THE EFFECTIVENESS OF AN ELECTRONIC-MAIL CAMPAIGN TO MODIFY STRESS LEVELS, MOOD STATES, AND COPING TECHNIQUES AMONG EMPLOYED ADULTS

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The present study was conducted to explore the effectiveness of a worksite stress management program delivered via electronic mail (e-mail). One hundred and thirty-seven employed adults (36 males, 102 females; mean age = 29.46) from several diverse businesses consented to participate. The volunteers completed Cohen's Perceived Stress Scale, the Daily Hassles Scale, the Daily Work Hassles Scale, the TCU Self-Ratings Scales, and a demographic and opinion questionnaire. Individuals in the treatment group received e-mail messages twice weekly and had access to a website for three months about a variety of cognitive-behavioral techniques for managing worksite stress. A MANCOVA of post-intervention stress levels indicated that individuals who received the stress management messages perceived the same amount of stressors and hassles as individuals who did not receive the messages [$F(5, 86) = 0.95$, $p = .45$]. However, a MANCOVA of post-intervention perceived mood states revealed a tendency for individuals in the treatment group to be less depressed, anxious, and angry than individuals in the control group [$F(3, 92) = 2.44$, $p = .07$]. Demographic variables did not influence the outcome variables and pre- and post-test absenteeism and illness rates were similar for treatment and control groups. Coping skill usage was similar in amount and frequency, but differed in quality between the groups. The findings of the present study indicate that health promotion programs can be feasibly and effectively delivered via e-mail in the worksite.

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CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

The impact of stress on today's workforce makes it a critical issue of study (Cooper, 1986). Attempts to address the issue through the development of more effective and more efficient stress management programs for the employee must be preceded by an analysis of the concept of stress, the consequences of chronic stress, and previous stress management programs. Stress has been an elusive subject to operationally define because theorists conceptualized it in a series of relatively incompatible models. History indicates that theorists have viewed stress as a stimulus, a response, or a transaction between a stimulus and a response (Cooper, Dewe, & O'Driscoll, 2001). Each model of stress has both virtues and drawbacks, which are discussed in the following paragraphs.

Models of Stress

Stimulus model. The stimulus model of stress evolved from the works of Claude Bernard and Walter Cannon. Bernard pointed out that simple, unicellular organisms are only able to live and survive in a supportive external environment. Their maintenance is dependent upon the correct balance of water, nutrients, oxygen, and temperature. More complex organisms are more independent from the physical environment because they can self-regulate and adjust more readily to changes in the environment, but they are highly responsive at a cellular level to internal environmental changes. The organism's life is dependent upon the maintenance of a stable internal environment despite a changing external environment. Stress according to Bernard, therefore, is a stimulus that challenges the maintenance of life. Cannon expanded Bernard's theories, first defining the process of maintaining internal stability in a changing

environment as homeostasis. Homeostasis is maintained as nerves transmit information to the brain about the internal and external environments, and the brain stimulates reactions to adjust to the challenges. Cannon acknowledged that both physical and psychological challenges could disrupt homeostasis (Lovallo, 1997).

The stimulus model of stress indicates that there is an identifiable source of stress that elicits a response from the individual. If too many stimuli overwhelm the individual's tolerance level, a breakdown in coping behavior may occur. The stimulus model is based on an engineering approach to stress, which is concerned with the elasticity of substances (Bartlett, 1998). When a force is exerted on a substance, the "strain" caused by the force "stresses" the substance. Permanent damage occurs when the elastic limit of the substance is exceeded. The analogy to the human stress model is that environmental stimuli stress the individual and may lead to ill health if the strain exceeds the individual's tolerance limit. Focusing on the specific life events that are sources of stress makes the stimulus the most important part of understanding stress, which is the approach offered by Holmes and Rahe (1967) in their Social Readjustment Rating Scale. This scale offers a list of stressful events that are ranked in terms of impact, which may have a detrimental effect on the health of the respondent.

Following the logic of the stimulus model of stress, identifying and eliminating the stress-inducing stimuli would greatly reduce the undesirable outcomes of stress. Therefore, stress management interventions following this model focus on reducing the factors in the work environment that are potential stimuli of stress (i.e., temperature, lighting, social density, etc.). Additionally, this approach is elaborated by the theory that there may be an optimal stress level, as explained in the inverted U hypothesis by Yerkes and Dodson (1908). Too much or too little stress may result in poor performance by the individual, depending on the interaction with task

difficulty. The inverse relationship between task difficulty and the optimum stress level indicates that as a task becomes more difficult, the level of stress should decrease to ensure a good level of performance. Stress management programs might try to identify the optimal level of stress for maximum performance in the worksite.

According to King, Stanley, and Burrows (1987), the flexibility of the inverted U hypothesis makes it almost impossible to disprove. At the same time, there has not been any strong, convincing evidence that demonstrates the truth of the theory. Yerkes and Dodson developed their hypothesis based on their work with rats, so the applicability of the theory to human stress is not absolute. Another argument against the inverted U hypothesis and the stimulus model of stress is that it is not practically applicable as a stress management strategy. The demands of tasks change quickly, so managers are faced with the impossible tasks of either predicting the difficulty level of a task and pre-stressing individuals, or trying to raise and lower stress levels to produce optimum performances.

Response model. The response model of stress defines stress from the perspective of individual experience and responses, which may be inferred on the basis of physical, emotional, and behavioral symptoms. Strong evidence for this model can be gleaned from the numerous articles and books on the link between stress and the breakdown of physical, psychological, or behavioral functioning (Cassidy, 1999). The response model asserts that the appearance of various symptoms is indicative of the presence of stress.

The response model has its roots in the General Adaptation Syndrome (GAS) model, which emerged from Selye's work with rats. He noticed a similar physical reaction, including enlarged adrenals, shrunken thymus and lymph nodes, and the development of ulcers, which occurred as a response to unpleasant environmental condition or a wide variety of noxious

substances (which Selye termed "stressors"). He defined stress as the body's response to any demand, whether the demand is pleasant or unpleasant. Selye (1978) states explicitly, "…stress is not simply nervous tension…" (p. 62) because the general, predictable stress reactions occur in organisms without nervous systems, in unconscious or anesthetized patients, and in cell cultures. Physical alarm, resistance, or exhaustion characterizes the stress response and varying levels of the body's tolerance to the "fight or flight" reaction.

Selye's work with rats demonstrated that exposure to noxious stimuli resulted in a consistent triad of physiological reactions, and the same was assumed to be true for humans. Indeed, there are some stimuli that produce the human stress response without cognitive interpretation of the demands or the ability to cope. According to one author, those stimuli are "…amphetamine, caffeine, theobromine, theophylline, nicotine, extreme heat, and extreme cold…" (Everly & Sobelman, 1987, p. 17). Worksite stress management programs following this model might seek reduction in the number of stressors and stress-producing stimuli so that the stress response can be avoided when possible.

Limitations of the stimulus and response models. Both the stimulus and response models pay little attention to individual differences in perception and responses to stress, as well as the interaction between the two components of the stimulus-response relationship. Also ignored are the properties of the stimuli and responses, such as frequency, intensity, and duration, which have important implications in explaining stress (Cooper, Dewe, & O'Driscoll, 2001). Neither the stimulus or response models can account for variablility between individuals, so other variables must be considered.

Personal interpretation and characterization of the situation is important in understanding stress. Selye (1978) acknowledges that pleasant conditions may elicit the stress response,

although they cause less damage than unpleasant conditions (eustress vs. distress), which indicates that there must be a subjective evaluation of the quality of the stressor. The presence of a stressor does not necessarily guarantee that an individual will experience distress. Additionally, the absence of stressors (i.e., unpleasant situations or threats to homeostasis) does not guarantee that an individual will feel relaxed or stress-free. Researchers have also shown that stress can result from constraint, a low level of demands, or boredom; a finding that is not explained by Selye's research (King, Stanley, & Burrows, 1987). Cognitive evaluations of the situation and the self are necessary to result in the experience of stress in those cases.

A variable besides the stimulus or response is necessary to explain the variability of the production of the stress response. It seems clear that human stress is mediated by something else, like a cognitive evaluation of the situation and self. Even Selye acknowledges that the individual's interpretation of the event as positive or negative has an influence on the amount of damage produced by the stress response, with positive demands producing much less physical damage than negative demands. Although the ultimate adaptation of the organism may be influenced by interpretation, the elaboration of this point is not sufficient in the stimulus or response models. The transactional model compensates for some of the shortcomings of the other models.

Transactional model. The development of the transactional model of stress was strongly influenced by the work of Richard Lazarus, as well as the upsurge of the cognitive psychology movement. These influences in stress research resulted in two major conclusions: 1) any event may be a potential stressor, and 2) no event can be labeled as a stressor without a person's cognitive appraisal. Appraisal, according to Lazarus, is the cognitive evaluation process that mediates between demands and resources, with the goals and beliefs of the individual. A stress

stimulus is labeled as a threat if a harmful condition is anticipated in the future, and reactions to threats may be physiological, affective, and / or behavioral in nature (Lazarus, 1966). Primary appraisal involves the identification of problems and secondary appraisal involves the identification of coping resources. Beliefs and cognitive style may contribute to individual differences in stress perception and health. Dominant themes in this research area are perceived control / helplessness, attributional style, pessimism / optimism, problem-solving style, motivation toward achievement, and perceived social support (Cassidy, 1999).

The transactional model differs from the previous linear or sequential models in that it characterizes stress in terms of a continuing association between an individual and his or her environment. Both the stimulus and response models are encapsulated within the transactional model, but the individual is considered in the context of a uniquely perceived environment. Stress is defined by the individual's cognitive awareness that an encounter that disrupts homeostasis may be harmful, threatening, or challenging, followed by an appraisal of whether one has the resources to cope with the encounter. Stress occurs when the individual appraises the encounter as exceeding his capacity to cope with it. Thus, the transactional model considers stress in terms of a dynamic psychological process and context, the perception of which is mediated and altered by information gleaned from various feedback loops (Bartlett, 1998).

Since cognitive appraisal plays such a large role in the transactional model, worksite stress management programs following this model might help participants develop coping strategies to counteract stressors and negative cognitive appraisals. These programs may enable individuals to examine the things they evaluate as important and the meanings they assign to various events. Altering the individual's belief system and improving the coping resources may reduce the impact of stressful situations in the workplace.

Some of the confusion in the literature could be clarified by defining stress as only that which is disruptive, rather than a necessary fact of life or any demand upon an organism (King, Stanley, & Burrows, 1987). Kolbell's (1995) definition of stress seems to best encapsulate the transactional model of stress, stating that stress is a result of a demand that exceeds the individual's perceived ability to cope, which results in a physiological or psychological disturbance. Pratt & Barling (1988) offer further clarification of terms commonly used in stress literature. They state, "…stressors are objective environmental events, stress is the subjective experience of the event, and strain is the person's psychological and / or physiological response to stress" (p. 42). For the purposes of this paper, the guiding sentiments of the transactional model and the above terminology will be followed for the remainder of the discussion.

Job-Related Stress

Workplace stress has become an almost universal phenomenon in life. Work itself is a mixed blessing, taking away idle time while providing monetary reward for both survival and comfort. The Industrial Revolution in the late 18th and early 19th centuries transformed the nature of work, making standard the production- and time-pressures that have become increasingly high in today's workforce. The working class was subject to greater health risks as technological advances transformed the workplaces and factories. Additionally, the changes that accompanied the revolution included an imbalance of power and social status between the capital investors and the hired workers (Holt, 1993). The urgency of machine-regulated production, the risk to life and limb, and the imbalance of power are only a few of the potential sources of stress in today's workplace.

While an increasing number of people find work to be a significant source of stress, not everyone finds the same things to be stressful, as discussed in the transactional model. However,

understanding the major sources of stress in the modern workplace is an important aspect of developing effective stress management programs (Sutherland & Cooper, 1988). Several researchers have attempted to identify and quantify the most common sources of job stress (Cooper, 1986; Sutherland & Cooper, 1988; Ferguson, 1987; Cooper & Murphy, 2000), and it seems that occupational stress factors can be generally categorized into job-specific / organizational, external, or person-specific sources (Cooper, Dewe, & O'Driscoll, 2001).

Potential job-specific or organizational stressors are those sources of stress that are intrinsic to the job, work environment, or the worker's role in the organization. Sources of stress that are intrinsic to the job might include the physical working conditions, an overwhelming workload, pressures to work quickly, and responsibility for the lives of others. Organizational structure and climate, such as decision-making latitude, behavior restrictions, office politics, and ineffective consultation have the potential to be stressors (Sutherland & Cooper, 1988). Factors specific to the worker's role in the organization, such as conflicting or unclear job demands, can be stressors. Career development issues, such as overly rapid promotion, under-utilization of the worker's skills, job insecurity, impending retirement, and lack of opportunity for advancement, have been shown to be sources of stress. A final group of job-specific stressors includes relationships at work with bosses, subordinates, or colleagues, which may include harassment, ineffectiveness, or uncooperativeness (Sauter et al., 1999; Sutherland & Cooper, 1988). There is a great deal of variation in individual interpretation and reaction to the situations listed in this category. In general, organizational and job-specific stressors are extremely slow to change (Sutherland & Cooper, 1988).

The effects of pressures outside work also have the potential to disrupt and negatively influence job performance. Examples of common stressors outside work include family conflict,

economic difficulties, time demands, and incongruence of personal and corporate belief systems. The effect of distress at home that is carried over into the normal functioning at work is referred to as the home/work interface, and may exacerbate difficulties that are experienced at either home or at work (Ellis, Gordon, Neenan, & Palmer, 1997). Dual-career relationships are an additional source of stress, although the situation may be necessary to avoid financial stressors (Sutherland & Cooper, 1988). Fighting traffic on the way to and from work is an additional stressor that may be particularly influential on work performance (Ferguson, 1987). While these external factors may contribute to the stress dynamic, they are essentially unmalleable with workplace interventions.

As illustrated in the transactional model, person-specific factors, such as individual characteristics and cognitive styles, contribute to the stress dynamic (Sutherland & Cooper, 1988). "The assignment of meaning that occurs during stressful transactions is highly contextually embedded within the interpretive framework of the individual. This framework is largely based upon an individual's life history and it is therefore experiential-phenomenological in nature" (Bartlett, 1998, p. 98). The internal pressures that people make for themselves due to irrational, dysfunctional thinking and beliefs can cause distress (Ellis, Gordon, Neenan, & Palmer, 1997). Other commonly sited examples of stress-inducing personal characteristics include the tendency toward a Type A behavior pattern, levels of anxiety and neuroticism, level of self-esteem, and comfort with ambiguity (Sutherland & Cooper, 1988). Factors such as age, ethnicity, physical fitness, and ability or experience level can contribute to stress for a variety of reasons (Cooper & Murphy, 2000; Sutherland & Cooper, 1988). These personal characteristics act as moderator variables that can make the individual more or less susceptible to stress, and can

determine how easy or difficult it is to learn and incorporate coping techniques (Sutherland & Cooper, 1988). The focus of change generally lies in these person-specific factors.

An understanding of the wide variety of factors that contribute to stress is inadequate for preventing negative outcomes because the research consensus indicates that stress does not inevitably result in illness. Negative effects of stress may only become obvious under certain definable conditions (Holt, 1993). Some of the moderators of occupational stress that have been investigated include personality, perception of control, social support, frequency of health practices, and coping style (Cooper, Dewe, & O'Driscoll, 2001; Cooper & Murphy, 2000; Day & Livingstone, 2001; Wiebe & McCallum, 1986). Physiological moderator variables might include use of alcohol, drugs, and caffeine, disruption of diet, exposure to dust and chemical pollution, and exposure to radiation. Also included in research of moderator variables are situational factors, such as characteristics of the work unit, job autonomy, and co-worker and supervisor relationships, organizational structural factors, and sociological factors, such as social support outside work, interpersonal relationships, and community involvement (examples sited in Holt, 1993). Thus, a variety of factors must be taken into account when studying stress management programs.

Needs Assessment – Why Another Worksite Stress Management Intervention?

There is a continued interest in the development, implementation, and improvement of work site interventions that promote the management of stress (Murphy, 1996), and preventative health promotion programs are the approach advocated by the United States government (Pelletier, 1987). According to a national survey, almost one-third of Americans consider job stress to be the primary source of stress in their lives, and almost half of those surveyed ranked their jobs as very stressful (Northwestern National Life Insurance Company, 1991 in Murphy,

1996). People spend the majority of their waking, adult lives at work (Pelletier, 1987), and everyone who works can expect to be exposed to some form of stress during the course of a career (Murphy, 1996). Because so many people and organizations are negatively affected by worksite stress and the interventions thus far have not eliminated the problem, there is a need for further refinement of the approach to stress management.

Worksite stress is a considerable threat to both personal and organizational health (Sutherland & Cooper, 1988). Evidence of the effects of occupational stress is derived from commonly measured variables such as absenteeism, turnover in staff, rate of health care claims, number of industrial accidents, efficiency of production and of work duties, level of worker morale, quality of workmanship, evaluations of job performance, reports of burnout, and rate of suicides (Ellis, Gordon, Neenan, & Palmer, 1997). Unacceptable rates on any of the above variables can be extremely costly for the individual and the organization.

Organizations are willing to implement stress management programs for two main reasons. One of the primary reasons for the implementation of a worksite health promotion program is to improve and increase work performance (Donaldson, 1995). Employers correctly presume that the improvement of employee health will be correlated with improvements in the quantity and quality of work produced (Donaldson, 1995). Health promotion programs are also effective at improving employee morale, which may indirectly improve work performance as job satisfaction improves (Pelletier, 1987). A second reason for implementing a health promotion program in the workplace is that chronic diseases incur the most medical expenses and are the most expensive to treat (Fielding, 1984). Because chronic diseases may be precipitated by stress, it will likely save the employer money and lives if stress management techniques are taught (Fielding, 1984). Pelletier (1987) sited a study by the National Institute on Occupational Safety

and Health (NIOSH) that estimated the annual cost of executive stress to be between $10 and $20 billion, when lost work, hospitalization, outpatient care, and mortality were considered. "All employers and employees… regardless of the nature of their work, have problems associated with a number of prevalent health problems that are amenable to health promotion / disease prevention efforts" (Fielding, 1984, p. 15). Examples of commonly sited stress-related health problems include hypertension, smoking behavior, lack of exercise, and poor nutritional habits. Alcohol-abuse is another costly stress-related health problem that may cost employers up to $45 billion per year in direct and indirect expenses (Pelletier, 1987).

There is extensive documentation that stress management programs can reduce the psychological and physiological problems associated with excess stress (Everly, 1989), but these potentially beneficial programs tend not to be widely distributed or used (Bartlett, 1998; Fries et al., 1993; Pelletier, 1987). Lack of distribution may be attributed to the fact that traditional stress management interventions are quite costly, receive inadequate funding, and are not extensively supported in well-designed cost-effectiveness studies. Therefore, the financial incentive to implement a stress management program in workplaces is not always readily available (Pelletier, 1987). Participation in a stress management group may be unintentionally stressful, in and of itself. The daily requirements of group training are burdensome for the participants because they take away from time that could be spent reducing the workload (Kolbell, 1995). Kolbell also found that traditional health promotion programs require the worker who wishes to learn new skills to take time away from work tasks to attend lectures or workshops, which can be costly in terms of lost productivity.

Failing to address the issue of employee stress is often more costly for the corporation. Among American workers, perceived stress has been associated with higher absenteeism rates,

lower productivity, and increased numbers of medial claims (American Psychological Association, 1992 in Jacobson et al., 1996). Additional indicators of stress at an organizational level include "…tardiness rates, grievances filed, employee assistance program (EAP) usage, rate and severity of work-related accidents, interdepartmental employee transfer rates, and employee turnover rates…" (Cooper Institute, 2001). Stress may sometimes have a negative psychological impact on the workforce in terms of decision-making ability. According to Janis (1993), individuals are likely to make more rash decisions when stress levels are high. Because a large part of the cognitive capacity is occupied by stress, the abilities to problem-solve and think clearly are diminished. Poor decisions can result in detrimental and costly outcomes for any business. For all of the above reasons, cost-conscious corporations may benefit from addressing the impact of employee stress on their corporate resources and the physical and mental health of their employees.

Stress and physical health. A number of researchers have looked at the association between stress and physical health, with greater stress generally being correlated with poorer health status (Hafen, Karren, Frandsen, & Smith, 1996; Heard, 1988; Jacobson, Aldana, Goetzel, Vardell, Adams, & Pietras, 1996; Whitehead, 1994). While researchers must be cautious in their attempts to generalize these findings to other situations (i.e., outside the laboratory), it appears as though a connection between longer-term stress and the development of physical health problems (Leventhal, Patrick-Miller, & Leventhal, 1998). The seriousness of the concern about work site stress is reflected in the Occupational Safety and Health Administration (OSHA) statement that stress is a workplace health hazard.

More than a few researchers have attempted to associate particular health problems with exposure to chronic stress. The following health problems have been identified as side effects of

chronic stress: peptic ulcers, ulcerative colitis, irritable bowel syndrome, hypertension, migraine headaches, Raynaud's disease, bronchial asthma, skin disorders (i.e., eczema, acne, psoriasis), and general immunosuppression (Everly, 1989). Stress has also been associated with cardiovascular disease risk and hormonal fluctuations, as well as a delay in recovery from acute stressors (Matthews, Gump, & Owens, 2001).

There are three main biological pathways that may be affected by stress: 1) neurological, 2) hormonal, and 3) psychoneuroimmunological (Bartlett, 1998). Stress may have a negative effect on health through repeated or sustained activation of the fight-or-flight response. Once something in the environment is perceived as a threat, the human body prepares itself for confrontation or escape by maximizing certain systems and minimizing others. There are two primary stress pathways in the neurological and neuroendocrinological systems, which are the sympathetic adrenal medullary response (SAM) and the hypothalamic pituitary adrenal axis (HPA). The sympathetic arm of the autonomic nervous system provides a rapid response mechanism, which controls an organism's acute stress response (SAM). Through the innervation of the smooth muscle and internal organs, messages are quickly sent to activate the bodily systems and to release epinephrine and norepinephrine (as neurotransmitters). In response, heart rate increases, digestion decreases, cellular metabolism increases, muscles tense, glycolysis increases, and blood flow to needed areas increases. This immediate and rapid response is generally short-term. To ensure continued responding, the hypothalamus in the brain receives information about the stimulus. A series of transmissions occur which eventually result in the additional release of norepinephrine, epinephrine, and enkephalines. Norepinephrine prolongs the sympathetic response, while epinephrine arouses the body for action. The neural and neuroendocrinological components of the SAM occur almost simultaneously, so that the neural

component occurs as soon as the stimulus is perceived and the neuroendocrinological response follows quickly.

The body also transmits messages via the activation of the glands of the endocrine system and the release of chemicals called hormones. Hormones are carried in the bloodstream and affect either a target organ or another gland. The effects are both slower and longer lasting than neural transmission, making hormonal activation an indication of chronic or longer-term stress. The neural and hormonal systems are connected in a feedback loop. It would be an oversimplification to say that the SAM is the way that all stressors exert their effects on the body, even though the SAM is activated by a number of different stressors. There are several hormones that respond to stress, which may either mediate or perpetuate organ damage. Also, psychological or cognitive interpretation of the stress influences different endocrine responses. Finally, the hypothalamic pituitary adrenal axis (HPA) is probably equally important in producing pathology. The hypothalamus secretes corticotropin releasing factor (CRF), which directs the anterior pituitary to release ACTH. The ACTH is a hormone that stimulates the release of glucocorticoid in humans, which mobilizes energy. Glucose amounts are increased in the blood and uptake is prevented in everything except the brain, which is critical for helping the organism respond to the stressor. The glucocorticoids also keep the inflammatory response in check and suppress the immune response. Glucocorticoids are helpful in the short-term, but can cause protein breakdown, fat breakdown, muscle and bone weakness, and overall immunosuppression in the long-term.

Psychoneuroimmunology is concerned with how cognitions and psychosocial factors influence the functioning of the immune system through neural and hormonal mediators. Research by Kiecolt-Glaser and Glaser indicates that there is significant data to conclude that

psychological stressors can lead to physical changes and damage, although the specific mechanisms that enable the interrelationship between the CNS and the immune system have yet to be identified (Bartlett, 1998). The vast majority of information in human stress literature is correlational or laboratory-based, so there is not an accurate way to gauge the susceptibility of the immune system in the real world. However, Cohen, Tyrrell, & Smith (1991) were the first researchers to show a cause-and-effect relationship between stress and illness in humans. Prior to exposure to a strain of rhinovirus, study participants completed questionnaires regarding psychological stress, personality, and lifestyle factors. The rhinovirus was delivered via nasal spray to otherwise healthy volunteers (N=400). The subjects were quarantined for 2 days before and 7 days after exposure to the common-cold causing virus. Cohen et al. found that psychological stress was associated with an increase in the risk of infection in a dose-response manner. Differences in infected versus uninfected individuals could not be attributed to behavioral health practices, personality factors, type of rhinovirus, or status prior to exposure. In other words, the rate of infection was determined primarily by the level of stress, with greater stress significantly increasing the likelihood of infection.

According to the diathesis-stress model, the specific health outcomes that occur as a result of stress depend on the vulnerabilities in certain organ or systems. People appear to differ in terms of their predispositions to react in physiological patterns in response to stress. For example, some people react with muscular tension while others produce stomach acid. This hypothesis is not compatible with Selye's theory that there is a predictable, general response to stress. In contrast, it appears as if certain people have tendencies to develop certain types of disease (Bartlett, 1998).

In the workplace, measurements of physiological indices, such as increased heart rate, blood pressure, or secretion of catecolamines and cortisol in the bloodstream, may be indications of stressful environments and failed coping strategies (Herd, 1988). However, it is often difficult to attribute the effects of job stress, per se, versus stable, transitory, and / or procedural mitigating factors (Rowland, Ferris, Fried, & Sutton, 1988). Stable factors like family history, gender, and age must be considered in accounting for physiological differences among research participants. In an ideal experimental situation, transitory factors such as time of day, temperature, postural position, and caffeine and nicotine intake would be controlled, as would procedural factors like number and time between physiological measurements (Rowland, Ferris, Fried, & Sutton, 1988).

The measurement of physiological variables in large-scale studies is both costly and logistically impractical, a fact which makes attractive the self-reporting of stress perceptions (Pennebaker & Watson, 1988). Because self-reported perceptions of stress, the physical symptoms, and the negative emotionality reflect the same underlying construct, it seems logical that one could choose only one of three possible methods of measurement to get the same desired result – a determination of stress (Pennebaker & Watson, 1988). Self-reports, while highly correlated with each other, are only weakly correlated with specific physiological indicators of stress (Pennebaker & Watson, 1988). However, self-reports may be more highly correlated with general physiological indicators (Pennebaker & Watson, 1988).

Stress and mental health. Stress appears to be related to mental health issues even in studies where a number of potentially confounding variables are taken into consideration (Tyssen, Vaglum, Gronvold, & Ekeberg, 2000). Documented psychological manifestations of the stress response include affective disorders, diffuse anxiety, manic behavior patterns, brief

reactive psychosis, post-traumatic stress disorder, and some forms of schizophrenia (Everly, 1989). Major categories of depression, anxiety, and anger are widely accepted as contributing factors to health problems.

There seems to be a general consensus among researchers that cognitive and emotional arousal play a significant role in the impact of stress on the body (Bartlett, 1998). The specific mechanisms by which cognitive and emotional factors affect the autonomic nervous system are not clear-cut, but the evidence does suggest a close relationship. One difficulty in drawing specific conclusions about the role of psychological factors and stress results from the fact that people can experience multiple emotions at a time and they continually revise those emotions based on their cognitive interpretations. The coping process may be accompanied by cycles of emotional and cognitive responses that lead to a "self-perpetuating cycle of arousal." (Bartlett, 1998, p. 97). Therefore, it is difficult to determine which specific emotion or cognition is related to the arousal or stress response.

In general, it can be said that psychological stress has a similar effect on the body as physical stress. For example, individuals undergoing tests of mental arithmetic, a typical mental challenge in which subjects are asked to perform a series of calculations without the use of a writing instrument or paper, demonstrate activation of the SAM and HPA axes. Psychologically challenging situations, such as the unpredictable presentation of aversive stimuli (shock, loud noise) and unrewarded work, have also been shown to activate the human stress response (Lovallo, 1997).

Given the relationship between stress and psychological health, researchers have focused some attention on interventions that address related problems. Some of the most commonly explored psychological problems include depression, anxiety, and anger / hostility. The research

on these psychological components and the outcome of related stress management research are discussed in the following paragraphs.

Depression. According to the National Institute of Mental Health (NIMH; 2000), approximately 19 million people experience depression each year and the majority of those individuals do not seek treatment. Potential symptoms include persistent feelings of sadness, loss of interest in activities that were previously enjoyable, crying or irritability, feelings of guilt, hopelessness, or pessimism, excessive or insufficient sleep, excessive or insufficient food intake, decreased energy, suicidal ideation or attempts, impaired concentration, and / or physical maladies that do not respond to treatment. Having some of the symptoms does not mean that an individual is clinically depressed. Certainly, some individuals may be more genetically vulnerable to depression or the biochemical imbalances that are associated with depression. However, environmental and situational stressors contribute largely to the onset or perpetuation of depression (NIMH, 2000).

In some cases, the economic burden associated with chronic depression in the workplace may exceed the burden associated with chronic diseases like heart disease and low back pain because depressed employees may take longer disability leaves and be more likely to return to disability status (Conti & Burton, 1994). Wang and Patten (2001) found that 5.6% of the approximately 7000 workers that they surveyed could be characterized as having major depression. They reported that workers with high levels of perceived stress, as measured by the Job Content Questionnaire (Karasek et al., 1998), were more likely to be at risk for major depression than those with lower stress. They further found that men experiencing high levels of psychological stress and / or low decision-latitude were more likely than women to display

depressive symptoms, and women with physically challenging jobs were more likely to display depressive symptoms than men with similarly physical jobs.

Comparing the effect of different approaches to stress management training, Sallis, Trevorrow, Johnson, Hovell, and Kaplan (1987) found that a relaxation training group, a multi-component stress management group, and an education / support group all demonstrated a significant reduction in participants' depression levels, as measured by the Beck Depression Inventory. Researchers reported a significant decrease in scores on Cobb's (1970) six-item depression measure following a stress management intervention consisting of both cognitive and behavioral skills training (Ganster, Mayes, Sime, and Tharp, 1982). Although Firth and Shapiro (1986) did not utilize a control group, as the studies above did, they also reported a decrease in depression scores following a stress management intervention of both cognitive-behavioral and humanistic therapy.

Anxiety. The Anxiety Disorders Association of America (ADAA; 1999) estimates that approximately 1 in 10 people in the United States experiences an anxiety disorder at some point in their lifetime. Only about 25% of those individuals seek professional treatment. There are a variety of anxiety disorders, but the underlying feature is excessive anxiety and worry that is difficult to control and is out of proportion to the threat. Associated with the anxiety can be muscular tension, irritability, difficulty concentrating, disturbed sleep, and / or feeling restless or easily fatigued. Like depressive disorders, anxiety disorders are caused by a combination of biological and environmental factors. Cognitive-behavioral therapy and relaxation techniques are particularly effective in helping the individual learn to cope with the stresses that can contribute to anxiety (ADAA, 1999).

Several researchers have explored the effectiveness of stress management programs to reduce anxiety among worksite populations. For example, Forman (1991) obtained pre- and post-intervention State-Trait Anxiety Inventory (STAI) scores from a sample of school psychologists. After participating in relaxation training and cognitive restructuring, the participants had significantly lower anxiety levels than the control group. Sallis, Trevorrow, Johnson, Hovell, and Kaplan (1987) also found that STAI-assessed anxiety levels significantly decreased for individuals participating in either a relaxation training, a multicomponent stress management, or an educational / support group. The decreases in anxiety levels for the treatment groups exceeded any change evident in the control group. Additionally, researchers reported that a stress management program utilizing cognitive-behavior and humanistic therapy techniques was effective at reducing trait anxiety scores among a group of managerial / professional workers (Firth-Cozens & Hardy, 1992). While Firth-Cozens and Hardy's results were similar to the previous studies, a control group was not utilized in the former study.

Anger. Anger is a basic emotional response with a physiological component, which can occur without threat or provocation (Bakal, 1992). There seems to be a connection between the anger response and bad feelings of another kind, such as pain, illness, sadness, or even exposure to unpleasant sounds, odors, or temperatures. Of course, people do not become angry every time an unpleasant or frustrating event occurs, but rather cognitive appraisal determines the appropriateness of angry behaviors or feelings. Lazarus (1966), in a discussion of anger and stress, indicates that anger is most likely to occur in situations in which attack (fight, of the fight-or-flight reaction) is a viable means of coping with a threat. Although anger expression involves the activation of the physiological stress reaction, that reaction will be reduced if aggression removes the threat (Bakal, 1992). However, if anger is suppressed in stressful conditions, the

prolonged cardiovascular response may be more detrimental than if the emotion had been expressed (Bartlett, 1998).

Higher levels of stress may sometimes inhibit the expression of anger. For example, in busy work environments like hospital intensive care units (ICUs), the employees' inhibition of anger may be imperative because there is no time for such outbursts (Hay & Oken, 1977). Personality factors also influence whether anger is expressed or suppressed. Highly hostile individuals have been shown to be more likely to react with angry feelings and physiological stress reactions in stressful environmental situations than less hostile individuals (Lovallo, 1997).

Researchers have explored the effectiveness of stress management training to influence dysfunctional anger in healthy adults. Schiraldi and Brown (2001) recently performed an exploratory study in which college students completed nine questionnaires pre- and post-intervention, including measures of anger and hostility (the Cook-Medley Hostility scale of the MMPI, the William's Hostility Short Scale, and the Rosenberg Misanthropy Scale). Although they noted significant decreases in depression and state and trait anxiety following their stress management intervention, the researchers did not find any significant improvements in anger levels. Deffenbacher, Huff, Lynch, Oetting, & Salvatore (2000) also explored state and trait anger levels following a stress management intervention, and were unable to demonstrate significant reductions in anger levels following the intervention. Although Deffenbacher et al. improved upon the Schiraldi & Brown study by using a no-treatment control group to compare intervention effects, they were studied a group of individuals with a history of problem anger instead of a less pathological group. A third study that examined individuals with maladaptive anger levels found that both group counseling and computer-administered counseling conditions were equally effective in reducing state and trait anger, as compared to a waiting-list control

group (Timmons, Oehlert, Summerall, Timmons, & Borgers, 1997). Thus, the findings regarding anger reduction as a result of stress management training are mixed and require further exploration.

Successful Stress Management Interventions in the Worksite

The literature reviewed to this point indicates that a worksite stress management program will be maximally beneficial if it reduces the negative impact of threats to both physical and mental health. General components of beneficial stress management programs include 1) a comprehensible definition of stress, 2) an explanation of the physical and mental effects of stress, 3) a method for identifying personal reactions to excess stress, 4) a personal exploration of the triggers of stress, and 5) the explanation and practice of a variety of stress management techniques (Everly, 1989). The majority of stress-management programs offer some variation of these basic components to improve the health of participants.

A theoretical framework from which to work is essential in making the worksite stress management program cohesive and quantifiable. As mentioned above, the transactional model, which quantifies stress as the perception of an event as threatening or exceeding the organism's capacity to cope, signifies that the responsibility for the interpretation of the event occurs within the individual. The transactional model fits easily into the prevailing corporate culture because individual differences in perception and ability to cope lay entirely in the hands of the perceiver. Programs operating from a different theoretical model and attempting to alter the work environment or organizational structure are likely to be costly, resisted, and disruptive. Therefore, the vast majority of contemporary stress management programs focus on changing individual responses to stress (Cooper, Dewe, & O'Driscoll, 2001; Shipley & Orlans, 1988).

The format of work site stress management programs tend to be similar. Programs that provide information to employees about cognitive and behavioral methods of coping with stress are considered secondary prevention techniques (Murphy, 1996), because they operate in an environment where stress exists and the goal is damage prevention (Cooper & Murphy, 2000). Work site stress management programs consist of a combination of established techniques for enhancing self-awareness and reducing stress, such as progressive muscle relaxation, biofeedback, meditation, and cognitive-behavioral modifications (Cooper & Murphy, 2000; Murphy, 1996). Programs are typically educational in scope and workers are usually trained in small groups sessions that last an hour or more (Murphy, 1996).

Some researchers have demonstrated that stress management programs are correlated with decreased levels of perceived stress. For example, Williams, Kolar, Regar, & Pearson (2001) provided an 8-week stress management program to 59 participants and documented a decrease in the effect of daily hassles from baseline, as measured by the Daily Stress Inventory and compared to 44 individuals in a control group. Similarly, Timmerman, Emmelkamp, & Sanderman (1998) reported that participants in a stress management program reported fewer daily hassles than a group of matched individuals who did not participate.

There are several reasons for the success of stress management programs in the work site. First, the workplace itself is a source of perceived stress, so it makes sense to attack the problem in the environment in which it occurs. Second, employers are able to fund and provide the programs, which might not otherwise be attainable for working adults. Employers benefit from the cost-savings associated with the positive outcomes of the program, as well as the opportunity to offer an incentive capable of attracting and maintaining employees. Finally, the programs can be an effective complement to existing Employee Assistance Programs (EAPs) and counseling

services, which may encourage longer-term retention of stress management skills (Fries et al.., 1993; Pelletier, 1987).

Although there has been some success with employee stress management programs, the rates of success could be improved. Many companies do not offer programs to their employees. Other companies find that their employees are dissatisfied with or dislike their company's current program (Watanabe, 2000). Traditional consultation and workshop programs for stress management education tend to be quite costly, so some corporations may perceive the provision of those services to be an impractical and unjustifiable investment (Pelletier, 1987; USDHHS, 1992). Companies may have difficulty justifying the expenditures associated with health promotion programs to their stockholders (Pelletier, 1987). The cost-benefit ratio for stress management programs appears to be balanced more toward the cost aspect for many companies. One way of increasing employee satisfaction and defraying employer costs is to base stress management programs on the concept of minimal contact therapy.

The Application of Minimal Contact Therapies to the Workplace

Brief therapy formats, such as minimal contact treatment, may be an advantageous way of saving corporate money and providing an efficient intervention for several reasons. Minimal contact therapies (MCT) save time for the practitioner, as well as the participant. The client is highly involved in skill acquisition and the problem of treatment generalization to settings outside the clinician's office is null (Townsend, 1999). By nature, MCT requires the client to incorporate the treatment into their home or work environments because those settings are where the treatment takes place (Townsend, 1999; Rowan & Andrasik, 1996). The cost of providing interventions is reduced for the client and the practitioner because there is less need to travel or to schedule additional time for sessions (Rowan & Andrasik, 1996). Because MCT requires less

time for therapists and clients, operates within the regular environment, and requires no travel, it is a highly cost-effective method of treatment.

The treatment efficacy of MCT has also been rigorously studied in the past 20 years, with a variety of studies examining various MCT formats, evaluating the differences between MCT and other traditional methods of treatment, and comparing MCT groups to control groups (Rowan & Andrasik, 1996; Brown & Lewinsohn, 1984). In a review of the use of MCT to treat headaches, Rowan & Andrasik (1996) concluded that MCT relaxation protocols are as effective as lengthier clinician-administered therapies in reducing the frequency and duration of adult tension and vascular headaches. Additionally, these same researchers indicated that overall attrition and compliance rates were similar and client perceptions of treatment credibility were equal to other forms of treatment. A study by Blue Cross / Blue Shield Insurance Company demonstrated that a low-cost, educational program consisting of self-guided manuals and a presentation significantly reduced outpatient visits and insurance claims (Lorig, Kraines, Brown, & Richardson, 1985). Additionally, a health promotion program administered entirely via postal mail was effective in reducing smoking, dietary fat, salt, fiber, cholesterol, and stress levels and increasing exercise among older adults (Lorig et al.., 1985).

Identification of the cost-savings associated with MCT is especially relevant in any intervention aimed at a workplace. Teders et al.. (1984) and Pezzot-Pearce, LeBow, & Pearce (1982) both explored the cost-effectiveness aspect of MCTs. Teders et al.. found a home-based, MCT relaxation treatment for tension headaches to be more cost-effective than a similar intervention delivered entirely by a therapist. Less contact with the therapist was required in the MCT condition, thereby saving money for treatment. Pezzot-Pearce, LeBow, & Pearce (1982) compared four groups receiving varying amounts of therapist guidance in a weight loss program.

The researchers reported that cost-effectiveness increased as therapist contact decreased, while the effectiveness of the treatment remained equivalent across groups.

Researchers have generally concluded that behavior-change methods can be taught as effectively using MCT as with traditional, longer-term therapies. As an effective change agent, MCT is attractive because it requires less one-on-one interaction between the therapist and the client. Just as group therapy allows for the efficient use of limited time and space, MCT takes into account the limited time, space, and resources that might otherwise be necessary to provide behavior modification interventions. Because MCT appears to be equally effective as more traditional therapies, the same interventions can be offered to more people and to those in distant locales.

The Internet and Computer-Assisted Therapy as an MCT

Distance and financial resources can be further reduced as a limiting factor by using the Internet and Computer-Assisted therapy as the means by which MCT is delivered. The idea of providing psychological or health services from a distance is not entirely new, as evidenced by the use of telephone, fax communications, printed self-help manuals, and postal mail campaigns for several decades (Jerome et al.., 2000). The process might be further improved by using the more efficient technologies that are available today. The 21st century has found a variety of psychological interventions available on computers and the Internet, with the social sciences fields slowly beginning to embrace the potential uses of computer technology in a fashion similar to other fields (Barak, 1999; Jerome et al., 2000).

The early 21st century includes a working society in which people are generally comfortable with computers (Sturges, 1998). Computer technology is rapidly proliferating in companies of all sizes, as they attempt to increase work output and efficiency (Watanabe, 2000).

A survey of approximately 550 workers in Japan revealed that 17% used computers at work for 6 or more hours per day, 44% for 2 to 4 hours per day, and 32% for 1 to 2 hours. Approximately 90% of the survey respondents indicated that they felt as if they had or were almost adjusted to the computer technology in their workplace. A small percentage (~20%) of the workers reported physical or mental stress that they attributed to the use of computers, with the most frequent complaint being eye or shoulder strain (Watanabe, 2000).

Computer competence has become a skill demand for much of today's workforce. Workers are now able and expected to communicate more quickly, to more geographically diverse locations, and in more formats than in previous centuries (Huang & Alessi, 1996). Computer-mediated communication, such as e-mail, chatrooms, and video conferencing, has become commonplace in businesses in the 21st century (Barak, 1999). E-mail alone is revolutionizing communication in the workplace, providing access to people in- and outside the organization in ways that no one previously thought possible (Huber, 1990). The vast majority of companies reportedly encouraged the use of e-mail, especially for workplace communications (Watanabe, 2000).

Adapting psychological interventions to computer formats seems to be the next logical step for the application of psychology in the workplace. According to Keen (1990), caution in pursuing technological advances in telecommunication is not prudent. He states that advances in telecommunications will likely meet organizational goals for improvement and thus, telecommunication advances and effectiveness should be on the forefront of research. He asserts that the needs of employees and the potential benefits to the organization outweigh the risks of waiting cautiously (Keen, 1990).

There is a current trend in the workforce toward the use of distance learning technologies for the attainment of continuing education (Jerome et al., 2000). Web-based instruction can incorporate a variety of components to create a highly effective learning environment (Khan, 2000). Examples of features that are unique to web-based programs include interactive internet tools that allow students to interact with each other, the instructor, and on-line resources; the availability of multiple media elements, such as video, text, audio, graphics, and animation; global accessibility; the ability to pace the speed of information intake; convenience of time and place; ease of use of point-and-click technology and user interfaces; and cost-effectiveness (Khan, 2000).

An example of workplace innovation that resulted from Internet technological advantages is the use of "telemedicine" by physicians and other health professionals. Telemedicine includes on-line information gathering, use of e-mail, and video conferencing with patients or other medical care providers. United States Army Medical Centers have taken the lead in actively exploring the potential of "telemedicine" services (Jerome et al., 2000). The Army currently offers experimental behavioral health services via secure Internet links and videoconferencing to some remotely stationed military servicepersons. Success has been shown in smoking cessation, weight loss, biofeedback, and marital therapy telemedicine programs (Jerome et al., 2000). A study by Harris and Campbell (2000) revealed that rural physicians who had access to telemedicine were resistant to using e-mail and video conferencing, although they conceded to the use of the Internet for researching medical literature. The researchers explained the physician's resistance to incorporating the full capacity of the Internet into their practices by stating that using the Internet would necessitate changing previously established patterns of communicating. It is possible that the use of such technology in the workplace will advance as

the Internet continues to become more incorporated into everyone's daily life habits (Harris & Campbell, 2000).

The quantity and range of current research on different psychological applications on the Internet is limited, due to the relative infancy of the field (Barak, 1999; Finfgeld, 1999). However, certain forces like the de-hospitalization of psychological treatment, the limitations of long-term insurance coverage for psychological treatment, access to computer technology, and the ingenuity of mental health care providers, have allowed for change in the provision of services. These factors have resulted in the adoption of Internet-based psychological services before all the implications could be assessed (Finfgeld, 1999).

The incorporation of technology into psychological services has generally been well received by consumers (Jerome et al., 2000; Newman, Kenardy, Herman, & Taylor, 1997) and practitioners (Sturges, 1998). The wealth of psychological services on the Internet includes information resources, self-help guides, assessment services, psychological advice, and short- or long-term e-mail counseling (Barak, 1999). The practitioner is limited only by the amount of time he or she is willing to spend learning to incorporate technology into his or her practice (Sturges, 1998).

Computer-based technology promises to save valuable time of both the client and the clinician. For example, assessment is generally more efficient and accurate compared to traditional methods, due to the ease of administration of scoring of self-report measures. The reliability and validity of computer-administered assessment materials appears to be equivalent or better than clinician-administered assessments. Computer technology also allows standardization of test and interview administration, which is psychometrically superior to traditional methods (Sturges, 1998).

A few researchers have examined the overall effectiveness of computer-assisted or computer-administered individual therapy (Agras, Taylor, Feldman, Losch, & Burnett, 1990; Hester & Delaney, 1997; Newman, Kenardy, Herman, & Taylor, 1997; Selmi, Klein, Greist, Sorrell, & Erdman, 1990). In general, the interventions sited in these studies were standard cognitive-behavioral or behavioral self-control therapies. Studies were successful in demonstrating the relative effectiveness of computer interventions for treating obesity, heavy drinking, panic disorder, and depression (Agras, Taylor, Feldman, Losch, & Burnett, 1990; Hester & Delaney, 1997; Newman, Kenardy, Herman, & Taylor, 1997; Selmi, Klein, Greist, Sorrell, & Erdman, 1990). According to Laszlo, Esterman, & Zabko (1999), cognitive-behavioral therapies translate well into text-based messaging because they rely heavily on cognitive processing by the client. Additional detailed examples of recent efficacy studies follow.

Newman, Kenardy, Herman, & Taylor (1997) compared the effectiveness of a standardized cognitive-behavioral treatment (CBT) delivered during individual therapy versus the same program delivered with the assistance of a palm-top computer. They found that in a small sample of individuals suffering from panic disorder, there was greater initial progress among participants in the individual therapy condition. However, people who received treatment primarily from their palm-top computer improved as much as those who received individual therapy as measured at a 6-month follow-up. This preliminary study demonstrated the relative long-term equivalence of computer-assisted therapy as compared to traditional therapy, at least for individuals with panic disorder.

Selmi, Klein, Greist, Sorrell, & Erdman (1990) reported significant reductions in depression among individuals participating in a six session, computer-administered cognitive-

behavioral treatment. The effects of the treatment were equivalent to a therapist-administered cognitive-behavioral treatment, and produced more change than a waiting-list control group. Similarly, Agras, Taylor, Feldman, Losch, & Burnett (1990) compared samples of mild to moderately overweight women who participated computer therapy, computer therapy with group support, or group behavior therapy. The researchers found that computer therapy was comparable to group or individual therapy in terms of education and outcome.

Thus, the literature demonstrates that Internet-based treatments are an effective method of evoking cognitive and behavioral changes among individuals who are motivated to pursue these changes. After all, participants in Internet programs must log-onto a website and follow a certain number of steps to learn new information.

A question remains whether individuals who need some reminding or prompting might also be amenable to behavior change with the assistance of computer technology as an MCT. E-mail might be one way to circumvent the drawback intrinsic in other Internet-based treatments which require motivation.

E-mail as an Intervention

Research on the field of e-mail as an intervention or adjunct to therapy has been even slower to evolve than Internet research. Critics argue that the lack of non-verbal cues and difficulty in establishing the therapist's concern, personality, or warmth would impede the therapeutic relationship and process (Barak, 1999; Finfgeld, 1999). Additionally, e-mail therapy is not entirely secure. On-line therapies are also characterized by "elitism" because they are only accessible to individuals with the resources and education necessary to participate. Some of the hesitation in pursuing the exploration of the effectiveness of e-mail may be due to these obvious drawbacks.

Although it remains controversial and scantily researched, e-mail therapy is one of the most prevalent forms of psychological applications on the Internet (Barak, 1999; Holmes, 1998). According to Barak (1999) and Finfgeld (1999), e-mail counseling has several advantages over conventional therapy. First, the dialogues between client and therapist are easily saved and archived for future examination, making both parties accountable for their statements. Second, the process of writing is likely to be therapeutic in itself, in a fashion similar to bibliotherapy. Third, the messages are convenient, in that they can be read and transmitted at irregular intervals when it is convenient for the client and the therapist, without the constriction of hourly intervals or daytime schedules. Fourth, e-mail is a unique form of communication in that it allows for the ability to edit, send multiple copies, accurate use of quotations, and the examination of past messages. The conglomeration of one-of-a-kind advantages of e-mail therapy is leading researchers to take a closer look at its potential (Barak, 1999).

E-mail allows users to send text messages to any other user's electronic mailing address (Huang & Alessi, 1996). In the early 1990s, e-mail was typically used as an adjunct to other communication, to reiterate or confirm what was previously discussed (Huber, 1990). However, e-mail has probably evolved into more of a substitute for other forms of communication than Huber would have predicted. Its ease of use allows for the widespread dissemination of information, as well as the establishment of interpersonal relationships. A preliminary study by Cohen and Light (2000) demonstrated that communicating entirely via e-mail was successful in enabling the development of a mentoring relationship between several individuals with communication difficulties (i.e., patients with cerebral palsy). The researchers concluded that e-mail may not be the best way of establishing relationships between peers, but it was certainly effective at establishing relationships between people that may not have met otherwise. In

general, it appears as though e-mail has become an effective form of communication in a relatively short amount of time.

E-mail may be a helpful adjunct to therapy because it allows the therapist and client to communicate more frequently and to provide or receive additional feedback regarding the intervention. Murdoch and Connor-Greene (2000) concluded that the therapeutic relationship is enhanced by the use of e-mail homework assignments. Other researchers and practitioners are convinced that the overwhelming potential and benefits of on-line therapy make it the treatment of choice for some clients because of its similarity to psychoanalytic therapy sessions (Freeny, 2001). The absence of face-to-face confrontation may enable more candid and less inhibited responses. Freeny additionally suggested that clients may enjoy having time to formulate questions and responses at a more leisurely pace or while in a distant location (i.e., on a business trip or vacation).

A cognitive-behavioral e-mail campaign may be beneficial because there are advantages to messages that are primarily psycho-educational in content (Brown & Lewinsohn, 1984). The participant can take credit for learning a new skill, which may improve self-esteem and comfort with the skill, as opposed to crediting the therapist with skillful delivery of a therapeutic intervention. There is little or no stigma associated with a "student" learning a new skill, as opposed to a client attending therapy. These factors may make skill training more accessible to people who might not otherwise seek assistance (Brown & Lewinsohn, 1984).

Summary

The literature on the physical and mental health of the American workforce indicates that stress continues to be a significant problem that is not adequately addressed in the work site. Although the US government advocates the use of preventative programs to reduce the public

health threat of stressful worksites, stress management programs are not yet available to a large enough proportion of workers to meet the guidelines established in the "Healthy People 2000" goals. The lack of distribution of effective stress management programs may be attributable to the high costs associated with traditional programs, in terms of time, money, and effort expended. There continues to be a need to develop and refine stress management programs, with the goal of making effective and efficient programs available to larger numbers of workers.

Because stress is an inevitable force in human life, a significant portion of stress is derived from experiences in the workplace and employers bear the brunt of the costliness of treating the harmful psychological and physiological effects of chronic stress, employers likely feel some motivation to enable workers to cope with stressors. Research has shown that work site stress management programs, particularly those involving a variety of cognitive-behavioral techniques, are highly effective in terms of reducing health care costs and teaching stress management skills. The efficacy of such programs can likely be improved, possibly through the use of computer-administered brief therapy, the advantages of which are many-fold. E-mail is one of the most promising modes of delivering a cognitive-behavioral stress management program in the work site because it allows for the rapid dissemination of information to a large population and frequent reminders to incorporate coping skills into the work environment.

Hypotheses and Research Questions

Two hypotheses and two research questions were examined. The hypotheses were confirmatory, in that they sought to validate the implications of previous research. The research questions were considered exploratory because data had not previously been gathered on an e-mail intervention in this type of worksite population. A statement of and rationalization for each hypothesis and research question follows.

H1: The treatment group will demonstrate a greater perceived decrement in stress levels than the control group.

Regular practice of cognitive-behavioral skills is critical for the incorporations of the techniques into the coping repertoire (Newman, Kenardy, Herman, & Taylor, 1997). The general research question explored in this study was whether the regular reminders to practice the self-help skills presented in the individual's e-mail and on the adjunct website increased the likelihood of the incorporation of stress coping skills. If the e-mail stress management program was successful, individuals in the treatment group were more proficient copers and would perceive stressful events as less prevalent and intense than individuals in the control group.

H2: The treatment group will demonstrate significant decreases in negative emotional states than the control group.

A major question in this study was whether any secondary emotional side effects of chronic stress would decrease as a result of participating in this format of stress management training. Groups were compared on measures of depression, anxiety, and anger to determine whether there was a substantial change in emotional states following the intervention. Some "spontaneous" improvement or score variation in the control group was expected, due to time of year or workload changes or other unknown factors, but generally the treatment group was expected to demonstrate greater emotional improvement.

R1: What demographic differences among the participants influence the outcome variables?

Because Schumacher & Morahan-Martin (2001) suggested that differences may exist between typical users of computers, the outcome variables were analyzed to determine whether the differences could be explained in terms of demographic characteristics. It was considered

possible that the difference in responsiveness to the intervention may be null among a group of workers who are required to regularly interact with computers. There was no reason to expect differences due to one characteristic or another, so general tendencies were explored for the sake of questioning.

R2: Will the program have any clinical significance in terms of usage of stress management techniques, absenteeism rates, and employee satisfaction with the program?

The efficacy of the stress management program was explored as an examination of clinical significance. Participants were surveyed to determine whether the frequency of coping strategy use, their knowledge of stress management skills, the number of absences from work, and their satisfaction with the e-mail messages. Information about the direct perceptions and opinions about their participation was gathered to determine whether there was need for further improvement of this stress management program.

CHAPTER 2

METHOD

Participants

One-hundred thirty-seven (137) employed volunteers (36 males, 102 females; mean age = 29.46, SD = 11.36, range = 18-72) were recruited from several diverse businesses in North and Central Texas and Kentucky and randomly assigned to treatment or waiting list control groups. To be included in the sample, the employees were required to have access to e-mail at work and to monitor it on a regular basis (minimum of weekly monitoring). Twelve (12) employees volunteered from Easter Seals, 4 from IBM, 3 from Ameristar Jets, 9 from Gonzales Independent School District, and 18 from Cardinal Hill Rehabilitation Hospital. Also, 91 employed students from the University of North Texas were included in the sample.

The majority (75.20%) of the sample had personal incomes under $35,000. Participants had been working for their present employer for an average of 3.65 years (SD = 4.51, range = 1-24 years). Most (80.3%) of the participants had worked for their present employer for less than 5 years, 8.8% for 5 to 10 years and 10.9% for more than 10 years. Sixty-nine (50.40%) participants were employed full-time, while 68 (49.60%) were employed part-time. At the time of the survey, 45 (32.85%) of the participants were married, 65 (47.44%) were single, 17 (12.40%) were living with a romantic partner, 6 (4.38%) were divorced, 1 (0.72%) was widowed, and 2 (1.46%) selected other. A flaw in the survey design prevented individuals from selecting more than one response, so it is not possible to report how many participants have held more than one status; i.e., divorced but remarried. The highest degree earned was doctorate for 3 (2.19%), master's level for 13 (9.49%), baccalaureate degree for 26 (18.98%), some

undergraduate work for 67 (48.91%), technical or associate's degree for 23 (16.79%), and high school diploma for 5 (3.65%). Ninety-nine (72.26%) participants reported that they do not smoke, while 38 (27.74%) reported that they do.

Measures

The independent and dependent variables were assessed using a series of seven questionnaires. The measures were selected due to their psychometric properties and availability to the researcher. Permission to post the surveys on the secure website was obtained when necessary (see Appendix A). A copy of surveys that are not copyright protected are included in Appendix B.

Stress. Perceptions of stress were measured with two short questionnaires: the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983) and a subscale of the Fort Worth Employee Health and Performance in the Workplace Questionnaire (FWEHPW; Lehman, Rosenbaum, Olson, & Holcom, 1992). As stated by the authors of both scales, it was not necessary to obtain permission to use these scales for research purposes.

The PSS is a 10-item self-administered scale that takes approximately 5 minutes to complete. It is a face valid measure that determines the frequency in which the participant perceived stressful situations in the last month, with higher scores indicating greater frequency of perceived stress. Cohen, Kamarck, & Mermelstein (1983) reported that the PSS has adequate internal and test-retest reliability, as well as construct validity. The researchers further reported that the PSS is superior to other methods of assessing stress, such as the Life Events Scale, with correlations to symptomology ranging from .52 to .76.

The FWEHPW is a 3-item self-report scale that measures perceptions of stress in the workplace. Responses are rated on a 5-point scale ranging from "never" to "almost always",

with higher overall scores indicating greater levels of perceived workplace stress. The scale can be completed in approximately 1 minute. No information about reliability or validity was available at the time of this research project.

Depression. Depression levels were assessed using a 6-item subscale from the Texas Christian University Self-Rating Scales (TCU/SRS; Knight, Holcom, & Simpson, 1994). The questions required the respondent to rate current depressive feelings and thoughts on a 5-point scale ranging from "never" to "almost always." Higher scores are indicative of poorer functioning. Coefficient alpha reliabilities ranged from .77 to .78 and test-retest reliabilities were .79 in previous research. This scale has been highly correlated with the SCL-90 depression scale score (r = .81) and the Beck Depression Inventory (r = .75) (Myers et al., 1991 & Simpson et al., 1992 cited in Knight, Holcom, & Simpson, 1994).

Anxiety. Anxiety levels were assessed using a 7-item subscale from the TCU/SRS. Questions required respondents to rate anxious feelings and physical symptoms on a 5-point scale ranging from "never" to "almost always." Higher scores are indicative of poorer functioning. Coefficient alpha reliabilities ranged from .77 to .82 in three large samples, and test-retest reliability was .79. This scale correlates with the SCL-90 Anxiety scale (r = .74; Myers et al., 1991 in Knight et al., 1994).

Hostility / Anger. Hostility and anger levels were assessed using an 8-point subscale of the TCU/SRS. Questions require respondents to rate angry feelings, hostile urges, and antisocial behavior on a 5-point scale ranging from "never" to "almost always". Higher scores are indicative of poorer functioning. Coefficient alpha reliabilities ranged from .78 to .83 in three large samples. Test-retest reliability was found to be .88 in a 1991 study of moderate size (Simpson, 1991), indicating that the scale produces consistent results over time. The authors of

the TCU/SRS stated that it was not necessary to obtain their permission to use the scales for research purposes.

Daily Hassles. Daily hassles were assessed using the Daily Hassles Scale (Lazarus & Folkman, 1989), which is a 117-item self-administered questionnaire that takes approximately 5-10 minutes to complete. It is designed to measure the frequency and severity of events in the individual's environment that are perceived as stressful. The test administrator specified a time period of one month prior to the test date for consideration. Higher scores are indicative of the perception of more hassles in the daily life of the individual. The test-retest reliabilities of the frequency scores are .79, while the reliabilities of the intensity scores range from .38 to .48. The authors note that the scale has a high degree of face and content validity due to the nature of the questionnaire (Lazarus & Folkman, 1989).

Daily Work Hassles. The frequency and severity of irritants experienced in the workplace were assessed using the Daily Work Hassles Survey. This 25-item self-administered questionnaire includes a variety of common work situations or events that are rated on a 4-point scale of intensity from "none" to "a great deal" or can be given a rating of "not a hassle" to indicate that the item is not considered an irritant. This scale was developed during the course of a separate dissertation research project when the investigator recognized that other researchers had been drawing conclusions about work-related distress without separating the impact of daily hassles in subjects' personal and professional lives (Crawford, 2000). Cronbach's alpha reliability was .93 in a study of 207 working adults. Also, a moderate correlation of .52 was obtained between the Daily Work Hassles Survey and the Combined Hassles and Uplifts Scale (Lazarus & Folkman, 1989) in the same study (Crawford, 2000).

Procedure

Company representatives were contacted by e-mail and provided with a summary of the proposed study. Representatives that agreed to offer the stress management program to their employees received a one-page bulleted summary of the program, a contract to provide services, and a standard e-mail recruitment message that they could forward to their employees. A copy of all recruitment materials are available in Appendix C.

Employees who were interested in the program were able to respond directly to the researcher or their company representative, allowing potential participants the opportunity to protect their anonymity and privacy. The volunteers received an e-mail message from the researcher that explained what they could expect in the upcoming months. All volunteers were sufficiently informed of the nature of the study, treatment procedures, and potential risks, after which time they agreed to sign an informed consent form (see Appendix D). Volunteers were informed that they could withdraw from the study at any time and could receive documentation of the group results of the study after its completion.

All participants were instructed to complete a group of questionnaires by accessing a secure website with an individual log-on identification code and password. The questionnaires assessed the participants' demographics, depression levels, anxiety levels, anger levels, frequency and intensity of perceived stress, perception of daily hassles, and coping techniques typically used in stressful situations. Volunteers who completed the informed consent form and the on-line questionnaires were randomly assigned to the treatment or waiting-list control group.

Individuals in the treatment group received e-mail messages twice per week for three months, which included information about stress management techniques and were designed to take approximately 5-10 minutes to read (see Appendix E). The messages included the following topics: mind-body connection, symptoms of stress, diaphragmatic breathing,

progressive muscle relaxation, self-hypnosis, autogenics, exercise, gratitude journaling, and imagery. The first message of the week explained the rationale or background of the technique, and the second message provided step-by-step instructions about how to perform the activity. An assignment for practicing the technique was also given.

Clarification of the recipient's interpretation of the message was an important aspect of the present stress management program, so there were multiple opportunities given for the participants to contact the principle investigator via e-mail with comments and questions. However, a disclaimer was included in the first e-mail message, which read, "The purpose of this program is to provide educational information for coaching purposes. This program is not offered as a therapy or counseling program, but rather is offered as a self-coaching device to assist you to better understand yourself." The purpose of the disclaimer was to discourage participants from becoming personally involved with the investigator or exploring therapy issues in an unstable, anonymous environment.

At the end of the intervention period, both groups completed the same questionnaires as listed above, as well as a satisfaction survey. The waiting-list control group then began to receive the e-mail messages for the next three months to fulfill the incentive for volunteering for this study. The waiting-list group completed the surveys for a third time at the conclusion of the intervention. Finally, both groups of participants received a debriefing statement, a certificate of completion, and a summary of the group results of the study.

CHAPTER 3

RESULTS

The information collected from individual volunteers was coded to ensure confidentiality. Each individual in the study was assigned a number that was associated with his or her responses on the assessment materials. Results were calculated and reported in terms of group statistics, rather than individual results, to further protect anonymity. Data was analyzed with the assistance of the Statistical Package for the Social Sciences (SPSS) software program.

Pre-intervention comparisons

Kazdin (1998) suggests that random assignment is the best method to minimize group differences, although it does not guarantee group equivalence. The pre-treatment variables were examined to verify the equivalence of the treatment and waiting-list control groups' pre-treatment scores on the demographics, perception of daily hassles, perceived stress, depression levels, anxiety levels, and hostility / anger levels. A series of independent samples t-tests was used to test initial group differences. The data were analyzed to ensure that the homogeneity of variance, normality of the sampling distribution, and equal sample size assumptions were not violated. Specific between-group comparisons included the average age, years employed, work missed in the last month, number of sick days in the last month, anxiety scores, depression scores, hostility/anger scores, frequency and severity of daily hassles, frequency and intensity of daily hassles in the workplace, and intensity of perceived stress. There were no significant differences between the means of the two groups prior to the administration of the intervention in any of the above categories. See Table 1 for details.

Post-intervention comparisons

There was a low-moderate attrition rate among the treatment and control groups, with 99 individuals (72.26% of the original sample of 137) completing both the pre- and post-intervention surveys. Some individuals were unable to complete the program or surveys due to losing or quitting their jobs (7), difficulty completing the surveys (2), not having time to devote to the intervention (2), or for undisclosed reasons (27). At the time of the data analysis, 46 individuals remained in the treatment group (68.66% of original group) and 53 in the control group (75.71% of the original group). Of the remaining 53 individuals in the control group, only 20 (37.74%) completed the second set of post-intervention surveys after participating in the stress management program. Due to the low response rate for the control group, their post-intervention data was not analyzed or reported in this study.

Treatment effects were examined using multivariate analyses of covariance (MANCOVA) of post-intervention stress levels, with pre-intervention scores as the covariates. See Table 2 for the intercorrelations for the pre- and post-intervention scores for all variables. The overall group effect regarding frequency and intensity of perceived stress, daily hassles, and daily work hassles after the intervention was not significant [$F(5, 86) = 0.95$, $p = .45$]. In other words, the individuals who received the stress management messages perceived the same amount of stressors and irritants after the intervention as did individuals who did not receive the messages. The effect size was small ($R^2 = .052$) and the observed power was inadequate ($\beta = .33$) to detect a statistical effect. See Table 3 for the average post-intervention stressor and hassles scores for the treatment and control groups.

Treatment effects on emotional side effects of chronic stress were also examined using MANCOVA. The overall group effect after the intervention approached significance [$F(3, 92) = 2.44$, $p = .07$], indicating that the treatment group demonstrated some emotional benefits after

participating in the intervention, as compared to the control group. There was a tendency for the group who received the treatment to be less anxious, depressed, and angry than the individuals who did not receive the treatment. The effect size was small (R^2 = .074) with a moderate observed power (β = .59). See Table 4 for the average post-intervention emotional variable scores for the treatment and control groups.

Between-group t-tests were utilized to determine whether there were any differences in the effectiveness of the stress management program between participants in the treatment group based on their demographic characteristics. Groups were evaluated on the basis of the participants' age (above or below the mean), gender, work status (full- or part-time), smoking status (smokers vs. non-smokers), and individual income level (above or below $35,000). The pre- and post-intervention group scores were compared for perception of daily hassles, daily work hassles, daily stressors, depression levels, anxiety levels, and anger levels. Men and women were different prior to the intervention in terms of perceived stress, depression levels, and anxiety levels, with men scoring lower on these variables than women. There were no other pre-intervention differences for any of the other demographic variables. There were no differences between the groups post-intervention for any of the demographic variables. See Table 5 for statistical details.

The mean number of reported absences and absences due to illness were compared in separate tests using independent samples t-tests to determine whether this intervention produced clinically significant results. The average number of absences was similar prior to the intervention, with the treatment group reporting about the same number of absences as the control group [$M_{Treatment}$ = 2.04, $M_{Control}$ = 2.27; t (134) = -.34, p = .74]. Likewise, the average number of absences after the intervention were similar, with the treatment group again reporting

about the same number of absences as the control group [$M_{Treatment}$ = 1.95, $M_{Control}$ = 2.09; t (80) = -1.71, p = .01]. When the average difference in number of absences was calculated for each group, both the treatment group and the control group participants were reporting a similar amount of decrease in absenteeism over the 3-month period [t (79) = -1.01, p = .32]. The average number of absences due to illness was not different between groups prior to the intervention [t (134) = .59, p = .55], after the intervention [t (80) = .89, p = .38], or when the average differences from time 1 to time 2 were compared [t (79) = .00, p = 1.00].

Finally, the groups were analyzed to determine whether there were differences in coping skill usage and knowledge after the treatment group received the stress management messages. Prior to the intervention, the 63 individuals in the treatment group who responded to the questions about coping skills reported using an average of 3.08 (SD = 1.25) techniques approximately 14.65 (SD = 8.02) times per week. The 67 individuals in the control group reported using an average of 3.04 (SD = 1.20) techniques approximately 13.88 (SD = 7.46) times per week. The differences between the treatment and control groups were not significant prior to the intervention for either number of coping skills [t (128) = .16, p = .87] or frequency of use [t (128) = .56, p = .58]. After the intervention, the 21 individuals in the treatment group who responded to questions about coping skills reported using an average of 3.33 (SD = .86) techniques approximately 15.20 (SD = 7.06) times per week. The 22 individuals in the control group reported using an average of 3.27 (SD = .98) techniques approximately 14.91 (SD = 7.24) times per week. There were no substantial differences in amount [t (41) = .22, p = .83] or frequency [t (40) = 1.32, p = .90] of coping skill use between the treatment and control groups after the intervention. The differences between the groups were evident in a qualitative evaluation of the responses. The treatment group reported using techniques such as breathing,

self-hypnosis, gratitude, exercise, and progressive muscle relaxation after receiving the intervention. So, the number of techniques that were available in their behavioral repertoire for coping with stress actually increased between measurement times. The control group, on the other hand, reported using techniques such as smoking, drinking alcohol, and getting extra sleep as coping methods. Responses that could be considered unhealthy were non-existent in the treatment group at the time of post measurement. Thus, while both groups continued to cope with stress at about the same rate and frequency as they had prior to the intervention, the quality of their coping skills were different.

The participants' survey responses about their perceptions of and satisfaction with the e-mail stress management program were analyzed in qualitative terms. The participants had the opportunity to respond to several open-ended questions about their impressions of the stress management program. A list of the qualitative questions on the final survey was included below, as well as a summary of the typical or important responses to those questions. Responses to all questions were primarily positive with rare exceptions.

1. What did you like about the e-mail stress management program?

- It was quick and easy to follow; nothing complicated or terribly time-consuming.
- I really liked the fact that it was e-mail, that way I can keep it for a long time and it's not like a piece of paper that can get lost!
- Good tips on how to reduce stress.
- I could do it on my own time.
- I really liked the background information and the explanations of different topics. It helped me to understand why I was doing some of the exercises.

2. What areas of the program need improvement?

- Nothing / None / No suggestions.
- Not breaking the questions up into so many surveys.
- I can't think of anything that would have improved it. Sometimes when the messages came, I was too busy to review them immediately. One nice thing about this on-line effort is that it can be self-paced, which I consider helpful.

- Some of the messages were kind of wordy.
- Only that I would like to continue receiving information – it ended too quickly!

3. Knowing what you know now, would you choose to participate again?

- Yes (43)
- Maybe / it depends (6)
- No (6)
- I would choose to participate again. And in fact, in discussing the group with coworkers, they were interested in it as well.

4. Would you recommend this program to coworkers, friends, or others?

- Yes, you can learn quick ways to relax – even at work.
- I would recommend the program to a lot of people, because there are a lot that seem to be under constant stress.
- Sure, everyone could use stress management techniques.
- Yes! It is something they access at their convenience right where they are without having to add another meeting to their schedule (which is often a sources of stress).
- Yes, just taking time out for a few minutes to relax helps.

5. How often did you access the website and did you find it helpful?

- None / Never. (25)
- Not often. Once. Only a few times. The e-mails were good enough. (15)
- Often / Weekly / A few times per week… and yes, it was helpful. (15)

From these comments it appears that the e-mail stress management program was generally a success. The majority of the participants was satisfied with the program and found more than one thing beneficial about the encounter. Two participants stated that the stress management techniques were "common knowledge", but one participant viewed that as a negative, while the other participant commented that the reminders to do the known techniques were useful.

The primary weakness of the program appeared to be the website, with only about 1/3 of the respondents using it as an adjunct to their stress management program. Twenty-five (25) participants never accessed the website for additional information and 15 accessed the website

infrequently, while 15 repeatedly accessed the website and found the information to be very useful. The website was a relatively easy modality to maintain, and therefore could be kept as part of the whole program for those participants who would benefit from more information than could easily fit in a brief e-mail message. The sporatic or relatively infrequent use of the site indicates that only providing access to the website would be a very inefficient intervention.

A verification of reported website access indicated that participants spent a total of 74 minutes, 10 seconds learning about various stress management tips. The web pages that were most frequently accessed were those about abdominal breathing (23 hits) and exercise (22 hits). Participants spent an average of 36 seconds learning additional information about breathing, for a total of 13:53 minutes on that page. Participants spent an average of 2:10 learning additional information about exercise for a total of 47:49 minutes on that page. Other popular web pages included progressive muscle relaxation (6 hits; approximately 34 seconds each; 3:29 total time), imagery (4 hits; approximately 25 seconds each; 51 seconds total), time-savers (3 hits; approximately 1:50 each; 5:30 total), how to gain a day (2 hits; 25 seconds each; 51 seconds total), and stressful events hierarchy (2 hits; 53 seconds each; 1:47 total).

CHAPTER 4

SUMMARY AND DISCUSSION

Summary

This study was designed to evaluate the effectiveness of an e-mail campaign to reduce stress and improve mood states and coping techniques in a sample of workers at several work sites. The literature lacks evaluative studies regarding the use of e-mail, much less the delivery a psychological intervention that is conducted entirely through e-mail and an adjunctive website. Although effective stress management programs exist in other formats, there is a need to know whether a minimal contact, computer-based intervention is an effective method of educating workers about various stress management techniques.

Several hypotheses and questions guided this research project. The effectiveness of the program, in terms of reducing both stress levels and improving mood states, was evaluated with the hope that the program would produce a substantial positive change. Then the participants' open-ended responses were evaluated for their perceptions about the quality and enjoyability of the program, giving the employees an opportunity to provide feedback about the usefulness of the program. Finally, differences were explored based on demographic characteristics to determine whether the program was more or less effective for individuals with certain similarities.

The first hypothesis sought to verify previous literature on stress management programs, which indicated that groups who receive stress management training report lower stress levels than groups who do not receive the training. For the sample in this study, that trend did not hold true. Both groups who received and did not receive this stress management program self-

reported about the same stress levels as they did prior to the program administration. The regular reminders to practice stress coping skills were not sufficient to reduce the participants' perception of stress levels or daily- or work-related hassles.

The second hypothesis sought to verify the trend in the stress management literature suggesting that programs may produce improvements in participant mood states. The trend toward reduction in anxiety, depression, and anger/hostility levels was verified in this sample. The differences between the treatment and control groups were not substantial enough to produce a statistically significant result, but a trend was evident. This e-mail stress management program was somewhat effective at reducing the level of emotional arousal of the participants.

The first research question was designed to clarify some of the disparate findings in the literature regarding the role of various demographic characteristics in influencing the results of various programs. Some literature suggested that certain populations might be more comfortable with technology or that other demographic characteristics might otherwise influence the results. In this study, no differences in treatment outcomes were found between the program participants on the basis of any demographic variables.

The second research question examined the efficacy of the stress management program to produce clinically significant results, such as increasing the usage of stress management techniques, reducing absenteeism rates, and providing a program that employees enjoyed. Participants improved the quality, but not the quantity of the stress management techniques they used to cope with stress. They replaced techniques like drinking alcohol, using illicit drugs, and sleeping with techniques like abdominal breathing, progressive muscle relaxation, and exercise. Absenteeism rates did not differ between individuals who participated in the program compared to those who did not participate. Responses regarding the quality of the stress management

program were overwhelmingly positive, indicating that participants found the program enjoyable and helpful.

Other findings were not specific to a research question or hypothesis, but became evident in the course of promoting and implementing this particular work site stress management program. Employers seemed concerned about requiring their overworked or overburdened employees with another daily responsibility, so they generally had a "hands off" attitude when promoting this program in their companies. The greater the encouragement from the employer, the greater the subsequent volunteer rate. As an anecdotal example, a manager at one company presented the recruitment message to his supervisees at a meeting and over 50 employees volunteered. Upon further investigation, the same manager discovered that a company policy made it necessary for employees to participate in this stress management program on their own time (i.e, during breaks, during lunch hours, or before / after work). After this researcher was asked to send a message to each volunteer and explain that they could not participate during paid company time, the number of volunteers quickly dropped from 50 to 6. It seems that more employees are amenable to participating in skill acquisition programs during the workday, but they do not wish to spend their free time participating if the company is not supporting their activity.

Another extraneous finding is that this program met the goal of being highly cost-effective. The monetary, time, and effort costs are certainly much less in the e-mail intervention format as compared to traditional programs. The program had little overhead costs to this author, other than the cost of monthly Internet connection ($10.95/ month) and the fee for using some of the testing materials ($100). The time investment required to develop the program and the website was heavy for the author initially, but eased as the program continued. The program

itself was as efficient and inexpensive to distribute to one person as it was to a larger number of people, due to the ease of adding another e-mail address to an address list.

Explanation for the Findings

The inability of this stress management program to impact the stress levels of the participants can be explained with a re-examination of the program mechanisms. The program offered explanations of common stress management techniques and reminders to practice the suggested techniques. It did not, however, have any impact on or teach the participants ways of impacting the environment in which they work and live. Therefore, it makes sense that the perceptions of stress frequency and intensity would remain stable because the program had no impact on these variables per se.

The workplace climate during the time period of this study could also account for the lack of change in stress levels due to the worsening of conditions over time. During much of the last several years, corporate employees have been faced with high numbers of lay-offs, prospective lay-offs, and company restructuring in response to uncertain economic situations. It is possible that this particular stress management program was not appropriate to address the type of sustained, long-term stress faced by this population. Both potential volunteers and several who dropped out reported that their daily stress levels were too high to add the additional responsibility of participating in a stress management program. Those who participated in the program may have been better equipped to cope with the worsening workplace climate.

While this program produced no demonstrative change in stress levels, it seems that the participants felt somewhat better about their ability to handle the stressors that came their way. Obtaining skills to cope more effectively with stressors might lead to the demonstrated improvement in mood states. A very recent study by Penedo et al. (2003) reported that the

perception that one has skills to manage stress is correlated with positive mood. The improved mood states of the participants in the present study corroborate some of those in the Penedo et al. (2003) study.

The lack of difference in terms of demographic variables is not entirely surprising. The level of technical competence required to participate in this study was relatively low and the participants came equipped with the skills necessary to use the program. The sample that was selected for this study could be considered comfortable with the e-mail technology because their job responsibilities required them to use it on at least a weekly basis. Because the participants formed a relatively homogeneous group comfortable with technical skills, differences did not emerge over time for any of the demographic variables.

The participants' opinions about the program gave considerable insight into the viability of reproducing and refining e-mail stress management programs in the workplace. It is likely that the self-paced nature of the program and the brevity of the messages positively influenced the participants' perceptions of the program. The participants had a great deal of control over how much time they would devote to learning new skills, as well as the day or time when they found it most convenient to read the messages or practice the techniques. Another explanation for the positive comments is that the participants who found the program most enjoyable were self-selected to complete the satisfaction survey at the end of the program. The individuals who did not find the program to be useful or disliked the program for some reason probably dropped out prior to the administration of that survey.

Integration of the Findings with Past Literature

Several of the results for this study converge with the results presented in recent stress management and minimal contact therapy literature. Previous researchers also documented a

reduction in depression levels (Sallis et al., 1987; Schiraldi & Brown, 2001), anxiety levels (Firth-Cozens & Hardy, 1992; Forman, 1991), and anger / hostility levels (Timmons et al., 1997) following participation in a stress management program. The similarity in the results of these studies can be at least partially explained by the similar content of the cognitive-behavioral educational programs. These convergent findings suggest that this e-mail stress management campaign was as successful in reducing emotional arousal levels as more traditional stress management programs, which are rely on greater contact and cost. Thus, the participants receiving the e-mail messages were similarly able to derive emotional benefits from participating in a stress management program, despite having minimal contact with the program administrator.

Also, as expected, the treatment group tended to become more proficient copers, relying on healthier stress management techniques than the control group. Researchers have shown that educational programs sometimes stimulate coping activities (Parker, 1996). Regular practice of cognitive-behavioral skills is highly important for the incorporation of the techniques into the coping repertoire (Newman, Kenardy, Herman, & Taylor, 1997).

Divergent Findings

Just as some of the findings in the present study converge with recent literature, some of the findings diverge from the findings of other researchers. First, the e-mail stress management program did not result in a modification or reduction of perceived stress levels. This finding was unexpected, due to the intuitive nature of the question. It seems logical to envision a stress management program as capable of reducing the perception of stressors and hassles in one's daily life. However, a re-examination of the literature revealed that stress management programs are not always associated with a decrement in stress levels. A study by Hockenmeyer & Smyth (2002) found no differences in perceived stress following a 4-week, self-administered stress

management program, as compared to a placebo intervention. Much of the stress management literature focuses on the emotional and physiological benefits of participating in a stress management program, but there is comparitively little evidence to suggest that stress levels or daily hassles decrease following participation in stress management programs. It is possible that other researchers have had a similar difficulty quanifying a reduction in stress levels, but they have not been able to publish those articles due to the lack of statistically significant findings.

Second, the e-mail stress management program did not result in improved absenteeism rates. This finding can be explained in terms of the lack of impact of the program on the environment in which the participants work. It may not be the stress management program itself that results in a reduction in absenteeism rates, but rather the improved health of those who effectively manage stress or the improved morale of the workplace that offers health promotion programs. The participants' health status was not measured in the present study, nor was there an opportunity for improving morale among the employees because they did not have the opportunity to interact with one another. Although the offering of a health promotion program might be enough to improve employee morale in general, this particular program may have had the downfall of allowing the decision to participate to be entirely individual and anonymous.

On the positive side, the program maintained the Hippocratic principle of first doing no harm. It did not result in an increase in perceived stress or daily hassles; nor did it result in an increase in depression, anxiety, or anger levels among participants. The same conclusion is applicable to the rates of absences and sick days. The absenteeism rates and number of absenses due to illness remained steady for both program participants and individuals in the control group. While the program was not associated with a strong decrease in the number of absences, it was

similarly not associated with an increase in absenteeism. Thus, it seems that this stress management program was a harmless addition to the employees' workday.

Contribution of the findings to the literature

The present study contributes to three broad areas of the literature. First, it demonstrates that the principles of minimal contact therapy (MCT) can be combined with e-mail technology to produce an effective health promotion program. Second, it demonstrates the feasibility of conducting a stress management program entirely via e-mail. Third, it demonstrates the applicability of an e-mail program in the worksite. The combination of these contributions, as well as the individual aspects of each contribution, may be further developed to create increasingly effective health promotion programs.

The results of the present study indicate that MCTs can be implemented using the technology that is readily available in many of today's work places. Previous MCTs relied on written materials that were disseminated to participants in groups or via postal mail. The need for the implementation of stress management programs in the work site has been established for several decades in government health promotion guidelines, but the demand for these programs has exceeded the delivery capacity of traditional programs and company budgets. Therefore, the cost-effective solution of electronically distributing self-help information is a major contribution to the MCT literature.

The current program provides a hopeful template for the development of computer-based stress management programs of the future. The present research demonstrated that e-mail is as effective at disseminating information about stress management as many more traditionally formatted programs. Although adjustments to the program will likely improve outcome variables, the question of whether such a program is feasible is largely resolved by this study.

The results further imply that a broad population is likely to benefit from a computer-based work site MCT program. As technology has become increasingly incorporated into many workplaces, it seems that the previous skills gaps that separated various demographic groups has narrowed. While technical skills may have been necessary for a longer amount of time in certain fields dominated by certain demographically similar groups (i.e., engineering dominated by college-educated males), a greater variety of jobs now require technical competence (i.e., public school teachers). Many people have adapted to these demands and the technically competent now seem to be a fairly diverse group. The present study demonstrates that this broad population of technologically competent individuals may derive benefits from participating in MCT programs in the work site.

Limitations

The results of the present study may have been limited somewhat by threats to internal validity that occurred as a result of the study design. It is possible that the results may have been influenced by the effects of events outside or during the experiment. For example, some groups took the pre-test a few months after the September 11, 2001 World Trade Center bombings, which may have resulted in elevated stress or emotional distress levels at the beginning of the experiment and relatively lower levels after the passage of three months' time. Another threat to the validity of the results is the high attitrition rate; the post-test groups cannot be considered equivalent to the pre-test groups. It is unclear whether the differences between the experimental and the control groups are due to the effects of the stress management program or due to the different types of participants remaining in each of the groups. Finally, the participants' awareness that they were participating in an experiment might have obscured the results of this study. Individuals in the control group might have felt enthusiastic about the possibility of

participating in an on-line stress management study, but disappointed when they were assigned to the control group and had to wait three months to receive the intervention. It is possible that the control group participants altered their responses due to disappointment that they were not randomly selected for the experimental group or due to competition with the experimental group. It is equally possible that those in the experimental group attempted to be "good" subjects and report some improvement in their habits or mood following the intervention. These threats to internal validity limit this researcher's ability to conclusively state that the results of this study are known.

A few characteristics of the present study limit the generalizability of the results to other populations or conditions. Participants in this study knew that they were participating in a study about an intervention designed to reduce stress in the workplace. It is unclear whether the same results would have been obtained if the participants had been less informed about the nature of the study and the expected results. It is also unclear whether the effects demonstrated in this study were a result of the effectiveness of the stress management program or a result of the novelty of the program delivery. Finally, the participants' reactivity to the assessment procedures could have had some influence on the results, thereby limiting the generalizability of the results to populations that are not assessed. Pre-testing the participants could have altered the individual's response to the program, cuing participants about the possible outcome variables; post-testing the participants could have sensitized them to the intervention they received, producing results that would otherwise not be evident. The above threats to the external validity of the present study might be considered in future studies in this area so that generalization to larger populations might be possible.

The validity of the statistical conclusions in the present study may have been limited in some ways. Although there were many efforts made to limit the variability of the experimental conditions and the administration of the program to provide the most powerful test of the relationships between the independent and dependent variables, it was impossible to account for some variability. Due to a relatively high attrition rate, participants were recruited at different times and from different companies. Although that procedure improved the generalizability of the results to a wider population, the variability in the sample was increased. The increased variability reduced the power or sensitivity of the statistical tests. It would have been more advisable to maximize statistical power by limiting the variability in the sample and recruitment, rather than rely on a larger sample size to counter those effects.

Measurement selections may have produced limitations, as well. The complete reliance on self-report measures in the analysis of the effectiveness of the stress management program is a weakness of the experimental design. It would be useful, although it was considered implausible for the present study, to combine some observational or physical data to corroborate the reported stress levels, emotional variables, and behaviors that were reported. Additionally, the tests were chosen due primarily to their availability to this researcher, as opposed to the frequency with which similar tests were used by other researchers in similar studies. Using the same tests as other researchers would allow for more direct comparisons of research outcomes.

The above limitations should be considered when interpreting the results presented in this study. Reducing the impact of the limiting variables may be useful in future studies. Recognition of these limitations provides direction for future research, as do the more conclusive results sited in this study.

Future Directions

Several directions for future research can be based on the results of the present study. The vast majority of participants in this study reported that they enjoyed the program, believed they gained some useful skills, and wanted to recommend the program to others in their company. Participants found the program to be non-intrusive and a good source of self-help. Based on this information, future researchers may wish to explore whether this type of e-mail program is a viable way of providing a desired educational service to workers in today's modern workforce.

The findings of the present study suggest that further research in the applicability of computer-based minimal contact therapies in other topic areas is also necessary. Due to the individual and self-paced nature of this program and subsequent employee satisfaction, it may be useful to explore the utility of other health promotion topics. For example, participants in this study who accessed the adjunctive website for additional information spent most of their time on pages about weight loss and exercise. The level of demand for information about those topics suggests that the development of e-mail psychoeducational programs for employee fitness and weight management might also be useful. Future researchers may wish to explore the possibility of implementing other self-guided educational programs in the work site, such as smoking cessation, weight loss, or reduction of substance abuse.

In terms of work site stress management programs, future researchers may wish to reduce the variability in the formatting of the programs. Some researchers report success after 2-day workshops, while others implement 1-year programs. While much of the variability may be related to the employers' guidelines and the willingness of the participants to devote a certain amount of time to learning stress management techniques, there is some need for greater

consistency within the literature. There are methodological problems with comparing such diverse programs and viewing the results as similar or dissimilar.

The results of this study might be different if participants were measured in a more longitudinal method. The current results imply that the e-mail stress management program was not effective in producing perceptual benefits over a three-month period. However, it is possible that the effects or the differences between groups would be more evident over time. One of the benefits of e-mail is its long durability: the messages can be saved and reviewed at the individual's descretion and leisure. Unlike paper handouts that might be lost or verbal messages that might fade in a person's memory, e-mail messages endure in easily-stored electronic files. Future research might determine whether the effects of a program such as this one might be more evident as time passes, as compared to more traditional programs.

Finally, future researchers may wish to explore the role of social support in minimal contact therapies. Social support appeared to be more important than this author originally anticipated. Not only was the program administrator an invisible and unknown entity, but so also were the other participants. Paticipation in this program was a private and individual experience. It might be beneficial to examine the effects of a similar program with the addition of a social aspect, such as a chatroom feature on the website or an in-person monthly meeting where participants gather to practice techniques or discuss difficulties. Recruitment might also be advanced by ensuring that potential volunteers have an opportunity to meet the program administrator, ask direct questions, or discuss the program in more depth prior to signing up for it.

The future possiblities for research on computer-based MCTs are limited only by the speed with which social science researchers are able to develop and implement ideas to combine

modern technology with positive behavior change models. There seems to be a need for collaboration between psychology and technological experts. As changes take place in the workplace and the world in which people function, psychology has a responsibility to adapt to and help people cope with the new demands of those environments.

APPENDICES

APPENDIX A

PERMISSION TO POST QUESTIONNAIRE ON WEBSITE

Permission to Post Surveys on Website

----- Original Message -----
From: Cassandra Hoke
To: info@mindgarden.com
Sent: Friday, October 12, 2001 9:24 a.m.
Subject: Permission to administer tests electronically

To Whom It May Concern:

In conjunction with my supervised doctoral dissertation research, I would like to administer the Daily Hassles Scale to participants on computer terminals as opposed to the traditional paper fomat.

To ensure that access to the questionnaires will be limited to the study participants, each individual will be assigned a password that will allow access to a secure website. I will be able to track the number of individuals who take the tests and I will pay the appropriate per-use fee for the use of the tests.

Thus, I am writing to request permission to administer the DHS this way. Please respond by letting me know whether you publishing company will allow me to do so.

Sincerely,
Cassandra Hoke, M.P.H.
University of North Texas

----- Original Message -----
From: "Mind Garden, Inc." mindgardeninc@hotmail.com
To: Cassandra Hoke
Subject: Daily Hassles Questionnaire
Date: Monday, December 3, 2001 14:44:58

Cassandra,

Your request for online Daily Hassles questionnaires with a log on was reviewed and approved. Please contact us when you are ready to order.

Best regards,

Sugey
Mind Garden, Inc.
1690 Woodside Rd., Ste 202
Redwood City, CA 94061
Ph (650) 261-3500

APPENDIX B

SURVEYS AND QUESTIONNAIRES

Perceived Stress Scale.

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please select how often you felt or thought a certain way.

NEVER	0
ALMOST NEVER	1
SOMETIMES	2
FAIRLY OFTEN	3
VERY OFTEN	4

1. In the last month, how often have you been upset because of something that happened unexpectedly?
2. In the last month, how often have you felt that you were unable to control the important things in your life?
3. In the last month, how often have you felt nervous and "stressed"?
4. In the last month, how often have you felt confident about your ability to handle your personal problems?
5. In the last month, how often have you felt that things were going your way?
6. In the last month, how often have you found that you could not cope with all the things that you had to do?
7. In the last month, how often have you been able to control irritations in your life?
8. In the last month, how often have you felt that you were on top of things?
9. In the last month, how often have you been angered because of things that were outside of your control?
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Fort Worth Employee Health and Performance in the Workplace Questionnaire.

Instructions: Think over the past couple of weeks in your current job and answer the following questions using this scale:

NEVER	0
RARELY	1
SOMETIMES	2
OFTEN	3
ALMOST ALWAYS	4

1. How often does your level of stress exceed that of your co-workers?
2. How often does your level of stress exceed that of workers in other work groups or other departments?
3. How often do you feel stress as a result of your job?

TCU / Self-Rating Scales.

Instructions: Read the following statements and decide how often each item has occurred or been a problem for you over the past couple of weeks.

NEVER	0
RARELY	1
SOMETIMES	2
OFTEN	3
ALMOST ALWAYS	4

- Depression

1. You feel sad or depressed
2. You have thoughts of committing suicide
3. You feel lonely
4. You feel interested in life
5. You feel extra tired or run down
6. You worry or brood a lot

- Anxiety

1. You have trouble sitting still for long
2. You have trouble sleeping
3. You feel anxious or nervous
4. You have trouble concentrating or remembering things
5. You feel afraid of certain things, like elevators, crowds, or going out alone
6. You feel tense or keyed-up
7. You feel tightness or tension in your muscles

- Hostility / Anger

1. You feel mistreated by other people
2. You like others to be afraid of you
3. You have urges to fight or hurt others
4. You have a hot temper
5. Your temper gets you into fights or other trouble
6. You get mad at other people easily
7. You have carried weapons, like knives or guns
8. You feel a lot of anger inside you

Daily Work Hassles Scale.

Think over the past several weeks in your current job and answer the following questions (using the following scale).

NEVER	0
RARELY	1
SOMETIMES	2
OFTEN	3
ALMOST ALWAYS	4

1. How often does your level of stress exceed that of your co-workers?
2. How often does your level of stress exceed that of workers in other work groups or other departments?
3. How often do you feel stress as a result of your job?

Demographics Questionnaire.

1. Select your gender:
   * Male * Female
2. Your age: _____
3. Employer: _____
4. Number of years with this employer: ____
5. Department: _____
6. Job title: _____
7. Do you work full- or part-time? _____
8. What is the highest level of education you have completed?
    - Did not complete high school
    - High school
    - Some college courses
    - Degree from Technical college
    - Associate's degree
    - Bachelor's degree from University
    - Master's degree
    - Doctoral degree (Ph.D. or M.D.)
    - Other: _____
9. Personal Income:
    - Under $15,000
    - $15,000-$25,000
    - $25,000-$35,000
    - $35,000-$45,000
    - $45,000-$55,000
    - $55,000-$65,000
    - $65,000-$75,000
    - Over $75,000
10. Household Income:
    - Under $25,000
    - $25,000-$35,000
    - $35,000-$45,000
    - $45,000-$55,000
    - $55,000-$65,000
    - $65,000-$75,000
    - $75,000-$85,000
    - $85,000-$95,000
    - Over $95,000
11. Do you smoke? _____
12. Are you single, married, divorced, separated, living with a significant other, or widowed? _____
13. How many days have you been absent from work in the past 3 months?
14. How many of those days were due to illness?
15. Please list the methods of stress management you currently use:

a.
b.
c.
d.

16. How often do you use the stress management techniques that you listed above?
    a.
    b.
    c.
    d.

APPENDIX C

RECRUITMENT MESSAGES

Summary of Proposed Study.

Dear ***,

My name is Cassandra Hoke, and I am a doctoral student at the University of North Texas in Denton. I am studying Health Psychology with a specialty in Occupational Health and Worksite Wellness.

I was told that the employees of *** might make ideal candidates for my dissertation research project because your employees regularly check their e-mail at work. I would like to do a short intervention in which educational messages about stress management and work site wellness are sent to employees via e-mail on a weekly basis. The e-mail messages would take no longer than 5-8 minutes of the employee's day. The messages, for the most part, would not require responses from the employees, but I would make my e-mail address known so that they could ask me questions if necessary.

All participation by your employees would be completely voluntary and confidential. Also, any volunteers could withdraw from the study at any time.

I expect the study to take no longer than 3 months.

The expected starting date for the project is approximately late September or early October when most employees have completed their summer vacations.

Stress-management interventions at the business level typically have many benefits to the company that provides such services, such as decreased stress levels, greater productivity during the work day, lower absentee rates, lower turn-over rates, etc. The potential for a more cost-effective intervention in the workplace, such as the one I am proposing, is even greater than traditional programs. Because my research project is still in the formative stage at this point, the research questions can be extended to investigate even more issues of specific concern to your company.

Any help that you can offer, whether it be allowing me to speak to you further about this project or forwarding this message to others in or outside your company, would be greatly appreciated. I am looking for as large and as diverse a study population as possible.

Thank you so much for your time,

Cassandra Hoke

Summary of Program.

Stress Management Program

- This employee stress management program is offered as part of a doctoral-level dissertation research project.
- Any employee who regularly checks electronic mail (e-mail) at work is eligible to participate in this program.
- All participation is voluntary, confidential, and free.
- Volunteers must complete an on-line pre- and post-intervention survey and a written informed consent form.
- Volunteers will receive twice-weekly e-mail messages about stress management in the work site and stress-coping techniques.
- Volunteers will begin receiving messages in January 2003 for 3 months.
- Each message will take less than 5 minutes to read.
- Volunteers may choose to receive a summary of the results of the study. All results will be reported in terms of group outcomes. No identifying personal information will be revealed.

* Contact Cassandra Hoke at stressmgmtprogrm@yahoo.com for more information or to volunteer.

Contract to Provide Services.

I, as a representative of _____ (name of company), agree to let Cassandra Hoke, a graduate student at the University of North Texas, provide a stress management program to our employees via electronic mail (e-mail). The program will involve the provision of e-mail messages twice per week for three months during each phase of the study. There will be two phases: the first beginning in October 2002 and the second in January 2003. Employees will need to be available for either phase of the study when they volunteer, but they will only participate in one phase.

While we may opt to receive a summary of the results of the study, we understand that results will be reported on a per-group basis, rather than about any particular individual.

Depending on our preference, the name of our company may or may not be revealed in the reporting of this study in any publication or discussion of this study (please specify below).

By signing below, I am agreeing to the above terms of this contract.

_____

Printed name of Representative

_____

Signature of Representative

We would / would not like the name of our business to be revealed (circle one option).

Recruitment E-mail.

Do you ever feel stressed?

Do you want to do something about it, but think you don't have time?

***** employees are now eligible to participate in a cutting-edge stress management program .**

This is your opportunity to learn some

simple, practical ways of coping with stress,
and to be part of a workplace study that combines the best of technology and psychology.

Volunteers will receive 2 e-mail messages per week for 3 months. Also, volunteers will complete some brief surveys before and after participating in the program so that progress can be evaluated. This program is free, easy, and confidential.

To volunteer or request more information, send an e-mail to stressmgmtprogrm@yahoo.com or call 859-266-3562.

APPENDIX D

INFORMED CONSENT FORM

COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS
RESEARCH CONSENT FORM

Subject Name:_____ Date: _____

Title of Study: The effectiveness of an electronic-mail campaign to modify stress levels, mood states, and coping techniques among employed adults

Principal Investigator: Cassandra Hoke, M.P.H.

Co-Investigators: Warren Watson, Ph.D.

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the proposed procedures. It describes the procedures, benefits, risks, and discomforts associated with the study. It also describes the alternative treatments that are available to you and your right to withdraw from the study at any time. It is important for you to understand that no guarantees or assurances can be made as to the results of the study.

PURPOSE OF THE STUDY AND HOW LONG IT WILL LAST:

This study is intended to assess the effectiveness of an educational stress management intervention program that is delivered entirely via electronic mail (e-mail). Volunteers will receive messages twice a week for three months.

DESCRIPTION OF THE STUDY INCLUDING THE PROCEDURES TO BE USED:

Employed male and female volunteers will be recruited from several businesses in the Dallas / Fort Worth metropolitan area and randomly assigned to one of two groups. Individuals in the first group will begin receiving e-mail messages at their business address in January, while those in the second group will not begin receiving the same messages until April. Each message should take no longer than 10 minutes to read, and will contain information about stress management or procedures for coping with stress. Reading the messages and following any instructions will be completely voluntary each time a message is received.

In addition to receiving the e-mail messages, all volunteers will be asked to complete and return a series of written questionnaires in January and April. Individuals in the second group will be asked to complete the same questionnaires for a third time in July. The questionnaires will request information about personal characteristics, perceived stress levels, and recent mood states. An individual may choose to skip any question that he / she does not wish to answer, although it will be encouraged that he / she answer as many questions as possible.

Subject Name: _____ Date:_____
Title of Study: The effectiveness of an electronic-mail campaign to modify stress levels, mood states, and coping techniques among employed adults
Principal Investigator: Cassandra Hoke, M.P.H.
Co-Investigators: Warren Watson, Ph.D.

DESCRIPTION OF PROCEDURES/ELEMENTS THAT MAY RESULT IN DISCOMFORT OR INCONVENIENCE:

Some individuals may find it distressful or inconvenient to receive e-mail messages from the investigator for a three-month duration. If a volunteer would like to withdraw from the study at any time, he/she may send an e-mail message to the investigator and request that his/her address be removed from the mailing list. Additionally, some people may find some of the suggested procedures for coping with stress undesirable, uncomfortable, or inconvenient. In all cases, a participant should use his/her judgment to determine whether he/she would like to try or continue to try to follow any advice recommended during the course of this study.

DESCRIPTION OF THE PROCEDURES/ELEMENTS THAT ARE ASSOCIATED WITH FORESEEABLE RISKS:

There is only negligible risk of discomfort or of disclosure of personal information associated with this study.

BENEFITS TO THE SUBJECTS OR OTHERS:

The volunteers will receive information about stress management and stress coping techniques during their participation in the intervention. This project will help researchers to better understand the effectiveness of e-mail as a form of communication in the workplace and as a teaching tool. If this intervention proves to be effective, information about stress management may be provided to a larger number of working adults than previously accomplished with more traditional methods.

CONFIDENTIALITY OF RESEARCH RECORDS:

E-mail messages will be sent individually to protect the anonymity of each volunteer. A subject number will identify each participant for the purposes of record keeping, and a master list of all subject names and corresponding subject numbers will be stored in a locked file cabinet. The volunteer's employer and manager will not be made aware of any of the responses or results of any individual's participation before, during, or after the study. All results that are calculated, discussed, or printed will be on a per-group basis. Any individual identifiers will be altered or unreported to protect the identity of all participants.

UNIVERSITY OF NORTH TEXAS

COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS
RESEARCH CONSENT FORM

Subject Name: _____ Date: _____
Title of Study: The effectiveness of an electronic-mail campaign to modify stress levels, mood states, and coping techniques among employed adults
Principal Investigator: Cassandra Hoke, M.P.H.
Co-Investigators: Warren Watson, Ph.D.

REVIEW FOR PROTECTION OF PARTICIPANTS:

This research study has been reviewed and approved by the UNT Committee for the Protection of Human Subjects (940) 565-3940.

RESEARCH SUBJECTS' RIGHTS: I have read or have had read to me all of the above.

Cassandra Hoke has provided a written explanation of the study to me and answered all of my questions. I have been informed of the risks or discomforts and possible benefits of the study. I have been told of other choices of treatment available to me.

I understand that I do not have to take part in this study, and my refusal to participate will involve no penalty or loss of rights to which I am entitled. I may withdraw at any time without penalty or loss of benefits to which I am entitled. The study personnel can stop my participation at any time if it appears to be harmful to me, if I fail to follow directions for participation in the study, if it is discovered that I do not meet the study requirements, or if the study is canceled.

In case there are problems or questions, I have been told I can call Warren Watson, Ph.D. at telephone number 940-565-3277.

I understand my rights as a research subject, and I voluntarily consent to participate in this study. I understand what the study is about and how and why it is being done. I will receive a signed copy of this consent form.

_____ _____
Subject's Signature Date

_____ _____
Signature of Witness Date

For the Investigator or Designee:

I certify that I have reviewed the contents of this form with the person signing above, who, in my opinion, understood the explanation. I have explained the known benefits and risks of the research.

_____ _____
Principal Investigator's Signature Date

APPENDIX E

E-MAIL MESSAGES

MESSAGE #1:
Thank you again for volunteering to be a part of this stress management program, which will be delivered directly to you via your e-mail account.

Before you can begin receiving regular e-mail messages, you must complete a series of brief surveys. These surveys will ask questions about who you are and how you typically feel or behave. Be assured that this information is confidential and secure, so please answer as honestly as possible. Please complete these surveys within 7 days.

The surveys are available for you on-line. To access the surveys, please follow these instructions carefully (you may want to print a copy of this message):

a) Type the following address into your web browser: http://webct.unt.edu/
b) Select "log on to myWebCT"
c) Enter your username and password and click "ok" (YOU WILL RECEIVE YOUR INDIVIDUAL USERNAME AND PASSWORD IN A SEPARATE MESSAGE)
d) Click on "Stress Management" (under courses in the top left area of page)
e) Click on "Surveys and Quizzes"
f) Select "Survey #1" by clicking on its title
g) Read the survey's instructions carefully
h) Select your answers to each question by clicking on the circle next to your answer. Click "save answer" after each response. The red dot that corresponds to that question will turn into a green star, which indicates that you have completed that question.
i) Go on to the next question until you have completed the entire survey; then submit your responses to me by clicking "submit".
j) Follow steps f-i to complete all 6 surveys.

Your responses will be confidential, and it will take approximately 30-45 minutes to complete all the surveys.

You will not begin receiving the e-mail messages until you complete the surveys, so it is very important that you make every effort to complete the surveys within 7 days.

MESSAGE #2:
Hi, _____.

Refer to the previous message for instructions about how to access the study website. Let me know if you have any questions or difficulties.

Your username is

Your password is

Please complete your surveys as soon as possible.
MESSAGE #3:

Thank you for your rapid and candid responses to the surveys that are a necessary component of this research project! Great job!!

You have been randomly chosen to participate in the first stress management group, which will begin receiving e-mail messages this week.

MESSAGE #4:
As a participant in the first phase of the stress management program, you might find the following bits of information useful.

In the upcoming weeks, you will receive 2 messages per week. The first message will generally be educational, providing the background information on specific stress management techniques. The second message will generally be instructional and it will include a practice exercise for the week.

Also, you will also have access to the website which will be updated with new information weekly, providing you with more information about the topics and more examples (click on the "stress management tip of the week icon).

To get the most out of this program, try to incorporate the stress management techniques into your daily life. The suggested techniques have been validated and proven effective when practiced regularly. Practice the "technique of the week" each day until you get a new assignment. I promise you will get better at it!!!

It will be easier to remember to practice if you pick a time of the day (before breakfast, after lunch, etc.) to devote to stress management.

KEEP IN MIND THAT THIS PROGRAM IS NOT A THERAPEUTIC DIALOGUE. It is an educational program, and I am acting in a role similar to a coach. I am here only to provide guidance and clarification about the stress management techniques. Each week, you will be asked to respond about whether you understood the lesson and whether you found the technique useful.

I hope that this is a program that you will enjoy and learn from. Have a great weekend!!

MESSAGE #5:
As you are starting a stress management program, it is helpful to understand what stress is and what it does to your body.

Stress is a result of your awareness of and your body's response to potentially threats or challenges. Your body responds to challenges by getting "revved up" (speedy heart rate, rapid breathing, tight muscles, etc.). This is great when you need to fight off or run away from a lion that escapes from the zoo, but (thankfully) that doesn't happen every day.

Typical "stressors" for the modern person involves things like meeting deadlines or completing daily work tasks. Your body responds to those challenges by getting revved up, too.

Stress in your daily life becomes a problem because your body can only handle so much revving. Occassionally, you need to slow down and relax. The great thing about relaxation is that it is totally incompatible with stress.

In the upcoming weeks, this program will provide you with the opportunity to learn about ways to incorporate more relaxation and stress coping techniques into your daily life. Stay tuned!!

MESSAGE #6:
Listed below are some of the common symptoms of excessive daily stress. How many sound familiar to you? Have you experienced any of these symptoms in the last couple of months?

1. Anxious thoughts
2. Poor concentration / distractibility
3. Memory problems
4. Feeling tense
5. Feeling irritable
6. Unable to relax
7. Worrying too much
8. Feeling restless
9. Avoiding tasks
10. Difficulty sleeping
11. Failing to meet deadlines or complete work
12. Crying
13. Changes in eating / drinking / smoking behaviors
14. Tense or stiff muscles
15. Tension headaches
16. Gastrointestinal problems
17. Loss of interest in sex
18. Weight loss or gain
19. Tiredness
20. Awareness of heart beat
21. Changes in quality of social relationships
22. Difficulty swallowing
23. Tremors
24. Fidgeting
25. Stomach aches
26. Depression

After looking at this list, decide whether any of these symptoms are enough of a bother to motivate you make some changes in your response to stress.

MESSAGE #7:
The topic of this week is breathing.

Breathing is one of those things that we take for granted because we assume that our bodies will breathe when we need air. You might be surprised at how many times per day you hold your breath or fail to get enough air into your body.

When you learn to breathe properly, you will enjoy the benefits of relaxation and reduced tension in your muscles. One of the reasons many people experience tense shoulder muscles and stiff necks is because they are breathing improperly on a regular basis.

The next message you will get will include instructions about how to breathe properly. Try this for now: Place one hand on your chest and one hand on your stomach. Take a normal breath, and notice which hand moves the most. RESPOND TO THIS E-MAIL BY LETTING ME KNOW WHETHER THE HAND YOU PLACED ON YOUR CHEST OR STOMACH ROSE MORE WHEN YOU TOOK A BREATH. You may also want to take notice of your breathing habits over the next few days.

MESSAGE #8:
Technique of the Week: Breathing

You may find it easier to learn this technique if you lie on your back with your feet approximately shoulder-width apart. If that position is not possible, recline in a chair with your head supported.

1. Place one hand on your chest and one hand on your belly (directly above your waistline).
2. Inhale through your nose and press the hand on your belly upward as far as is comfortable. Count to four or five as you are inhaling.
3. Exhale through your mouth when you are ready, making a soft whooshing sound to the count of five or six and letting your belly relax. (Your exhale should be slightly longer than your inhale). Relax your tongue, mouth, and jaw.
4. When you are ready, take another deep breath and continue breathing at a comfortable rate for the next five minutes.

It may be helpful for you to close your eyes and visualize air traveling into and out of your body. Also, concentrate on keeping your shoulders down and relaxed and your chest stable (moving very little during in- and exhales).

ASSIGNMENT: practice this exercise twice a day until your next assignment. Good luck!

WARNING: Occasionally, some people feel light-headed or panicked during or after practicing this technique. Just stop and return to your normal pattern of breathing. Try again later in the day. Let me know if you continue to have difficulties.

MESSAGE #9:
Dr. Herbert Benson originally coined the term "relaxation response", which he used to describe a phenomenon of becoming physically and mentally relaxed in a matter of moments. All it takes is a little time and concentration from you!

Remember that relaxation is the opposite of stress. Therefore, learning to relax is the first step in reducing stress in your life.

You may have found by now that focusing on your breathing for a few minutes a day is enough to make you feel calmer and more focused. Try these steps to enhance your ability to relax.

1. Sit quietly in a comfortable position.
2. Clear your mind of all thoughts not relating to the present moment.
3. Select a word or phrase that is compatible with your personal belief system, such as "peace", "calm", or "love".
4. Close your eyes and relax your body.
5. Breathe slowly and naturally, repeating the word silently each time you exhale.
6. If other thoughts interrupt this pattern, just say "oh well" to yourself and return to breathing and focusing on your word.
7. Continue for 5-10 minutes.

HINT: Do not use an alarm to draw a conclusion to your concentration. Instead, rely on your internal clock to let you know when you have completed the 5-10 minute exercise.

MESSAGE #10:
Autogenic training (autogenics) is the simple act of focusing on the weight and temperature of your arms, legs, or other body parts. It works because it allows your body to do something besides feel stressed.

When your body responds to stress, your blood flow is drawn away from your extremities (arms, hands, fingers, legs, feet, toes). Pooling the body's blood around your vital organs (heart, etc.) is adaptive in short-term situations, because you won't bleed to death if your hand gets injured during a fight. However, chronic (long-lasting or frequently repeated)
stress disrupts your body's natural blood flow and leads to stress-related problems like tension and migraine headaches, muscle tension and stiffness, and cold hands and feet.

It is much healthier (and comfortable!) to have your blood flowing adequately through all parts of your body. Learning autogenic techniques is another way that you can relax by doing the opposite of stressing. Next time you will learn to repeat simple phrases to yourself to cue your body to relax.

MESSAGE #11:
Technique of the Week: Autogenics

Sit comfortably and have someone read the following slowly or make a tape recording of yourself reading the script until you get the hang of the technique.

"Close your eyes and focus on your breathing. As you breathe in and out, say to yourself 'My breath is calm and effortless... calm and effortless.' (pause and focus on breathing for a minute or two).

"Feel a sense of calm and well-being flow through your body as you allow yourself to relax. Become quite calm and relaxed.

"Now focus on your arms, hands, and fingers. Think to yourself, 'My arms are heavy and warm. Warmth is flowing into my arms, wrists, hands, and fingers.' Stay with these thoughts for a few minutes. Stay with the warmth in your arms, hands, and fingers for a few minutes.

"Now focus on your legs, feet, and toes. Think to yourself, 'My legs are heavy and warm. Warmth is flowing into my legs, feet, and toes. My legs are heavy and warm.' Stay with these thoughts for a few minutes. Picture blood flowing throughout your legs and down into your toes. Or picture yourself sitting in the sunshine, with the sun warming your legs and feet until they are comfortably warm.

"Now scan your body for any feelings of tension. If you notice any tension, focus your energy there for a few moments and let your muscles release that tension and send it out of your body. The tension is not serving any purpose for you as you are trying to relax.

"Take a deep breath and exhale any remaining tension. When you are ready, stretch a little, open your eyes, and get on with your everyday activities."

ASSIGNMENT: PRACTICE AT LEAST ONCE (PREFERABLY TWICE) PER DAY UNTIL THE NEXT ASSIGNMENT.

MESSAGE #12:
Edmund Jacobson originally developed Progressive Muscle Relaxation (PMR) in 1929. He emphasized that your muscles will tense or contract in response to stress or anxiety. In turn, the more tense your muscles, the more stressed you will feel. PMR is a technique in which you concentrate on various segments of your body and distinguish between feelings of tension and relaxation.

Research has shown that people who regularly practice PMR techniques have less muscle tension, neck and back pain, insomnia, depression, anxiety, irritability, and fatigue.

More detailed instructions will be included in the next message and is currently available on the website (http://webct.unt.edu under "stress management tip of the week"). Here is the general idea:

You will learn to concentrate on four major areas:
1. Hands, forearms, and biceps
2. Head, face, shoulders
3. Chest, stomach, back
4. Thighs, buttocks, calves, and feet

You will tense each muscle group for 5-7 seconds and then relax for 15-30 seconds, repeating with each area at least once. You may find it helpful to silently repeat one of the following phrases while relaxing:
* Let go of the tension
* Relax and release the tension
* Let the tension fade away

MESSAGE #13:
The following is a short PMR technique to be used when you need to relax quickly. A more thorough exercise is detailed on the website. You may wish to tape record one or both of the exercises so that you may listen with your eyes closed while you follow the instructions.

Repeat each procedure at least once, tensing each muscle group for 5-7 seconds and then relaxing for 15-30 seconds. Notice the contrasting sensations of tension and relaxation.

1. Sit in a reclined position with your head supported. Relax. Breathe deeply for a few minutes and free your mind of all concerns. Take this time for yourself.

2. When you are ready, curl both hands into fists, tighten your biceps and forearms (muscle man pose). Hold for 5-7 seconds, then relax. Notice the contrast in the way your muscles feel during and after tensing them. Repeat this sequence.

3. Now wrinkle up your forehead. At the same time, press your head as far back as possible. Roll it clockwise in a complete circle, and then reverse. Now wrinkle up the muscles of your face like a walnut: frowning, eyes squinted, lips pursed, tongue pressing the roof of your mouth, and your shoulders hunched. Then relax. Repeat this sequence.

4. Arch your back as you take a deep breath into your chest. Hold. Relax. Take a deep breach and press out your stomach. Hold. Relax. Repeat this sequence.

5. Pull your feet and toes back toward your face, tightening your shins. Hold. Relax. Curl your toes, simultaneously tightening your calves, thighs, and buttocks. Relax. Repeat this sequence.

ASSIGNMENT: PRACTICE THIS (OR THE MORE DETAILED) EXERCISE TWICE A DAY UNTIL THE NEXT ASSIGNMENT.

** This exercise is based heavily on pages 37-38 of the fourth edition of The Relaxation and Stress Reduction Workbook by Davis, Eshelman, & McKay (1995).

MESSAGE #14:
Self-hypnosis is simply the act of intently focusing your attention, which can help you relax or control your body's functions.

You may learn self-hypnosis by going to a professional hypnotherapist or by listening to a tape, both of which will offer suggestions that will help you reach your goals. The next e-mail message you will receive will contain instructions for making your own self-hypnosis tape, with

a suggested monologue. You can customize the suggestions so that you will progress toward an individualized goal (i.e., sleep better, feel less anxious, etc.) if you would like.

Self-hypnosis can work for anyone. However, it will work best if 1) you like to take personal responsibility for your health, 2) you believe that you have a good imagination, 3) you have a clear objective/goal in mind, and 4) you are willing to put forth the time and effort to practice this technique.

MESSAGE #15:
Below is a sample monologue for self-hypnosis. You can memorize the script or read it into a tape-recorder for easy listening. If you read this script into a tape-recorder, do so in a monotone, even-paced voice. Pause for approximately 1-2 seconds for each period (.) and comma (,). The goal of the self-hypnosis exercise is to allow your mind to drift into peaceful acceptance and relaxation.

"Sit in a comfortable position with your arms uncrossed and resting comfortably by your sides or on your lap. Your legs should also be uncrossed with your feet resting comfortably on the floor. Take a deep breath, all the way into your abdomen... and exhale. When you are ready, take another deep, relaxing breath.. and let go of the tension of your day. Relax your muscles... one by one... letting go of tension. Your head, your face, your neck... all feel comfortably relaxed. Your shoulders, your chest, your back and stomach... all feel comfortably relaxed. Take another deep, relaxing breath, and relax your thighs, legs, and feet... comfortable and relaxed.

Focus on your comfort and relaxation... as you drift deeper into a state of relaxation and calm. You are very relaxed and calm... You feel comfortable and in control. There is nothing to worry about right now. It can all wait until later.. You feel very relaxed and calm.. Totally relaxed and calm. Comfortable and relaxed. At peace with your world. Totally relaxed and calm and comfortable. Very relaxed and calm... and comfortable.

Now when you are ready, it will be time to return to the world in a more relaxed and calm state-of-mind. You will feel very alert and refreshed and ready to face the world. Take the feeling of relaxation and calm with you as you open your eyes, stretch, and get on with your day. Alert and refreshed now... wide-eyed and ready for the world."

ASSIGNMENT: PRACTICE THIS EXERCISE TWICE A DAY UNTIL THE NEXT ASSIGNMENT. HAVE FUN!

MESSAGE #16:
Here is another brief relaxation exercise that is simple and effective. It requires an imagination... which I promise that you have!

1. Take a few moments to concentrate on your breathing, making sure that you are breathing deep into your abdomen and relaxing your body.
2. Close your eyes and visualize your tension as a color and shape. Now change the color and shape of your tension by making it bigger or smaller, lighter or darker. See yourself holding the tension in your hands. Look at it in your hands and toss it up and down once

or twice like it was a ball. Now see yourself rearing back in slow motion to throw your tension away. Go ahead and throw it. See it leave your hand and move further and further away. Wait until it disappears from your awareness.

3. Now imagine your body filled with lights. See red lights for tension and blue lights for relaxation. Imagine the lights changing from red to blue in all the tension areas of your body. Be aware of any physical sensation you experience while you change to the blue light of relaxation. See all the lights in your body as blue and see that blue color becoming darker and darker. Feel yourself relaxing further with each shade of blue you experience.
4. When you are ready, open your eyes and tell yourself to continue to take the feeling of relaxation with you the rest of the day!

MESSAGE #17:
Exercise is one of those things that we eliminate when we feel stressed because we tell ourselves that we don't have enough time or energy, or any number of other excuses. But then all we are left with is a bunch of excuses and a body that keeps feeling worse!

Exercise is an excellent buffer against stress. Research has shown that regular exercise boosts the immune system and helps people stay healthy under stress. It can also provide relief from short-term anxiety and improve mood.

The key is to choose an exercise that you enjoy and want to repeat. After checking with your doctor and reviewing any limitations, try the following tips.
1. Think about taking lessons or joining a group.
2. Exercise three to five times per week.
3. Start with 5, 10, or 15 minute sessions -- better to ease into a new habit slowly!
4. Try to have fun with it. The more you enjoy the activity, the more likely you will be to keep doing it!!

More information about exercise is currently available on the website ("http://webct.unt.edu") on the "Stress Management Tip of the Week"

MESSAGE #18:
Sometimes you don't have much time to devote to relaxation or stress management. For example, you may need something to do right before a presentation or while you are working to meet a deadline. In those cases, a few moments of deep breathing is usually the best antidote for stress.

There are other things you can do, as well. The next few messages will be devoted to quick, simple relaxation exercises. If you have practiced the techniques up to this point, you should find the quick relaxers easy to incorporate into your daily routine.

As always, email stressmgmtprogrm@yahoo.com with any questions or comments, and check out the web site at http://webct.unt.edu for more information. Have a great day!

MESSAGE #19:

The following is a brief relaxation exercise that combines several elements of the previous relaxation exercises. It is particularly helpful at the end of a stressful day.

1. Do a short progressive muscle relaxation to relax your body (curl fists, tighten arm muscles, wrinkle face like a walnut, arch back, take a deep breath, flex feet, tighten leg muscles--- then relax it all!)

2. Think about today and select three things about today for which you are grateful or thankful. None of the things has to be a major event, but rather you could be grateful for the warm shower you took, a co-worker helping you, your child hugging you, a green light on the way to work, and so on. Take a moment to recall everything about each experience and enjoy the feelings that accompany the memory.

3. Now think aobut three things that you did that you feel good about. For example, you may feel good aobut giving your opinion in a meeting, taking time for yourself to relax or exercise, or calling a friend. Take a few minutes to re-experience those events and the positive feelings that accompany those memories.

MESSAGE #20:
Dear ____,

Thank you for participating in this stress management program. I hope that you have found the techniques to be helpful in managing stress in your daily life and in your workplace.

When you first learned about this project, you agreed to complete some surveys during the last week of the intervention. Please visit the website and complete Surveys #1 - #6 by (DATE). Let me know if some unusual circumstance will prevent you from completing the surveys by this deadline.

As a reminder, your username is _____ and your password is ____. Access the website by typing "http://webct.unt.edu" into your web-browser and clicking on the "Stress Management" course.

Thank you again for your participation! Let me know if you would like to recommend this program to a co-worker or friend.

Sincerely,
Cassandra Hoke

MESSAGE #21:
Thank you for participating in the stress management program and quickly completing your surveys. I appreciate all your time and effort! You did a great job!

Table 1

Pre-Intervention Comparisons

	Experimental		Control			
	M	SD	M	SD	t	p
Age	30.67	11.93	28.28	10.77	1.23	.22
Years Employed	3.81	4.75	3.51	4.30	.39	.70
Absences	2.04	4.12	2.27	3.94	-.34	.74
Sick Days	1.15	3.95	.81	2.56	.58	.56
Anxiety	15.31	5.53	15.00	5.66	.33	.74
Depression	13.61	4.09	13.88	4.17	-.38	.70
Hostility / Anger	10.36	5.57	11.12	6.35	-.74	.46
Daily Hassles	26.67	8.39	26.83	8.54	-.11	.92
Intensity of D.H.	37.82	16.05	36.88	15.38	.35	.73
Daily Work Hassles	14.45	5.43	13.50	5.47	1.01	.31
Intensity of D.W.H.	23.43	13.68	22.87	14.82	.23	.82
Perceived Stress	18.65	5.78	20.00	5.06	-1.12	.27

Table 2

Intercorrelations Between Subscales for Pre- and Post-Intervention Scores

Subscale	1	2	3	4	5	6	7	8
Pre-Intervention (n = 136)								
1. Perceived Stress	---	.37	.47	.32	.42	.69	.69	.58
2. Daily Hassles		---	.85	.35	.30	.35	.25	.18
3. Intensity of D.H.			---	.45	.47	.43	.37	.26
4. Daily Work Hassles				---	.85	.29	.23	.27
5. Intensity of D.W.H.					---	.39	.40	.42
6. Anxiety						---	.82	.70
7. Depression							---	.75
8. Hostility/Anger								---
Post-Intervention (n = 100)								
1. Perceived Stress	---	.26	.49	.38	.40	.68	.70	.60
2. Daily Hassles		---	.87	.54	.45	.35	.30	.23
3. Intensity of D.H.			---	.47	.50	.40	.42	.32
4. Daily Work Hassles				---	.88	.35	.23	.25
5. Intensity of D.W.H.					---	.42	.37	.36
6. Anxiety						---	.83	.74
7. Depression							---	.79
8. Hostility/Anger								---

Table 3

Post-Intervention Comparisons: Stressor and Hassles Scores

	Experimental		Control	
	M	SD	M	SD
Perceived Stress	18.67	5.16	20.15	4.65
Daily Hassles	27.13	8.71	26.15	8.50
Intensity of D.H.	37.00	16.56	36.67	15.95
Daily Work Hassles	14.93	6.10	14.19	5.72
Intensity of D.W.H.	22.85	13.19	23.11	14.38

Table 4

Post-Intervention Comparisons: Emotional Variables

	Experimental		Control	
	M	SD	M	SD
Anxiety	15.89	6.14	16.07	5.69
Depression	14.35	4.46	14.57	12.04
Hostility/Anger	12.07	5.40	12.04	6.63

Table 5

Pre- and Post-Intervention Comparisons by Demographic Variable

	Males		Females				
	M	SD	M	SD	t	df	p
Pre-Intervention							
Perceived Stress	14.79	6.03	20.08	5.22	-3.26	64	.00
Daily Hassles	26.00	8.90	26.87	8.31	-.35	65	.73
Intensity of D.H.	35.27	16.30	38.56	16.06	-.70	65	.49
Daily Work Hassles	13.13	6.06	14.83	5.25	-1.07	65	.29
Intensity of D.W.H.	19.33	10.76	24.62	14.28	-1.33	65	.19
Anxiety	12.53	5.89	16.12	5.21	-2.28	65	.03
Depression	10.67	3.75	14.44	3.83	-3.32	65	.00
Hostility/Anger	10.60	6.84	10.29	5.22	.19	65	.85
Post-Intervention							
Perceived Stress	16.50	6.26	19.14	4.87	-1.32	43	.19
Daily Hassles	27.89	11.19	26.95	8.17	.29	44	.77
Intensity of D.H.	37.22	18.84	36.95	16.25	.44	44	.97
Daily Work Hassles	15.33	5.92	14.84	6.22	.22	44	.83
Intensity of D.W.H.	19.56	3.20	23.65	2.29	-.83	44	.41
Anxiety	14.89	5.21	16.14	6.38	-.54	44	.59
Depression	12.22	4.09	14.86	4.45	-1.62	44	.11
Hostility/Anger	14.00	5.94	11.59	5.24	1.20	44	.24

Table 5 (continued)

	Older		Younger				
	M	SD	M	SD	t	df	p
Pre-Intervention							
Perceived Stress	19.38	6.44	18.71	5.44	.44	64	.66
Daily Hassles	27.21	7.28	26.37	9.02	.39	65	.70
Intensity of D.H.	38.42	18.90	37.49	14.44	.23	65	.82
Daily Work Hassles	14.54	5.69	14.40	5.35	.11	65	.92
Intensity of D.W.H.	24.42	16.75	22.88	11.81	.44	65	.66
Anxiety	15.50	6.60	15.21	4.92	.21	65	.84
Depression	13.63	4.45	13.60	3.93	.02	65	.99
Hostility/Anger	10.88	5.06	10.07	5.87	.57	65	.57
Post-Intervention							
Perceived Stress	17.72	6.68	19.30	3.85	-.90	43	.38
Daily Hassles	26.94	9.15	27.25	8.58	-.12	44	.91
Intensity of D.H.	34.83	19.50	38.39	14.59	-.71	44	.48
Daily Work Hassles	14.67	7.15	15.11	5.45	-.22	44	.83
Intensity of D.W.H.	22.22	15.48	23.25	11.78	-.26	44	.80
Anxiety	15.78	7.70	15.96	5.04	-.09	44	.93
Depression	13.61	5.84	14.82	3.83	-.83	44	.41
Hostility/Anger	11.56	5.65	12.39	5.31	.51	44	.61

Table 5 (continued)

	Full-Time		Part-Time				
	M	SD	M	SD	t	df	p
Pre-Intervention							
Perceived Stress	19.43	5.74	18.34	5.88	.76	64	.45
Daily Hassles	28.00	7.15	25.03	9.57	1.45	65	.15
Intensity of D.H.	39.24	16.56	36.07	15.49	.80	65	.43
Daily Work Hassles	14.19	4.85	14.77	6.15	-.43	65	.67
Intensity of D.W.H.	23.14	13.75	23.80	13.81	-.20	65	.85
Anxiety	15.73	5.94	14.80	5.03	.68	65	.50
Depression	13.73	4.23	13.47	3.98	.26	65	.80
Hostility/Anger	10.84	5.39	9.77	5.82	.78	65	.44
Post-Intervention							
Perceived Stress	18.24	6.08	19.20	3.79	-.65	43	.52
Daily Hassles	27.68	7.91	26.48	9.73	.46	44	.65
Intensity of D.H.	37.36	17.14	36.57	16.26	.16	44	.87
Daily Work Hassles	13.96	5.88	16.10	6.29	-1.19	44	.24
Intensity of D.W.H.	20.88	13.09	25.19	13.23	-1.11	44	.27
Anxiety	16.76	6.80	14.86	5.21	1.05	44	.30
Depression	14.44	4.86	14.24	4.06	.15	44	.88
Hostility/Anger	12.32	5.52	11.76	5.37	.35	44	.73

Table 5 (continued)

	Smoker		Non-Smoker				
	M	SD	M	SD	t	df	p
			Pre-Intervention				
Perceived Stress	19.05	6.00	18.40	4.60	.33	64	.75
Daily Hassles	26.23	8.09	28.91	9.86	-.97	65	.34
Intensity of D.H.	37.18	15.51	41.09	19.03	-.74	65	.46
Daily Work Hassles	13.96	5.51	16.91	4.44	-1.67	65	.10
Intensity of D.W.H.	22.91	14.22	26.09	10.64	-.70	65	.49
Anxiety	15.39	5.79	14.91	4.18	.26	65	.79
Depression	13.64	4.28	13.45	3.11	.14	65	.89
Hostility/Anger	10.30	5.28	10.64	7.16	-.18	65	.86
			Post-Intervention				
Perceived Stress	18.94	17.14	5.42	3.29	.85	43	.40
Daily Hassles	26.55	8.24	29.88	10.88	-.98	44	.33
Intensity of D.H.	35.74	15.95	43.00	19.21	-1.13	44	.26
Daily Work Hassles	14.45	6.31	17.25	4.62	-1.19	44	.24
Intensity of D.W.H.	22.58	13.87	24.13	9.98	-.30	44	.77
Anxiety	15.95	6.47	15.63	4.53	.13	44	.89
Depression	14.61	4.58	13.13	3.91	.85	44	.40
Hostility/Anger	12.05	4.93	12.13	7.68	-.03	44	.97

Table 5 (continued)

	Hi-Income		Lo-Income				
	M	SD	M	SD	t	df	p
			Pre-Intervention				
Perceived Stress	19.41	5.69	17.76	6.11	1.00	64	.32
Daily Hassles	26.92	9.13	25.94	5.86	.41	65	.68
Intensity of D.H.	39.12	17.00	34.53	13.39	1.01	65	.32
Daily Work Hassles	13.82	5.49	16.00	5.12	-1.44	65	.16
Intensity of D.W.H.	21.70	12.12	28.06	17.05	-1.68	65	.10
Anxiety	15.34	5.17	15.18	6.67	.10	65	.92
Depression	13.72	3.87	13.47	4.81	.22	65	.83
Hostility/Anger	10.26	5.77	10.47	5.25	-.13	65	.90
			Post-Intervention				
Perceived Stress	18.73	4.20	19.09	7.49	-.15	42	.88
Daily Hassles	27.15	9.14	27.00	8.11	.05	43	.96
Intensity of D.H.	38.26	17.91	33.09	12.42	.89	43	.38
Daily Work Hassles	14.62	6.16	16.18	6.26	-.73	43	.47
Intensity of D.W.H.	22.00	12.44	26.09	15.93	-.89	43	.38
Anxiety	15.53	5.93	17.64	6.70	-.99	43	.33
Depression	14.18	4.37	15.09	5.03	-.58	43	.56
Hostility/Anger	11.79	5.81	13.36	3.88	-.83	43	.41

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