when all groups were compared. Although the groups means individually were not significantly different, they could be ordered in terms of the smallest to largest post-test Beck score based on the differences between the means. The RSMP group had the lowest post-test Beck score, the RT group had the next lowest, and the three remaining groups RSMS, SMS, and WLC were approximately equal.

The ANCOVA using the post-test measure of the State Scale of the STAI as the dependent variable, group as the independent variable, and the pre-test measure of the State Scale as the covariate, showed a significant main effect, $F(4,45) = 5.53$, $p < .01$. The Tukey Test revealed a

significant difference between the RSMP and SMS groups at the $p < .05$ level with the RSMP group experiencing significantly lower state anxiety at post-test than the SMS group. No other group comparisons were significant. However, based on the differences between the means, the groups could be ordered from lowest to highest state anxiety at post-test. The RSMP group had the lowest state anxiety with the RT, RSMS, WLC, and SMS groups each with increasingly higher state anxiety, respectively at post-test.

Using the post-test Trait Scale of the STAI as the dependent variable, group as the independent variable, and the pre-test measure of the Trait Scale as the covariate, the results of the ANCOVA revealed a significant main effect, $F(4,38) = 24.49$, $p < .01$. However, the Tukey Test found no significant differences between group means. If the groups were ordered from lowest to highest on the post-test of the Trait Scale based on the differences between the means, they fell in the same order as with the post-test of the State Scale: the RSMP group had the lowest trait anxiety with the RT, RSMS, WLC,and SMS groups each having higher levels of trait anxiety, respectively.

Finally, the ANCOVA using the post-test measure of the Self-efficacy Scale as the dependent variable, the group assignment as the independent variable and the pre-test measure of the Self-efficacy Scale as the covariate also

found a significant main effect, $F(4,45) = 5.75$, $p < .01$. The Tukey Test revealed a significant difference between the means of the RSMP and RSMS groups with the RSMP group experiencing significantly higher self-efficacy at post-test than the RSMS group. The groups could be ordered from highest to lowest means on the Self-efficacy Scale based on the differences beween the means. The RSMP group had the highest self-efficacy at post-test with the RT, WLC, SMS, and RSMS groups each having lower levels of self-efficacy, respectively.

Overall, the results revealed significant group effects for each of the dependent variables when the pre-test measure on the dependent variable was used as a covariate. The RSMP group achieved consistently lower scores on the Beck Depression Inventory and the State and Trait Scales of the STAI than all other groups, although the RSMP group only differed significantly from the SMS group on the State Scale. The RSMP group had a significantly higher post-test mean on the Self-efficacy Scale than the RSMS group and had a higher mean than all other groups on this measure (although not significantly different, according to the Tukey Test). The RT group experienced the greatest increase in self-efficacy as well as the greatest decrease in trait anxiety from pre- to post-test. The SMS group showed the greatest increase on the Beck Depression Inventory, as well as the State and Trait Anxiety scales of the STAI.

Instructor Evaluations

The instructor evaluations revealed differences in perceptions of the instructor depending on group assignment. The RSMS, RSMP, and RT groups gave the instructor an average rating of 21, 22 and 22 respectively out of a total of 28 possible points. However, the SMS group only gave the instructor an average rating of 16, reflecting their negative feelings about the group and the instructor's presentation. Comments of the various groups are included in Appendix Q.

Summary

Overall, the primary hypotheses that the RSMS group would be superior to all other groups in reduction of state and trait anxiety, and depression, as well as in enhancement of self-efficacy were not supported. Rather, the RSMP group was superior to all other groups on all measures at post-test. The secondary hypotheses that the RT group and RSMP groups would be approximately equal on all measures but significantly lower on state and trait anxiety as well as depression, and significantly higher in self-efficacy than the WLC and SMS groups was partially supported. The RSMP and RT groups were not significantly different on any measure and were always the first and second groups, respectively, in terms of desired changes on the measures. Compared to the SMS and WLC groups, the RSMP and RT groups scored consistently better at post-test on all measures than

the SMS and WLC groups, although not significantly different in most instances. The other secondary hypotheses that the WLC and SMS groups would not be significantly different from one another on the different measures at post-test were supported. However, the hypothesis that they would remain unchanged was not supported as they experienced increased levels of depression and state anxiety from pre- to post-test. The SMS group also experienced a decrease in trait anxiety from pre- to post-test.

Since the compliance with completion of logs was good, noncompliance with log completion probably had little impact on the results. In addition, since the instructor evaluations for the RSMP, RSMS, and RT groups were similar and generally favorable, the instructor's presentation for these three groups probably had little differential impact on the outcome for these groups. However, given the poor instructor evaluations and negative comments about the stress education lectures in the SMS group, these factors may have had a negative impact on the outcome of this group. Exactly how much effect their perceptions of the instructor and the content of the material had on the outcome is unclear.

CHAPTER IV

DISCUSSION

Some of the hypotheses of this study were validated while others were not. The primary hypotheses that the group receiving relaxation training plus self-monitoring of stressors (RSMS) would be superior to all other groups in reduction of state and trait anxiety, reduction of depression, and in increasing self-efficacy, was not supported. In fact, the group receiving relaxation training plus self-monitoring of pleasant activities (RSMP) showed the most changes with a significantly greater decrease in state anxiety than the self-monitoring of stressors group (SMS) and a significantly greater increase in self-efficacy than the relaxation plus self-monitoring of stressors group (RSMS). The RSMP group showed more change in the desired direction on all of the dependent variables than any other group, even if not significantly better.

The RSMP group had lower depression, state and trait anxiety, as well as higher self-efficacy score than any other group at post-test. Thus, self-monitoring of pleasant activities, which was hypothesized to be an ineffective component of a stress management protocol, appears to have had a slight, but consistent additive effect on stress

reduction when paired with relaxation training. The meta-analysis by Matheny et al. (1986) did find a small effect size for "positive diversions" from stress (effect size of .20) when used in combination with other techniques. This study further supports the findings of Matheny et al. (1986). Perhaps, as in the case of people with serious illness relying on denial, the positive perspective emerging from the monitoring of pleasant activities produces additional endorphins.

The RSMS group did not differ significantly from the group receiving relaxation training alone (RT) on any of the dependent measures, thus indicating that the self-monitoring of stressors component did not appear to boost the effectiveness of the relaxation training. In fact, the RSMS group actually experienced an increase in depression and a decrease in self-efficacy from pre- to post-test. These results contradict the results of the meta-analysis by Matheny et al. (1986) which found that when used in combination with other techniques, self-monitoring appeared to be helpful. However, a variety of self-monitoring of stressors approaches were included in this analysis, leaving unclear the question of what kind of self-monitoring is helpful. The failure to find support for the hypothesis that the RSMS group would experience improvements in the desired direction on the dependent variables must be viewed as tentative because of the fact that a number of subjects

dropped out of the study leaving the RSMS group with the lowest number of subjects. This unfortunate event undoubtably reduced the power of the statistical results for this group, thus leaving doubts as to the failure to confirm the primary hypotheses of the study. However, t- test comparisons of pre-test scores of drop-outs versus those who remained in the groups were nonsignificant. The findings that the RSMS group experienced an increase in depression and a decrease in self-efficacy may indicate that self-monitoring of one's stressors causes a feeling of being overwhelmed and powerless in the face of many of life's stressors in the short run. However, in the long run, self-monitoring of stressors should focus attention on those times when one should use the relaxation technique and the repeated use of the technique should increase one's sense of control over oneself and the situation.

The relaxation training alone group (RT), following closely behind the relaxation plus self-monitoring of pleasant activities group (RSMP) on all measures did show a trend toward greater reduction in state and trait anxiety, as well as reduction of depression, and enhanced self-efficacy than the self-monitoring of stressors (SMS) and waiting-list control (WLC) groups, although not a significant difference. The SMS group actually experienced a near increase in state and trait anxiety, as well as depression, from pre- to post-test. These increases in

anxiety and depression could have been related to increasing daily stressors as the semester progressed with mid-terms and other significant stressors mounting. Possibly the students' anxiety and depression increased, because they developed increased awareness of their stressors without the training in how to then reduce this stress of which they were now more aware.

These results for the SMS group are contradicted by those of Woolfolk et al. (1982) who found that a self-monitoring group experienced significant reductions in apprehension (see discussion above). In another study (Borkovec et al., 1978), self-monitoring was not found to cause any change in daily tension levels (see discussion above). However, support for the results of this current study are provided by the meta-analysis done by Matheny et al. (1986) who found that when used alone, self-monitoring had a negative effect on coping outcome. These results also support the findings by Federer (1984) discussed above in which the Educational-Motivational Group actually increased in their perception of stressful experiences at work. This group received education about stress, was given a motivational component to change its reactions to stress, and self-monitored their stressors at work. However, they were not taught any stress management techniques. Federer concluded that merely providing individuals with information about stress is insufficient in helping them to reduce their

reaction to stress. In this current study, similar results were found. This group was offered the opportunity to learn relaxation training after the experiment was concluded.

The WLC group also experienced an increase in state anxiety and depression from pre- to post-test, although not as large an increase as the SMS group. Perhaps their daily stressors were increasing, as well, as the semester progressed with mid-term exams and other significant stressors.

One student whose Beck Depression Inventory score fell in the moderate to severe range was included in the study by mistake and was assigned to the RSMP group. She filled out the Beck on the first day of the study rather than on the regular screening day as the other students had. However, she apparently suffered no ill effects due to the study, and in fact, her Beck Depression score dropped from 25 to 7 from pre-test to post-test. Whether or not this decrease in depression can be attibuted to participation in the study cannot be determined. However, the possibility that some individuals with moderate to severe depression will experience beneficial effects due to stress management training is supported. Ideally, such individuals should be monitored carefully on an individual basis for signs of increased depression.

The problem with attendance, particularly in the RSMS and SMS groups which had the lowest numbers of subjects (8

and 9 respectively) may be due to the time demands upon the subjects in these groups to complete the SMS logs. The SMS logs required more time and thought than the other logs. The subjects who did complete the logs typically did so with thorough responses requiring time and thought (see Appendix Q for samples of log entries). Those who dropped out of the study may have found the logs too time consuming. In addition to completion of the SMS logs, the RSMS group was also required to practice the relaxation training exercises daily and complete the relaxation training logs, further demands upon their time. The SMS group, according to their feedback, found the lectures on the physiology of the stress pathways irrelevant, uninteresting and difficult to follow. Some of the subjects initially in that group may have dropped out for that reason. Those subjects in the RSMP and RT groups had the highest number of subjects in the groups with fewer drop-outs. These groups might have perceived themselves as receiving the most benefit from the study while not having to fill out extensive logs. Compliance with completion of the logs for subjects who stayed in the study was high (77 to 100% for the various logs). However, those subjects in the RT and SMS groups who were only required to complete one log had higher compliance rates than those in the RSMS and RSMP groups who were required to complete two logs a week. Overall, the problems with attendance and drop-outs may have been due to several

factors including the time demands upon the subjects in completing the logs and practicing relaxation training (for the RT, RSMS, and RSMP groups), and their lack of interest in the stress physiology lectures (in the SMS group).

In their evaluation of the instructor, the RSMS, RSMP, and RT groups gave the instructor higher ratings than the SMS group and had more positive comments to make about the study. One student in the RSMS group made the comment, "When I felt stress, I took notice of it and made efforts to relieve the symptoms I felt. For instance, I felt overwhelmed with work one day and noticed all my muscles were tense. I did the relaxation exercise to relax them." Those participating in the SMS group had many more negative, critical comments to make about the instructor as well as what they felt they got out of participation in the study. One subject in the SMS group even made the comment, "This experiment didn't help me with stress at all. I guess I was in the control group." For further student comments, see Appendix Q.

The transactional model of stress (discussed above) in which stress is viewed as an interaction between the person and the environment (Cox, 1978; Coyne & Lazarus, 1980; French et al., 1974; Lazarus, 1966, 1981b; Lazarus et al., 1980; Lazarus & Launier, 1978; Mason, 1975; McGrath, 1970) and which emphasizes the role cognitions and appraisal in mediating the individual's response to stress is clearly

supported in this current study as a useful model. Those subjects self-monitoring their stressors had a different reaction to their stressors than those self-monitoring pleasant activities. Clearly, changes in self-appraisal in the area of stress have an impact on the individual's experience of stress depending on the type of self-appraisal that is involved. Schwartz' (1979, 1983) disregulation theory and proposal that increased self-awareness will lead to self-regulation is called into question given the lack of significant changes in the RSMS group in this study. However, perhaps self-monitoring becomes more helpful in self-regulation over a longer period of time. If self-monitoring of pleasant activities can be classified as a way of increasing self-awareness, then support is provided for Schwartz' theory by this study.

Limitations

Several limitations of the study may have effected the findings. The failure to support some of the hypotheses may partially be due to the fact that many of the students started out with very low scores on the Beck Depression Inventory, the State Scale and the Trait Scale of the STAI, and very high scores on the Self-efficacy Scale at pre-test leaving little room for improvement. On the Beck Depression Inventory, over 50% of the students scored 7 or lower in the BDI pretest. Over 50% of the students scored 65 or higher on the Self-efficacy Scale with an upper limit of 85

possible. On the State Scale, 50% of the subjects scored 39 or lower at pre-test with possible scores ranging from 20 to 80. With possible scores ranging from 20 to 80 on the Trait Scale of the STAI, as well, 50% of the subjects scored 41 or lower. Perhaps if subjects had been selected who had higher scores on the Beck Depression Inventory, State and Trait Anxiety Scales of the STAI, and lower scores on the Self-efficacy Scale at pre-test, more significant changes would have been found between the groups at post-test.

Perhaps the length of the study was too short to find more significant differences between the groups in terms of change on the dependent measures. However, Kopp (1988) found, in a review of studies in the area of self-monitoring, that in almost all studies, changes occurred within the first three weeks of the study (see discussion above). Thus, providing support for the length of this study in terms of effects of self-monitoring.

Unfortunately, there is no way to check the honesty of the students regarding the completion of their logs on a daily basis and their actual time spent practicing the relaxation techniques. In addition, some subjects may have had prior experience with stress management training, but did not reveal this fact because of their desire to participate in the study.

The training may have had effects that were not assessed by the dependent measures used in this study. For

example, a measure of physical symptoms related to stress might have revealed additional training effects. However, the lack of a popular and well-designed measure of stress specifically targeted at a variety of stress symptoms limited the possible findings of this study. Had such a measure been available, possibly more definitive answers to the questions of this study might have been found.

Future Research

Future research in the area of self-monitoring of stressors would be helpful in further clarifying the findings of this study. In particular, a study using subjects from the community who request stress management training for their stress symptoms and who begin the study with high levels of stress symptoms might be more likely to demonstrate change over the course of a stress management study. Such individuals would probably also have greater motivation for change as well. Motivation has been found to be helpful in maintaining changes made through self-monitoring (Kopp, 1988) over long periods of time. Related to this idea, a study using self-monitoring paired with relaxation training over a longer period of time would be helpful in determining if further practice of relaxation training and awareness of the effects of stressors on oneself becomes more powerful in reducing symptoms of stress over time.

The presence of differential effects from the treatment (as seen by the increase in standard deviation for several of the experimental groups) suggests that individual differences moderate the treatment effects. Future research might examine the personality factors that determine these differential effects.

The use of cognitive restructuring techniques paired with self-monitoring of stressors would also be an interesting area for further research. Future studies could explore whether or not self-monitoring of stressors boosts the positive effects of cognitive restructuring on stress reduction.

Use of a measure of stressors (such as the Hassles and Uplifts Scale, Kanner, et al., 1981) at pre-test and post-test would be a helpful adjunct to future studies. Such a measure could be used to determine whether or not increases in symptoms are due to an increasing number of daily stressors from pre- to post-test.

A measure is needed specifically designed to assess symptoms of stress. Such a measure, if found to be valid and reliable, could be used across many studies of stress to allow comparisons of change by various stress management techniques, including the self-monitoring of stressors.

Conclusions

Although this study did not find support for the hypothesis that self-monitoring of stressors will boost the

effectiveness of a relaxation training program for stress reduction, the possibility that self-monitoring of stressors will have a more delayed, but powerful effect over stress reduction over a longer period of time has yet to be determined. This study found some support for the idea that self-monitoring of pleasant activities can actually increase the effects of relaxation training on stress reduction in college students, a surprising finding, but one worth further exploration. Further research in the area of self-monitoring of a variety of aspects of stress and stress reduction is needed to clarify the role of self-awareness on stress management in our hectic, modern-day society.

APPENDIX A

INFORMED CONSENT FORM

Informed Consent Form

I, _____, agree to participate in a stress management study which is being conducted by Julie Eads at Loyola College. This stress management study is a five week long study designed to study various approaches to stress management.

I understand that periodically I may be expected to participate in a number of experimental tasks including daily stress management techniques and the completion of questionnaires relating to my emotional, physical, and psychological functioning. I also may be asked to complete behavioral logs or diaries of specific behaviors. I am aware that I will be attending once-a-week half-hour to forty-minute long training sessions related to stress management for five consecutive weeks.

I have been informed that any information obtained in this study will be recorded with a code number allowing Ms. Eads to determine my identity for the purposes of recording attendance and compliance with the study. At the conclusion of this study, the key that relates my name with my assigned code number will be destroyed. Under this condition, I agree that any information obtained from this research may be used in any way thought best for publication or education, provided that I am in no way identified and my name is not used.

I understand that I should not participate in the study if any of the following apply to me: (a) if I am taking medication, particularly insulin, sedatives, hypnotics, anticonvulsants, antihypertensives, or cardiovascular medication, (b) if I am currently receiving psychotherapy, (c) if I have experienced psychotic states involving hallucinations or delusions, or have had dissociative reactions (involving a change in consciousness during which one's own sense of reality or identity is lost and replaced by a feeling of unreality or altered sense of identity), (d) if I have ever had a seizure, and (e) if I have ever received training in stress management or relaxation techniques.

I understand that there is minimal personal risk directly involved with this research and that I am free to withdraw my consent and discontinue participation in this study at any time. A decision to withdraw from the study will not effect the services available to me from Loyola.

If I have any questions or problems that arise in connection with my participation in this study, I should contact Julie Eads, the project director, at (301) 467-3854.

_____ _____

Date Signature of Participant

_____ _____

Date Witness

APPENDIX B

THE GENERAL SELF-EFFICACY SCALE

ID #: _____

Date: _____

Instructions: This questionnaire is a series of statements about your personal attitudes and traits. Each statement represents a commonly held belief. Read each statement and decide to what extent it describes you. There are no right or wrong answers. You will probably agree with some of the statements and disagree with others. Please indicate your own personal feelings about each statement below by marking the letter that best describes your attitude or feeling. Please be very truthful and describe yourself as you really are, not as you would like to be.

Mark:
A If you DISAGREE STRONGLY with the statement.
B If you DISAGREE MODERATELY with the statement.
C If you neither agree nor disagree with the statement.
D If you AGREE MODERATELY with the statement.
E If you AGREE STRONGLY with the statement.

1. When I make plans, I am certain I can make them work.
2. One of my problems is that I cannot get down to work when I should.
3. If I can't do a job the first time, I keep trying until I can.
4. When I set important goals for myself, I rarely achieve them.
5. I give up on things before completing them.
6. I avoid facing difficulties.
7. If something looks too complicated, I will not even bother to try it.
8. When I have something unpleasant to do, I stick to it until I finish it.
9. When I decide to do something, I go right to work on it.
10. When trying to learn something new, I soon give up if I am not initially successful.
11. When unexpected problems occur, I don't handle them well.

12. I avoid trying to learn new things when they look too difficult for me.

13. Failure just makes me try harder.

14. I feel insecure about my ability to do things.

15. I am a self-reliant person.

16. I give up easily.

17. I do not seem capable of dealing with most problems that come up in life.

APPENDIX C

BECK DEPRESSION INVENTORY

Beck Inventory

ID #: _____
Date: _____

On this questionnaire are groups of statements. Please read each group of statements carefully. Then pick out the one statement in each group which best describes the way you have been feeling the PAST WEEK, INCLUDING TODAY! Circle the number beside the statement you picked. If several statements in the group seem to apply equally well, circle each one. Be sure to read all the statements in each group before making your choice.

1. 0 I do not feel sad.
   1 I feel sad.
   2 I am sad all the time and I can't snap out of it.
   3 I am so sad or unhappy that I can't stand it.

2. 0 I am not particularly discouraged about the future.
   1 I feel discouraged about the future.
   2 I feel I have nothing to look forward to.
   3 I feel that the future is hopeless and that things cannot improve.

3. 0 I do not feel like a failure.
   1 I feel I have failed more than the average person.
   2 As I look back on my life, all I can see is a lot of failures.
   3 I feel I am a complete failure as a person.

4. 0 I get as much satisfaction out of things as I used to.
   1 I don't enjoy things the way I used to.
   2 I don't get real satisfaction out of anything anymore.
   3 I am dissatisfied or bored with everything.

5. 0 I don't feel particularly guilty.
   1 I feel guilty a good part of the time.
   2 I feel quite guilty most of the time.
   3 I feel guilty all of the time.

6. 0 I don't feel I am being punished.
   1 I feel I may be punished.
   2 I expect to be punished.
   3 I feel I am being punished.

7. 0 I don't feel disappointed in myself.
   1 I am disappointed in myself.
   2 I am disgusted with myself.
   3 I hate myself.

8. 0 I don't feel I am any worse than anybody else.
   1 I am critical of myself for my weaknesses or mistakes.
   2 I blame myself all the time for my faults.
   3 I blame myself for everything bad that happens.

9. 0 I don't have any thoughts of killing myself.
   1 I have thoughts of killing myself, but I would not carry them out.
   2 I would like to kill myself.
   3 I would kill myself if I had the chance.

10. 0 I don't cry anymore than usual.
    1 I cry more now than I used to.
    2 I cry all the time now.
    3 I used to be able to cry, but now I can't cry even though I want to.

11. 0 I am no more irritated now than I ever am.
    1 I get annoyed or irritated more easily than I used to.
    2 I feel irritated all the time now.
    3 I don't get irritated at all by the things that used to irritate me.

12. 0 I have not lost interest in other people.
    1 I am less interested in other people than I used to be.
    2 I have lost most of my interest in other people.
    3 I have lost all my interest in other people.

13. 0 I make decisions about as well as I ever could.
    1 I put off making decisions more than I used to.
    2 I have greater difficulty in making decisions than before.
    3 I can't make decisions at all anymore.

14. 0 I don't feel I look any worse than I used to.
    1 I am worried that I am looking old or unattractive.
    2 I feel that there are permanent changes in my appearance that make me look unattractive.
    3 I believe that I look ugly.

15. 0 I can work about as well as before.
    1 It takes an extra effort to get started at doing something.
    2 I have to push myself very hard to do anything.
    3 I can't do any work at all.

16. 0 I can sleep as well as usual.
    1 I don't sleep as well as I used to.
    2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
    3 I wake up several hours earlier than I used to and cannot get back to sleep.

17. 0 I don't get more tired than usual.
    1 I get tired more easily than I used to.
    2 I get tired from doing almost anything.
    3 I am too tired to do anything.

18. 0 My appetite is no worse than usual.
    1 My appetite is not as good as it used to be.
    2 My appetite is much worse now.
    3 I have no appetite at all anymore.

19. 0 I haven't lost much weight, if any lately.
    1 I have lost more than 5 pounds.
    2 I have lost more than 10 pounds.
    3 I have lost more than 15 pounds.

    I am purposefully trying to lose weight by eating less. Yes___ No___

20. 0 I am no more worried about my health than usual.
    1 I am worried about physical problems such as aches and pains; or upset stomach; or constipation.
    2 I am very worried about physical problems and it's hard to think of much else.
    3 I am so worried about my physical problems, that I cannot think about anything else.

21. 0 I have noticed any recent change in my interest in sex.
    1 I am less interested in sex than I used to be.
    2 I am much less interested in sex now.
    3 I have lost interest in sex completely.

APPENDIX D

DESCRIPTION OF AND INTRODUCTION TO THE STUDY FOR POSSIBLE STUDENT PARTICIPANTS

Description of and Introduction to the Study
for Possible Student Participants

Are you stressed out? You have the opportunity to participate in a five week study on stress management and receive class credit for participation in research. The study will require attendance of 40-minute a week sessions for five weeks focusing on stress management. During the first and last sessions, you will be asked to complete several questionnaires. You will also be asked to complete various daily logs which will be explained to you. You may also be asked to practice the stress management techniques you are taught at home on a daily basis.

If any of the following apply to you, we ask that you do not participate in the study:

(a) if you have received prior training in stress management or relaxation training,

(b) if you are currently receiving psychotherapy,

(c) if you have had any psychotic experiences such as hallucinations or delusions,

(d) if you have had any dissociative experiences (involving a change in consciousness during which one's sense of reality or identity is lost and replaced by a feeling of unreality or altered sense of identity),

(e) if you are taking medications, particularly insulin, anticonvulsants, sedatives, hypnotics, antihypertensives or cardiovascular medication, or

(f) if you have a history of seizures.

If none of these statements applies to you and you are interested in participation in the study, you will be asked to sign a consent form and then complete a questionnaire before you are included in the study. You will be assigned a code number at the beginning of the study which will be used on the various measures to identify you. This will be done to ensure confidentiality of your data.

(Pass out consent forms, the Beck Depression Inventory and a sign-up sheet for names and phone numbers of interested students).

APPENDIX E

OUTLINE FOR RELAXATION TRAINING PLUS SELF-MONITORING OF STRESSORS GROUP

Outline for Relaxation Training Plus

Self-monitoring of Stressors Group

Session I:

I. General Introduction to the Study (Appendix I) and Completion of Remaining Measures by Subjects

   A. Demographic Information

   B. General Self-efficacy Scale

   C. State-Trait Anxiety Inventory

II. Introduction of the Self-monitoring of Stressors Logs

   A. Distribution of the logs

   B. Overview of the instructions

   C. Answering of questions

III. Introduction to the Breathing Exercises (see Appendix L)

Session II:

I. Self-monitoring of Stressors Logs

   A. Collection of the Logs

   B. Answering of any questions about the logs

II. Review of Breathing Techniques

III. Training in Neuromuscular Relaxation Training (see Appendix L)

IV. Instructions to practice the Neuromuscular Relaxation Exercises at Least Once a Day

V. Relaxation Training Logs

   A. Distribution of the logs

   B. Instructions for completing the logs

   C. Answering of questions

Session III and IV:

I. Self-monitoring of Stressors Logs

   A. Collection of the logs

   B. Answering of any questions about the logs

II. Relaxation Training Logs

   A. Collection of the logs

   B. Answering of any questions about the logs

III. Review of Training in Breathing Exercises

IV. Review of Training in Neuromuscular Relaxation Exercises

Session V:

I. Collection of the Self-monitoring of Stressors Logs

II. Collection of the Relaxation Training Logs

III. Review of Training in Breathing Exercises

IV. Review of Training in Neuromuscular Relaxation Exercises

V. Completion of Measures by Subjects

   A. Beck Depression Inventory

   B. General Self-efficacy Scale

   C. State-Trait Anxiety Inventory

VI. Completion of the Instructor Evaluation Forms

VII. Debriefing of Subjects

APPENDIX F

OUTLINE FOR THE RELAXATION TRAINING PLUS SELF-MONITORING OF PLEASURABLE ACTIVITIES

Outline for the Relaxation Training Plus
Self-monitoring of Pleasurable Activities

Session I:

I. General Introduction to the Study (see Appendix I) and Completion of the Remaining Measures by the Subjects
   A. Demographic Information
   B. General Self-efficacy Scale
   C. State-Trait Anxiety Inventory

II. Introduction of the Self-monitoring of Pleasurable Activities Logs
   A. Distribution of logs
   B. Overview of the instructions
   C. Answering of questions

III. Introduction to the Breathing Exercises (Appendix L)

Session II:

I. Self-monitoring of Pleasurable Activities
   A. Collection of the logs
   B. Answering of any questions about the logs

II. Review of Breathing Exercises

III. Training in Neuromuscular Relaxation Training (see Appendix L)

IV. Instructions to Practice the Neuromuscular Relaxation Exercises at Least Once a Day

V. Relaxation Training Logs
   A. Distribution of the logs
   B. Instructions for completing the logs

C. Answering of questions

Session III and IV:

I. Self-monitoring of Pleasurable Activities Logs

A. Collection of the logs

B. Answering of any questions about the logs

II. Relaxation Training Logs

A. Collection of the logs

B. Answering of any questions about the logs

III. Review of Training in Breathing Exercises

IV. Review of Training in Neuromuscular Relaxation Exercises

Session V:

I. Collection of the Self-monitoring of Pleasurable Activities Logs

II. Collection of the Relaxation Training Logs

III. Review of Training in Breathing Exercises

IV. Review of Training in Neuromuscular Relaxation Exercises

V. Completion of Measures by Subjects

A. Beck Depression Inventory

B. General Self-efficacy Scale

C. State-Trait Anxiety Inventory

VI. Completion of the Instructor Evaluation Forms

VII. Debriefing of Subjects

APPENDIX G

OUTLINE FOR RELAXATION TRAINING ALONE

Outline for Relaxation Training Alone

Session I:

I. General Introduction to the Study (see Appendix I) and Completion of Remaining Measures by Subjects

   A. Demographic Information

   B. General Self-efficacy Scale

   C. State-Trait Anxiety Inventory

II. Introduction to the Breathing Exercises (see Appendix L)

Session II:

I. Review of the Breathing Techniques

II. Training in Neuromuscular Relaxation Training (see Appendix L)

III. Instructions to Practice the Neuromuscular Relaxation Exercises at Least Once a Day

IV. Relaxation Training Logs

   A. Distribution of the logs

   B. Instructions for completing the logs

   C. Answering of questions

Sessions III and IV:

I. Relaxation Training Logs

   A. Collection of the logs

   B. Answering of any questions about the logs

II. Review of Training in Breathing Exercises

III. Review of Training in Neuromuscular Relaxation Exercises

Session V:

I. Collection of the Relaxation Training Logs

II. Review of Training in Breathing Exercises

III. Review of Training in Neuromuscular Relaxation Exercises

IV. Completion of Measures by Subjects

A. Beck Depression Inventory

B. General Self-efficacy Scale

C. State-Trait Anxiety Inventory

V. Completion of the Instructor Evaluation Forms

VI. Debriefing of the Subjects

APPENDIX H

OUTLINE FOR SELF-MONITORING OF STRESSORS ONLY GROUP

Outline for Self-monitoring of Stressors Only Group

Session One

I. General Introduction to the Study (Appendix I) and Completion of remaining measures by subjects

A. Demographic Information

B. General Self-efficacy Scale

C. State-Trait Anxiety Inventory

II. Introduction of the Self-monitoring of Stressors Logs

A. Distribution of the logs

B. Overview of the Instructions

C. Answering of questions

III. Introduction to Sympathetic and Parasympathetic and Neuromuscular Nervous Systems

A. Explanation of the pathways and neurotransmitters involved

B. Various physiological effects of activation of the Sympathetic, Parasympathetic, and Neuromuscular Systems

Session Two

I. Self-monitoring of Stressors Logs

A. Collection of the logs

B. Answering of any questions about the logs

II. Introduction to the Neuroendocrine Axis

A. Explanation of the pathways involved in the axis

B. Explanation of the various possible physiological effects of activation of the neuroendocrine axis

Session III

I. Self-monitoring of Stressors Logs

A. Collection of the logs

B. Answering of any questions about the logs

II. Introduction to the Endocrine Axes

A. Overview of the four primary endocrine axes

B. Explanation of the physiological pathways of the adrenal cortical axis

C. Explanation of the possible physiological affects of activation of the adrenal cortical axis

Session IV

I. Self-monitoring of Stressors Logs

A. Collection of the logs

B. Answering of any questions about the logs

II. Introduction to the Second Primary Endocrine Axis, the Somatotropic Axis

A. Explanation of the physiological pathways of the somatotropic axis

B. Explanation of the possible physiological effects of activation of the somatotropic axis

III. Introduction to the Third Primary Endocrine Axis, the Thyroid Axis

A. Explanation of the physiological pathways of the thyroid axis

B. Explanation of the possible physiological effects of activation of the thyroid axis

IV. Introduction to the Fourth Primary Endocrine Axis, the Posterior Pituitary Axis

A. Explanation of the physiological pathways of the posterior pituitary axis

B. Explanation of the possible physiological effects of activation of the posterior pituitary axis

Session V

I. Self-monitoring of Stressors Logs

A. Collection of the logs

B. Answering of any questions about the logs

II. Completion of the Measures by the Subjects

A. The Beck Depression Inventory

B. The General Self-efficacy Scale

C. The State-Trait Anxiety Inventory

III Completion of the Instructor Evaluation Forms

IV. Debriefing of the Subjects

APPENDIX I

INTRODUCTION TO THE FIRST SESSION

Introduction to the First Session

Hello, and welcome to this study on stress management. My name is _____ and I will be leading this group. You will be learning training in stress management techniques for reduction of stress during the course of this study. If you have any questions along the way during the course of the study, please feel free to ask them. I may not be able to answer all of your questions, but I will do my best. If you need to reach me between sessions with a question regarding the study, my number is: _____. Now, let's get started. (Follow outline for your particular group).

APPENDIX J

DAILY SELF-MONITORING STRESS LOG

Daily Self-monitoring Stress Log

Instructions: In the space provided below, list several stressors (at least 2) you have experienced today. These can be positive or negative events such as excitement about a date, attending a new group or social activity, an argument with someone, dealing with traffic, not enough sleep, or time pressure. Then next to each stressor, describe the reaction you had to the stressor (headache, muscle tension, heart palpitations, stomach ache, knot in stomach, anxiety, sadness, anger, etc.). Please record the stressor and your reaction to it within one hour after it occurs. Carry this log with you throughout the day if necessary.

ID Number:_____

Date Started:_____

Stressor (Event, Interaction, Thought)	Reaction to Stressor (Physically, Emotionally)	When Stressor Occurred	Time Recorded
Day 1:			
Day 2:			
Day 3:			
Day 4:			
Day 5:			
Day 6:			
Day 7:			

APPENDIX K

DAILY SELF-MONITORING LOG OF PLEASANT ACTIVITIES

Daily Self-Monitoring Log of Pleasant Activities

Instructions: Please list in the space provided below at least one pleasant activity or positive diversion from stress that you did today. This could include doing a hobby, exercising, talking to a friend, taking a walk, reading an enjoyable book, etc.

ID #:_____

Date Log Started:_____

	Pleasurable Activity
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	

APPENDIX L

OUTLINE FOR RELAXATION TRAINING

Outline for Relaxation Training

I. Introduction to Breathing Exercises

A. Overview of usefulness of breathing techniques

B. Training in breathing exercises

1. Instruction for placement of hands on abdomen

2. Instructions for inhalation and description of imaginary pouch being filled in abdomen

3. Instructions for holding breath briefly and repeating to self, "My body is calm."

4. Instructions for exhalation

5. Repeat of the above 4 steps of instructions several times

C. Instructions to Practice the Breathing Exercises Approximately 10 to 20 times a day

II. Introduction to the Neuromuscular Relaxation Exercises

A. Overview of the usefulness of the technique and background information

B. Precautions regarding the practice of the neuromuscular relaxation techniques

1. Precautions regarding nerve problems, weak or damaged muscles or skeletal problems and regarding clenching of teeth

C. Training in the neuromuscular relaxation techniques

1. Tension in relaxation exercises for chest involving inhaling and exhaling

2. Tension and relaxation exercises for lower legs

3. Tension and relaxation exercises for thighs and stomach
4. Tension and relaxation exercises for hands and arms
5. Tension and relaxation exercises for shoulders
6. Tension and relaxation exercises for face
7. Closure
8. Reawakening

D. Instructions to Practice the Neuromuscular Relaxation Techniques at least once a day

APPENDIX M

RELAXATION TRAINING LOG

Relaxation Training Log

Instructions: Please record in the space provided below for each day of the week the time of day that you practiced the progressive neuromuscular relaxation exercises, the length of time you spent doing the relaxation, and the tension level you felt before and after completion of the exercises. Rate the tension level on a scale from 1 to 10 with 1 being extremely relaxed and 10 being extremely tense. Please complete this log immediately after practicing the technique.

ID #:_____

Date Log Started:_____

	Time of day	Length of Practice	Tension Before/After
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			

APPENDIX N

EVALUATION OF INSTRUCTION

ID #:_____

Date:_____

Evaluation of Instructor

Please rate your instructor on the following items on the scale provided:

1. How clear was the instructor's presentation?

completely unclear 1 2 3 4 5 6 7 very clear

2. How much did you enjoy listening to this instructor?

not at all 1 2 3 4 5 6 7 very much

3. How would you rate this instructor as a teacher?

terrible 1 2 3 4 5 6 7 excellent

4. How helpful was this instructor in answering your questions?

not helpful at all 1 2 3 4 5 6 7 very helpful

5. Please describe any changes or observations you have made about yourself while participating in the study:_____

_____

_____

_____

6. Please write any comments or feedback you have about the study:_____

_____

_____

_____

Thank you for your participation in the study.

APPENDIX O

DEBRIEFING SCRIPT FOR SUBJECTS AT THE CONCLUSION OF THE STUDY

Debriefing Script for Subjects at the
Conclusion of the Study

You have been part of a stress management study that was designed to find out whether or not self-monitoring of stressors and thus increasing one's awareness of one's reaction to stress will enhance the effectiveness of relaxation training. Relaxation training is a well-proven stress reduction technique, with a number of variations, two of which were included in this study, progressive neuromuscular relaxation and deep breathing techniques.

Five groups were included in the study. One group received relaxation training plus self-monitoring of stressors. This was hypothesized to be the most powerful stress reduction group. A second group received relaxation training plus self-monitoring of pleasant activities. The self-monitoring of pleasant activities component was not expected to enhance stress reduction. It was included to counteract the effects of adding a second component to the relaxation plus self-monitoring of stressors group. A third group received relaxation training only without any self-monitoring components. A fourth group self-monitored stressors alone to evaluate whether this component by itself would be effective. This group also received some stress education which was not expected to reduce stress. And a fifth group was a waiting-list control group. They filled out the measures at the beginning and end of the study, but

did not receive any treatment. You were in the group receiving_____.

All groups were given 3 measures: the State-Trait Anxiety Inventory, the Beck Depression Inventory, and the General Self-efficacy Scale. The study evaluated which groups had the most significant reductions in state and trait anxiety, and depression, and the most significant increase in self-efficacy. The State-Trait Anxiety Inventory is divided into two scales measuring state anxiety and trait anxiety. The scale is designed to measure temporary, subjective feelings of tension and apprehension. The trait scale measures trait anxiety, a relatively stable disposition to perceive situations as dangerous.

The Beck Depression Inventory is designed to measure signs and symptoms of depression and scores can range from normal to severe. The General Self-efficacy Scale is designed to measure the belief that one has the ability to behave in such a way as to produce desireable outcomes. When an individual's self-efficacy is enhanced, they will be more likely to engage in coping behavior, they will exert more effort in doing so, and will sustain their effort for longer periods of time in the face of obstacles and adverse experiences.

Those individuals who have been in the Self-monitoring of Stressors alone group will now have the opportunity, if they wish, to receive relaxation training in conjunction

with self-monitoring of stressors. There will be sign-up sheet up front for those of you who are interested. However, your participation in the study is complete, and this is being offered as an optional choice for you. If you know of other students who are in the Waiting-List Control group, please do not discuss the study with them for the next five weeks since they will be receiving the treatment and we would like them to be blind to the study.

Are there any questions about the study? (Wait for and answer questions). What did people experience as a result of participation in the study? (Watch for signs that someone is experiencing distress. Encourage any such individuals one-on-one after the debriefing to seek individual psychotherapy. You can refer them to the student counseling services offered on campus).

Thank you for your participation in the study.

APPENDIX P

DEMOGRAPHIC INFORMATION

Demographic Information

ID #:_____

Date:_____

Age:

Gender: M / F (please circle one)

Race: (a) caucasian
(b) black
(c) oriental
(d) American Indian
(e) other _____

College Status: (a) Freshman
(b) Sophomore
(c) Junior
(d) Senior
(e) Other _____

Marital Status: (a) single
(b) married
(c) divorced
(d) widowed
(e) separated

Number of Children You Have: (a) 0
(b) 1
(c) 2
(d) 3
(e) other _____

Average work load (employment) per week:

(a) 1-10 hours
(b) 11-20 hours
(c) 21-30 hours
(d) 31-40 hours
(e) not employed
(f) more than 40 hours

Average school load per week (including classtime and study time): (a) 1-15 hours
(b) 16-30 hours
(c) 31-45 hours
(d) 46-60 hours
(e) more than 60 hours

APPENDIX Q

STUDENT COMMENTS AND SAMPLES OF LOG ENTRIES

Student Comments and Samples of Log Entries

The students had a variety of comments to make about the study which varied widely depending much upon the group to which they were assigned. For example, one student in the RSMS group said, "I am more irritable than I thought I was and more emotionally stressed out because of recent events. I discovered that I do feel a lot of stress but when I'm through with that event the stress slowly leaves. I think that this study was interesting. It teaches how to somewhat relieve stress and can show yourself just how stressed you are with the daily log." Another student in the same group wrote, "I have noticed that as my workload got bigger, my stress didn't. I am a lot calmer and relaxed about doing my work. I really never experienced anything like this before. I really enjoy the stress tests and it has done a lot for me. I will continue to use this exercise." In the RSMP group, one student commented, "I suffer from much more stress than I ever thought I did. It really helped me learn to control my stress. I sleep better now and don't panic over exams. Thank you!" Another student in the RSMP group wrote, "As a result of practicing the techniques learned to reduce stress, I feel better able to cope with tension. I enjoyed this study and feel that it was useful to me." In the RT group, one student commented, "I've learned a little about me and how to relax myself during stressful situations. It was nice to learn more

about relaxation exercising." Others wrote, "I've been more calm," "I am able to relax regularly," and "I find it a little easier to calm down when I am tense." However, students in the SMS group made many more negative comments such as, "This has just make me realize how stressed I am, which probably added more stress! I hope this was the control group, because you've totally lost me as to a purpose if not." Another wrote, "I don't think I've changed all that much. It doesn't seem any different than going to class except that we don't take any notes from the lecture so it's a waste of time. Too much information was thrown at us with no reason to pay attention. This experiment didn't help me with stress at all. I guess I was in the control group." Yet some students did seem to benefit somehow from this group as indicated by such comments as, "I have become more aware of stressful times in my life. It helps you to evaluate your life and how you feel," and "I realized how I really react to stress in my life. It was interesting to point out stressful factors in one's life."

Subjects completing the Self-monitoring of Stressors Logs made some interesting entries. Examples of some of these entries, particularly the stressor and the reaction to the stressors included the following: "Angry, argument with roommate; anger, tension," "dissappointed, problem with a boy; depressed, confused, tired," "tired, not much sleep, stressed over work; headache," "lunch with Mary; incredible

joy," "had to give up my car; anger," "late for crew practice; tense, nervous," "thinking of upcoming work; tense, nervous," "French exam; heart rate increased, nervous, jumpy," "Biology lab test; very nervous, felt sick, heart rate jumped, stomach felt strange," "asked a friend out; scared senseless," "bought cigarettes (I'm trying to quit); nervous, nauseous," "started intermural soccer; knot in stomach," "started community service (tutoring); excited, happy, satisfied," "took a chemistry quiz; upset, angry, thought I failed," "had an argument with a good friend; sad, frustrated," "woke up late for an 8:00 class; rushed, upset," "I had to go home for a funeral; nervousness, anxiety, knot in my stomach," "Italian oral; nervous, heart beating," "friend leaving; worried, stomach in knot," "thought of Mary on Valentines Day; excited, worried, anxiety attack," "late to pick up a friend; heart palpitations," "get Spanish and Calculus tests back; anxiety," "not enough sleep; muscle tension," "got very tired; anxious, headache," and "received flowers for Valentine's Day early; happy, excited" as well as many others. Their logs seemed to reflect a variety of real life daily stressors with accompanying reactions emotionally and physically.

On the Daily Self-Monitoring Log of Pleasant Activities, students wrote a variety of activities that they did including the following: "walked in park, swimming,

went to basketball game, relaxed-reading magazines in bed, socialized with friends, exercised, talked to my boyfriend, went out to dinner with friends, slept in late, spoke to a close friend about stress, wrote poetry, went to bed earlier than usual, went to the mall, singing class, talked with mom on the phone, went to an ice hockey game, went to church early to pray silently, had a good dinner at my grandmother's, shot pool, played in snow with neighborhood children, played computer games, going to boat show with my father, went to a party, and listened to music." Activities which were repeated most frequently included talking to and spending time with friends, talking with parents, exercising, and watching TV.

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