STRESS, CONTROL, AND CANCER

A Thesis Presented to the Graduate Faculty of California State University, Hayward

In Partial Fulfillment of the Requirements for the Degree Master of Science in Counseling

By Gemma Niermann

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ABSTRACT

The objective of this study was to investigate the connection between an accumulation of stressful life events and the onset of cancer. The life histories of cancer patients and their family members at John Muir Memorial Hospital in Walnut Creek, California were gathered by interviews and by written questionnaires. Comparisons were made between the responses of cancer patients and the responses of family and friends of the patients.

Also examined was the effect of helplessness and hopelessness on the progress of neoplasm in patients with tumors. Cancer patients with a sense of control and patients who felt powerless were compared for mortality and prognosis.

Patients and their family members were taught a relaxation and imagery exercise; the purpose of this technique was to help individuals relax, deal with anxiety and insomnia, and to ease pain. It was also hoped that the visualizations would enable cancer patients to marshal their immune function to fight their disease.

On the basis of this study, it was concluded that stressful life events did not necessarily predispose
an individual toward tumor formation. Healthy individuals appeared to have as much traumatic change requiring adjustment as those subjects with signs of cancer. Some people with an excessive amount of stress in their lives had cancer, some did not. Some of the cancer patients had relatively stable, uneventful lives in the decade preceding the study.

More conclusive evidence was gathered to support the hypothesis that a sense of control improved a patient's chances of surviving or going into a stage of remission. Patients who felt in control of their lives and effective in directing the course of their treatment had better prognoses than those who felt that they were helpless in the face of their disease. All but one of the patients who died during the study exhibited hopelessness and loss of control before they succumbed to the cancer.

All but two of the subjects expressed the opinion that the relaxation and imagery exercises were of some use to them. Some of the cancer patients experienced great improvement in response to treatment and in pain management. It was concluded that the exercises were of value in the treatment of cancer patients.

It was suggested at the end of this study that more conclusive results than those generated by this
study would be needed to prove a link between cancer and stress, and that one area of research might be a predictive study involving healthy respondents over a very long time period. Also suggested were laboratory studies of lymphocyte function in subjects who did relaxation exercises, those who practiced imagery, and those who practiced both techniques. More work studying leukocyte multiplication and effectiveness in conjunction with a sense of control was also called for.

In spite of the small number of subjects, the conclusion was made that holistic therapy was an important tool in the treatment of cancer patients.
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CHAPTER ONE
INTRODUCTION

General Statement of the Problem

Millions of dollars have been spent each year on cancer research with cure and prevention as the ultimate goals. Millions more have been spent on the treatment and care of cancer victims. Cancer has disrupted the lives of individuals and their families in ways that cannot be measured in mere dollars. Various forms of cancer have been linked with several different causative factors, including nitrates, cigarettes, fat-laden diets, female hormones, lack of female hormones, radiation, cyclamates, and excessive exposure to sunlight. One more variable that has been investigated as a possible precursor to cancer is stress. The study discussed herein has been designed to address the question of a possible relationship between stress and cancer.

Stress Defined

Hans Selye, a researcher on the effects of stress, defined stress as "the nonspecific response of the body to any demand made upon it" (Selye, 1974, p. 27). He further elaborated that the specific stressor, the agent or situation producing the response,
could be either pleasant or unpleasant. Selye considered the critical factor to be the intensity of the demand for readjustment, rather than the nature of the stressor. A similar view of stress was held by B.H. Fox (1978); he considered any stimulus that created an imbalance in physiological homeostasis a stressor. Anxiety, temperature changes, hormonal fluctuations, great joy, and extreme sorrow have all been considered stressors. Selye has stated that stress cannot and should not be avoided; "complete freedom from stress is death" (Selye, 1974, p. 32). Thus, some stress has been found to be necessary to maintain the dynamic tension inherent in living organisms.

Background of the Problem

Throughout the centuries, there have been a few individuals who have noted a connection between cancer and emotional factors. C.B. Bahnson has cited an ancient resource from as early as 200 A.D., in which it was observed that "melancholic" women developed breast cancer more often than did their more optimistic counterparts (Bahnson, 1980, p. 975). However, concentrated scientific inquiry has been nearly absent until the 1950's. Since that decade, there has been some convincing research in the area.

Several researchers have remarked that a
significantly higher number of cancer patients have suffered the loss of an important relationship not too long before the onset of cancer. For instance, Neumann (1959) remarked that 80% of her cancer patients had experienced the loss of a primary relationship within a two-year period prior to diagnosis of their illness. LeShan (1957) also observed an association between emotional trauma, such as grief, anxiety, depression, loss of a love object or career, and the subsequent onset of cancer.

Psychological decompensation as a precursor to clinical cancer has been suggested by several sources. Constance Holden (1978) studied 400 cancer patients and their matched controls. Of the cancer patients, 72% had suffered the loss of a loved one within a few months to eight years before diagnosis, whereas only 10% of the control group had experienced such a loss.

In a more intimate study, monozygotic twins were examined to assess the result of variations in environment on individuals with identical genotype. The findings showed that the twin with a diagnosis of leukemia was more likely to have experienced losses and frustrations than the healthy twin (Greene & Swisher, 1969). Greene and Swisher collaborated on further investigations involving patients with reticuloendothelial
disease and found similar connections; patients with leukemia or lymphoma had suffered a loss or separation nine or more months before the onset of the disease in almost every case. In one case, serious relapses occurred in a female cancer patient who was overly attached to her son when he became engaged, when he announced his engagement publicly, and again when he married. Three weeks after the wedding, the woman died (Greene, Young & Swisher, 1956). Greene noted that a characteristic antecedent of malignancy appeared to be severe loss combined with depression, helplessness, and emotional inhibition (Greene, 1954).

Others have commented on a link between certain personality traits and cancer occurrence. Working with over 500 cancer patients, LeShan and Worthington (1956; 1960) remarked that depression and insoluble life situations were present in most of the patients. Administering Worthington's personal history questionnaire to subjects with and without tumors, three factors were found to be common to the cancer patients: loss of an important relationship before diagnosis, inability to express hostile feelings, and unresolved tension over the previous death of a parent. Further investigation showed that 56% of the patients who had experienced loss were grieving over the death of a child
or spouse (LeShan, 1977). Additional work by LeShan indicated that many cancer patients had difficulty forming relationships and suffered from a feeling of futility and helplessness. LeShan (1966) examined pre-biopsy subjects for helplessness and hopelessness, as well as for suppression of anger and hostility; he was able to predict the presence of cancer correctly in 24 out of 28 cases (p < .0001). LeShan (1977) summarized and tabulated the body of data obtained in a series of several studies.

**TABLE 1**

**Psychological Predictors of Cancer**

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<th>Psychological Factor</th>
<th>% Cancer Patients</th>
<th>% Non-Cancer Patients</th>
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<tr>
<td>Loss of crucial relationship</td>
<td>72%</td>
<td>12%</td>
</tr>
<tr>
<td>Inability to express hostility</td>
<td>47%</td>
<td>31%</td>
</tr>
<tr>
<td>Tension over death of a parent</td>
<td>38%</td>
<td>13%</td>
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(LeShan, 1977, p. 26)

Schmale and Iker (1966) found similar results.
They interviewed a group of women and tested them with the MMPI. All of the women were at risk for developing cervical cancer, based on Papanicolaou smears showing Class III lesions. The researchers predicted that women showing recent loss and a sense of hopelessness would develop a cervical malignancy in the future; the predictions were significantly accurate (p<.007).

One study explored the use of psychological attributes to predict the presence of cancer in 160 women who were scheduled for breast lump biopsies. Interviews and tests (the Caine and Foulds Personality Questionnaire and Eysenck Personality Inventory) done the day before surgery revealed that about 40% of the respondents displayed an abnormally high suppression of anger and other emotions; this group was predicted to test positive for cancer. In fact, 80% of these suppressors had neoplasms, while most of the women with more normal character profiles had benign lumps (Greer & Morris, 1975).

Sexual repression, self-sacrifice, suppressed anger, and a generally masochistic character structure have been considered as factors in breast cancer patients. Bacon and colleagues used psychoanalytic methods to develop a personality profile of 40 women with breast cancer. It was found that these patients
displayed inhibited feelings of motherhood, an inability to handle anger (which was covered by a veneer of pleasantness), and an unresolved childhood conflict with their own mothers, leading to denial and self-sacrifice. The study revealed that 50% of the cancer patients had experienced increasing guilt in the year preceding discovery of their breast lumps; 63% detested sex and had never had orgasms; and 88% were diagnosed as masochistic. Self-criticism and anxiety characterized the depressions of these patients (Bacon, Renneker, & Cutler, 1952).

With the Neuroticism Scale Questionnaire (NSQ) and an anxiety scale (Self-analysis Form) as tools, R.E. Huggan (1968) found that cancer patients were less able to control and express emotion and needs in a realistic way than their healthier counterparts. Huggan found the correlation between emotional repression and occurrence of cancer to be significant (p=.05).

In further study of personality and its connection with cancer, Abse and associates found that lung cancer patients showed a higher degree of repression, experiencing poor dream recall, difficulty expressing emotional conflict, and dependency problems than their healthy partners. These characteristics were even more pronounced among the younger patients.
Blumberg and associates administered Rorschach and MMPI tests to cancer patients and patients without cancer. Unresolved stress was found to be more prevalent among the cancer patients than those without malignancies. Cancer patients with rapidly growing tumors were more anxious and defensive, and they tended to be acquiescent and polite; whereas cancer patients who responded well to therapy and experienced long remission and survival rates tended to be more expressive and aggressive about fighting their disease (Blumberg, West, & Ellis, 1974).

Bruno Klopfer (1957) also used Rorschach (p < .02) and MMPI (p < .001) to relate ego defense and ego strength with the relative speed at which certain patients' tumors grew. He found that slowly growing cancers correlated with a low investment in ego defense, and that quickly growing tumors were more common in people with high ego defenses.

Retroactive correlation studies have supported the results of the previously cited work. In one case, a set of MMPI test scores for a group of military personnel was exhumed for scrutiny. It was found that those test subjects who developed malignancies many
years after the test was administered were more likely to have initially displayed repressive and depressive tendencies than did the matched test subjects who had not developed cancer (Dattore, Shontz, & Coyne, 1980).

In a similar study involving Swedish respondents, O. Hagnell (1966) examined the results of a personality test given twenty years before his investigation. With a sample of 2500 people, there was significant correlation between depressive personality traits and the eventual onset of cancer. Hagnell noted in particular that female cancer patients were more often of a depressive personality than the controls, indicating that a depressive mood or attitude was probably present many years before the diagnosis of cancer in those patients.

A longitudinal study recently done in Yugoslavia involved an entire village. In conjunction with a health program, a questionnaire was given to the village inhabitants. Ten years later, the local doctor reported all incidences of cancer and other internal diseases. People who had been diagnosed positive for cancer in the ten years following the test showed a higher tendency toward one or more of six personal characteristics: blocked expression of feeling, extreme stress, negation of the self, repression of emotion, lack of recreation
and relaxation, and abuse of alcohol, tobacco, drugs, and food (Grossart-Maticek, 1980).

In an extensive review of the research in this field, Bahnsen (1980) made the observation that not everyone who has suffered a loss has gotten cancer. He examined the loss-depression hypothesis and came to the conclusion that loss must be combined with emotional inhibitions to be an accurate predictor of disease; he maintained that it was "not loss and depression alone that usher in clinical onset of cancer, but the combination of depleting life events with a particular ego-defensive and coping style" (Bahnsen, 1981, p. 213).

Pioneering work by the Simontons (1978), two radiologists who observed patterns of response to radiation treatment, has supported the above observation. The Simontons found that individuals with a more positive attitude about themselves and their situation, regardless of history of losses, had better clinical response than patients with similar tumors but negative attitudes. Important factors in survival and remission were the belief systems of the patient, the patient's family and friends, and the patient's physician. The Simontons noted that those who most rapidly succumbed to their cancers showed feelings of rejection and self-pity, a tendency to hold resentment and a marked
inability to forgive, a lack of ability to develop and maintain meaningful and long-term relationships, and a very poor self-image. The conclusion was that loss had to be combined with other factors to result in cancer or to affect prognosis of an existing tumor (Simonton & Simonton, 1978).

The idea that attitudes and personality traits can influence one's health has gained widespread popularity among the general public. However, there have been some rebuttals to the research on psychological factors in the etiology of cancer. Susan Sontag, herself a recovered cancer patient, has led the counterargument with her book, *Illness as Metaphor* (1978). She has drawn parallels between the trend to connect emotions and personality with cancer and the tendency in the 1800's to consider tuberculosis a disease of histrionic individuals. She has stated that psychological theories of illness have promoted the idea of cancer as a punitive ailment of the will, placing the blame on patients, who, in believing that they have unknowingly caused their disease, have been made to feel that they deserve it (Sontag, 1978).

Few researchers have collected evidence to refute the findings of the Simontons, LeShan, and the rest, but a small number have ventured to contradict
the theories of psychogenic cancer. For instance, following his attempt to duplicate Blumberg's (1954) work, Alan Krasnoff (1959) found in his cross-validation study of women with one type of skin cancer that there was no significant correlation between psychological variables and the occurrence of malignant melanoma. However, most recent studies support the theory that there is a connection between cancer, stress, and immunity.

Significance of the Problem

As recently as 1980, many medical practitioners were not aware that the mind had any impact on disease. As the concept of holistic healing found its way into the popular press, more and more lay publications printed articles about esoteric and sometimes controversial works in epidemiology and immunity (Schmeck, 1985; Smith, 1985; Wechsler, 1987) and personality precursors to cancer (Hensel, 1985). However, the medical establishment was less enthusiastic than the press and public. Only in recent years have some doctors begun to accept the role of the mind as an important part of the healing process. Relatively new disciplines, such as psychoneuroimmunology and neuroendocrinology have evolved out of controlled studies exploring the relationships between the brain, immunity, and disease,
but many medical practitioners have tightly held to their skepticism, equating a holistic approach to healing with snake oil merchants and quackery. There has been an increasing need to collect more information on the psychogenic aspects of malignancy in order to ensure that cancer patients receive every possible dimension of treatment for their disease.
CHAPTER TWO
CANCER, STRESS, AND IMMUNE RESPONSE: A REVIEW

It has been generally accepted that almost all individuals have developed neoplasms throughout their lifetime. These rebellious cells have usually been destroyed by the body's first line of defense: the immune system. When the body's immune system has failed, the spontaneously occurring cancer cells have divided, unchecked, and a tumor has become established. But for most individuals, the cancer cells have never survived the antibodies, leucocytes, and other components of a properly woking immunity network (Curie, 1974).

Stress and Immunity

Stress has been shown to inhibit the immune response. In a study involving mice, it was found that subjecting the animals to stress in the laboratory raised levels of steroid hormones secreted by the adrenal cortex, high levels of which damage or suppress the immune system. When experimentally stressed mice were implanted with tumor cells, tumor growth was uncontrolled in 92% of the animals. When cancer cells were implanted in unstressed mice, tumor growth was restricted; 0% of the unstressed mice developed cancer after implant, and only 7% of moderately stressed mice were unable to
reject the tumor cells (Riley, 1975, 1981).

Other studies with rodents supported this work. Dominant mice have been found to have higher levels of antibodies in their blood than more submissive and, therefore, stressed mice. Crowding of mice has been shown to decrease antibody levels in mice. Portions of the limbic system, the site of emotions in the brain, have been implicated in this situation. Experimentally induced lesions on the anterior hypothalamus of Hartley Guinea pigs reduced their antibody levels and increased adrenocortical hormones (Stein, Schiavi, & Camerino, 1976).

Solomon (1984) established the field of Psychoneuroimmunology to investigate such phenomena. He found that stress in animals upset the balance of immunoglobulins, and that immunosuppression was closely tied to the Central Nervous System (CNS), including the site of emotional response. Studies by Solomon (1984) showed that both emotional stress and injected cortical hormones suppressed the formation of interferon in vivo. Other evidence was introduced suggesting that stress reduced antibody action, and that stresses in infancy actually influenced an adult's immunity; rats who were stroked as infants grew up with better immunity to disease (Solomon, 1969).
In a cell-typing study at UCLA, a group of healthy subjects was tested for emotional factors, lymphocytes (white blood cells), and mitotic figures (cells in division, found in abundance in cancerous and precancerous tissues). In subjects who showed signs of stress and had greater difficulty expressing emotions, there were more mitotic figures and fewer lymphocytes, specifically macrophages and T-cells, which have been shown to induce immunity and to be the body's first line of defense against disease. Solomon suggested the existence of an immunosuppressive type of personality: people with Alexothymia (having no words for feelings), those denying they have problems, and individuals with an external locus of control (Solomon, 1984).

Solomon's view that the immune system and CNS are intimately linked has been supported by some preliminary studies of human immunomechanisms (Squires, 1985). These projects have uncovered many similarities between certain classes of white blood cells and the neuroglial cells of the brain and spinal cord. Many of these neuroglial cells have been seen to move like leucocytes, and at least one type of neuroglial cell has been observed performing a debris removal function in the CNS, similar to the clean-up mechanism of macrophages, the largest leucocytes. Several types of
white blood cells have been found to possess receptors sensitive to the same neurotransmitters that have been shown to pass information throughout the nervous system. Finally, glial cells have been found to originate from white blood cells in the marrow. Indeed, macrophages have been referred to as "a kind of free-moving nerve cell....but classified as a white blood cell" (Squires, 1985, p. 14).

Bereavement, a very distressing and disruptive life event requiring a great deal of adaptation, has been found to impair the immunity network. In an investigation of twenty-six recently bereaved persons matched with twenty-six controls for age, sex and race, blood samples taken at three week and six week intervals following the loss showed dramatically reduced IgG, IgA, antibodies, and, most significantly, T-lymphocyte function. In the recently bereaved individuals, there was a positive correlation between the degree of distress and the levels of adrenocortical and thyroid hormones. Lack of coping ability was found to be a factor in raising these steroid levels (Bartrop, Luckhurst, Lazarus, Kilch, & Penny, 1977). In other words, bereavement lowered several important blood factors important to the system responsible for protecting the body from disease and raised levels of
hormones known to suppress immunity.

**Stress and Blood Chemistry**

Some cortecoid hormones have been found to have similar structures to those of carcinogenic coal-tars; chronic exposure to either the hormones or the coal-tars has been linked with tumor development. Prolonged emotional distress has been known to increase the metabolic rate and to stimulate the endocrine system beyond its normal limits to the point of destruction. It has been observed that "...a particular kind and quality of emotional stress produces a characteristic disturbance of the hormonal (endocrine) system and results in a predictable disease...cancer" (Simmons, 1966, p. 152).

In studying the psychoendocrinology of breast cancer patients, Katz and associates found that women with a breakdown in their ego-defense system had higher hydrocortisone output and a very poor prognosis. Katz hypothesized that the hydrocortisone may have inhibited immunological reactions, worsening the patients' ability to fight their disease. Women with more flexible and effective coping styles were found to have lower levels of hydrocortisone, as well as better prognoses (Katz, Gallagher, & Hellman, 1969).

Other factors in the blood have been linked to
changes in the emotional state. For instance, emotional expression in breast cancer patients has been correlated with IGU levels in the blood (Pettingale, Greer, & Tee, 1977). When researchers measured serum immunoglobulins in women awaiting biopsy of breast lumps, a significant difference in IGU levels was noted in those who habitually suppressed anger. The blood test was performed before surgery, and prediction of the presence of malignant tumor mass was based on IGU levels; correlation between IGU levels and malignancy was found (p<0.001).

Concentrations of free fatty acids (FFA), which have been implicated as a factor in the etiology of cancer, have been seen to rise in healthy humans in response to anxiety, anger, fear, and depression. Levels of free fatty acids have also been found to be significantly higher in individuals with active tumors (Goldfarb, Dreisen, & Cole, 1967). In a bloodwork study, Goldfarb and associates found that depressed cancer patients experienced tumor remissions when FFA lowering substances, such as reserpine and orinase, were injected into each patient's bloodstream. In some cases, electroconvulsive shock therapy to relieve depression also lowered FFA levels in the blood and caused tumors to shrink noticeably.
Several other investigations have discovered similar relationships between emotional stress, changes in blood chemistry, and cancer. For example, the level of cyclic adenosine monophosphate (cAMP), which has been known to play an important role in immunological cell processes, has been found to decrease with anxiety and depression (Horowitz, Beer, & Clody, 1972).

Levi (1964) used pleasant and unpleasant experimental situations to induce stress in human subjects and found that levels of iron, FFA, and triglycerides significantly changed after the induced stress.

Kissen and Rao (1969) discovered a higher adrenaline output in lung cancer patients when they were compared to patients with other chest diseases. The level of adrenaline, which increased at the time of hospitalization in control patients, was already high at the time of admission of the patients with lung cancer. Based on this study, Rao (1970) was able to develop an endocrine index for predicting malignancy of the lung in pre-op patients; this blood index was able to predict presence of cancer with an accuracy approaching 90%.

Marmorston (1966) was able to detect differences in the urinary hormone metabolite levels of patients.
Her endocrine profiles included assays of pregnanediol, etiocholanolone, and other hormone metabolites. The profiles were so exact, they could be used to distinguish between benign tumors and malignancies of the breast, the prostate, and the lung.

**Stress and Control**

The link between stress, immunity, and cancer has been well-researched; however, the fact that not all victims of stressful life events have developed cancer has only been partly addressed. One factor thought to play a role in the expression of cancer in stressful situations, control, has been studied. It has been postulated that losing control over one's life exacerbates the chemical imbalances in the blood previously described, leading to illness as a result, perhaps as a drastic exit from a situation that was perceived to be out of one's control (Pelletier, 1979).

In a study of coping factors, rats were subjected to electric shocks. When the rats were injected with tumor cells, it was found that those rats who were not given the opportunity to escape the shock developed tumors earlier than those who were able to get away from the shock. Rats subjected to inescapable shock had exaggerated tumor size and greatly reduced survival time (Sklar & Anisman, 1979).
A similar study with improved design also showed that the lack of control over shock as a stressor reduced the organism's ability to fight disease. Sprague-Dawley rats were injected with Walker 256 tumor cells. Rats that received no shock treatment rejected the implanted tumor in 54% of the cases. Those subjected to inescapable shock rejected tumor implants in only 27% of the cases, while rats who were subjected to shock but allowed to escape rejected tumors at a higher rate than either the rats without choice or the unstressed rats. Apparently, the stressor was not inherently unhealthy; in fact, the act of avoiding the stressor appeared to increase immunity (Visitainer, Volpicelli, & Seligman, 1982).

While interviewing human subjects, Stern and his collaborators found that a relationship between stressful life events and illness depended on whether the subject viewed the events as controllable. Almost all the subjects viewed disease as beyond their control. The study found that having control, or a sense of control, reduced the immunosuppressive effect of stress. Perceived control over stressors was a stronger factor than the severity of the stressors in contributing to disease (Stern, McCants, & Pettine, 1982).
Stress and Relaxation

A stress-inhibited immune system has been shown to open an individual to cancer in some cases; therefore, stress-reduction techniques have been explored as tools to enable the body to increase its defenses, allowing it to prevent cancer or fight an established malignancy. In a well-known study based on this idea, Carl and Stephanie Simonton (1978) used a relaxation and imagery method in conjunction with standard isotope treatment for various cancers. The cancer patients were taught a simple relaxation exercise, which was followed by a visualization technique. Patients chose imagery (sharks, white knights, etc.) to symbolize their white blood cells, which they visualized destroying weak and confused cancer cells. The Simontons used this technique with 159 patients diagnosed with incurable cancers and given a maximum of one year to live. Of the original group, 63 patients were still alive after two years. Of these survivors, 22.2% showed no sign of cancer, 19.1% showed tumor regression, and 27.1% showed no tumor growth.

A recent study supported these results; cancer patients from a wide variety of backgrounds were taught relaxation exercises and self-hypnosis to help them reduce internalized stress. Of the patients who stayed in the training, 57% had survived in the eight-year
program at the time of reporting. A matched group of patients who chose to drop out of the program before they had attended at least ten sessions had a mortality rate of 82%; only 18% survived at the time of reporting. Continuing participants in the training had survival rates that were significantly higher than the national median, three to four times the median in some cases (Newton, 1982).

In a study on biofeedback, 21 women and 20 men were assessed for stress levels. Those with high levels of stress were found to have reduced immunity as measured by a nitroblue tetrazolium test for phagocytic immune function. The subjects were randomly assigned to either a control group or to biofeedback assisted relaxation groups. Those in the biofeedback groups later demonstrated improved coping skills and a heightened phagocytic capacity. The biofeedback relaxation method appeared to positively affect quality, rather than quantity, of phagocytic neutrophils (Peavy, Lawlis, & Grover, 1985).

In another project, a group of healthy individuals aged 22 to 85 were tested for baseline lymphocyte function by analyzing a 25cc sample of blood from each subject. Then the subjects were hypnotized with relaxation induction and instructed to visualize
their white blood cells destroying influenza virus. The subjects were asked to practice the exercise twice a day for a week, at which time they returned for a second hypnosis session. One hour after each office session, another 25cc sample of blood was drawn to test level of immune functioning. Subjects over the age of fifty years had small to no response in either post-session blood test. But subjects under fifty years of age showed increased lymphocyte function after the first session and a significantly higher increase after a week of practice. This study demonstrated that hypnosis and imagery could increase immune function for certain individuals, especially those who had a high level of hypnotic susceptibility. Aging subjects might have showed little response because of the fact that increasing age has been known to reduce immunity in general (Hall, 1982). In light of such data, Howard Hall has stated, "The relationship between stress, the production of adrenal cortecoid hormones, the suppression of the immune system, and the progression of cancer suggests that methods of reducing stress and cortecoid production could play an important role in the treatment of cancer" (1982, p. 98).

Summary
Evidence has been compiled to support the theory
that stress might reduce immunity and thus increase an organism's chance of getting cancer. Similarities of nerve cells and white blood cells have been studied, and the effects of grief, repression, and other emotional imbalances have been linked with changes in blood levels of various hormones, immunoglobulins, triglycerides, and lymphocytes. It has been noted that not all individuals who have been exposed to high levels of stress have developed cancer or another serious illness. The suggestion has been made that perhaps lack of control might have influence, suggesting a multi-factor approach to the theory of psychogenic etiology of cancer.
The Problem

In order to further explore the connection between stress and cancer, a 2.5 year study was undertaken in Contra Costa County. With the formation of several "I Can Cope" cancer information groups at John Muir Memorial Hospital, Mt. Diablo Hospital, and Kaiser Permanente Hospital, some oncologists in this area have become more aware of the role played by a patient's emotional state in fighting disease. However, many physicians have not yet been convinced that there is a connection between the mind and the health of the body. This study was conducted to examine that connection.

Hypotheses

The following Hypotheses were tested:

Hypothesis One: Women who have experienced recent stressful life events are more likely to develop cancer than women who have not experienced stressful life events.

Hypothesis Two: Men who have experienced recent stressful life events are more likely to develop cancer than men who have not experienced stressful life events.

Hypothesis Three: Women who feel they have
little control over their lives are more likely to develop cancer than women who feel they are in control.

Hypothesis Four: Men who feel they have little control over their lives are more likely to develop cancer than men who feel they are in control.

Hypothesis Five: Women with cancer who practice relaxation and imagery exercises are more likely to experience health improvements than those who do not do the exercises.

Hypothesis Six: Men with cancer who practice relaxation and imagery exercises are more likely to experience health improvements than those who do not do the exercises.

The independent variables in this study were locus of control and a history of stressful life events.

The dependent variables were the diagnosed presence of any type of cancer. (The term cancer in this study refers to any malignant neoplasms. Cancers represented in the study included such rare forms as Wilm's Tumor and a seldom seen type of myeloma, as well as the more frequently occurring lymphomas, lymphosarcomas, carcinomas, sarcomas, leukemias, and oat cell lung cancer.)

General Methodology

The study consisted of two parts. The first
part involved interviews with the respondents. These interviews were conducted on a weekly basis for a minimum of one month to two years plus six months. The interviews were client-oriented and open-ended, allowing each subject the opportunity to express concerns and problems as they arose. Each interview began with a discussion of the patient's treatment and progress. Friends and family members of the patient, who were also interviewed, were given the opportunity to discuss their health and emotional states as well. Each respondent was given time to remark on improvements and losses, as well as any other topics the individual wished to explore. Each respondent was encouraged to continue the interview until he or she elected to end it. Most respondents chose to end the discussion before an hour had elapsed. The interviewer employed a nondirective method of reflection and restatement during the interviews. Patients' questions were answered, and topics discussed were initiated at the patients' discretion.

Subjects also participated in a weekly cancer support group at John Muir Hospital, which was held from 5 p.m. until 7 p.m. every Wednesday night. Participants were encouraged to drop in on the on-going group session when they were able. Some attended for the full two-hour session, while others arrived late or left early. Many
subjects participated regularly, but some were unable to attend every session because of adverse reactions to treatments or other physical difficulties. The Support Group was open to all cancer patients, their family members, and their friends. Patients and their support people discussed topics that came up during the session. The two facilitators, both recovered cancer patients, engaged in minimal, non-directive interaction with group members. When specific questions concerning hospital policy, information access, and other health-related subjects arose in the group, a facilitator or another participant would supply the answer. Some of the participants in the Group were very well informed about some aspects of cancer and its treatment.

Patients and their support people shared feelings and experiences during the group sessions. Members of the group provided each other with emotional support and exchanged practical advice on diet, pain management, information sources, legal matters, and dealing with doctors. As newly diagnosed individuals and their loved ones entered the Support Group during the three-year study period, the original members of the group shared their accumulated knowledge and experiences.

Most sessions were ended with a relaxation and imagery exercise similar to that used by the Simontons
(1978), in which patients were taught to relax their bodies and minds, and to visualize healing taking place internally. Lights in the room were dimmed, and patients were asked to make themselves as comfortable as possible. For ten to twenty minutes, the participants were guided through a step-by-step relaxation process which varied from week to week. Most relaxation sessions began with a sequential tightening and easing of tension in the muscles of the toes, arches, ankles, lower legs, knees, thighs, hips, waist, back, chest, shoulders, arms, wrists, fingers, neck, and head. The technique usually included deep breathing at frequent intervals. When patients had completed the initial relaxation portion of the exercise, they were guided through a variety of mental visualizations. The subjects were sometimes asked to imagine themselves on an elevator, descending until they reached a private, special place. After being guided to observe the private place, subjects were asked to make suggestions to their subconscious selves; the subjects were allowed to choose their own suggestions that would empower them to do whatever they wanted or needed to do. On other occasions, the participants were sent on imaginary hot-air balloon or raft trips to a special place. Some mental exercises involved imagery of repair or growth in certain parts
of the body, such as healing incisions, aggressive white blood cells, rapidly dividing hematopoietic tissue in the bone marrow, and a "healing light" throughout the body or where needed. Patients with pain were asked to visualize soothing balms on the painful areas. Some patients invented their own imagery when the suggestion was given that they do so; patients later described religious figures easing pain or nausea, sharks or white knights defeating the cancer cells, and even sheep ripping tumors out of the healthy tissues in the same manner as real sheep ripping grass out by the roots. The facilitators sometimes suggested that tension or anxious thoughts could be wrapped in boxes and put in one's mental "attic" until later; minor worries or problems were imagined being tied to brightly colored balloons, which floated away and out of sight. In every imagery session, subjects were asked to create their own messages and imagery, and two or three minutes were allowed for them to visualize these ideas. Some patients requested and received relaxation tapes made by Shannon McGowan, M.F.C.C., and they practiced the exercises at home when they desired.

The Support Group met in whatever room the hospital had available each Wednesday evening. The first year, most meetings took place in the Sequoia Room,
a meeting room next to the cafeteria. This room was sometimes moderately noisy, and the chairs were uncomfortable wooden structures. The Yosemite Classroom on the ground floor of the Yosemite Building, where Nuclear Medicine is housed at John Muir, was quieter and had more comfortable molded plastic chairs; this room was sometimes used the first year, whenever the Sequoia Room was needed for other meetings, and the Support Group moved into the classroom on a relatively permanent basis the second year. By the beginning of the third year of the study, the group was frequently moved to the auditorium on the seventh floor of the hospital. For the last two months of the study, the Group met in the Family Room on the Oncology Ward at John Muir. Although this room was smaller than the rest (about 10' x 12'), it was very comfortable, with couches and padded chairs.

Participation in the study was voluntary, and each subject was given the choice to terminate contact whenever he or she decided it was time. Some respondents maintained contact with the researcher throughout the study. Brief case histories of participants were compiled.

The second part of the study involved a brief written questionnaire. In response to an invitation by
the researcher, patients were given an optional questionnaire to be completed at home. Some patients became ill from treatments or forgot the questionnaires; approximately 50% of the questionnaires were returned to the researcher. All of the people who returned the answered instrument also signed a release form. (See appendices for questionnaire and release form.) The written responses on the questionnaire were used to supplement the material generated by the interview process.

Population/Sample

The population investigated included residents of the Bay Area who were at that time participating in the John Muir Hospital Oncology Services activities: "I Can Cope", "We Can Weekend", and the ongoing Cancer Support Group. Cancer patients and their family members were given the opportunity to voluntarily complete a questionnaire and to participate in individual and group interviews. A consent form, which had been approved by the Hospital Board, was signed by all participants in the study (Appendix B).

The experimental group consisted of patients who were currently being treated for some kind of malignancy or who had been treated in the past. Most of the respondents had been recently admitted to a Bay Area
hospital for diagnosis, surgery, and/or treatment of cancer within a year of the beginning of the study. Some of the participants in the study had been diagnosed at some time in the past and had come to the Oncology Services activities because of recurrence. A number of the respondents considered themselves cured or in remission. Most of the patients were treated or in the process of being evaluated and treated in four Contra Costa County medical facilities: John Muir Hospital in Walnut Creek, Mt. Diablo Hospital in Concord, and Kaiser Health Centers in Walnut Creek and Martinez. Other medical centers were represented in the sample, including University of California Medical Center in San Francisco, Stanford Research in Palo Alto, and the Naval Medical Center in Oakland.

Comparisons were made with Bay Area residents who had not had cancer. This control sample was drawn from the family members and friends of cancer patients participating in the study. Those family members and friends who were willing to fill out a questionnaire were representative of Bay Area regions similar to those of the cancer group.

Volunteers were recruited from the Support Group and "I Can Cope" groups; the study was announced in the fourth of ten weekly sessions of the "I Can Cope" group.
All subjects were self-selected and had the option to end participation at any time.

**Instrumentation**

The questionnaire used in this study was based on the Social Readjustment Rating Scale of Holmes & Rahe (1967). The Scale provided a ranking of life events and assigned arbitrary values to each stressor (See Appendix C). Such pleasant events as marriage, vacation, holidays, and outstanding achievement at work were included, each representing a change requiring adaptation on the part of the individual experiencing the events.

The original Scale was developed as a quantitative measure of the amount of adjustment required by stressful life changes, in conjunction with a study on the connection between stress and illness. The Social Readjustment Rating Questionnaire was first completed by 394 subjects, who were asked to compare life event items with an arbitrarily assigned value by ranking each item numerically according to the amount of adjustment required. In comparisons of mean item scorings of groups that varied in age, gender, marital status, education, religion, and race, the range of correlation coefficients (Pearson's $r$) was .820 to .975, the average $r$ being .945. Spearman's rank order correlation coefficients were almost identical.
Further statistical analysis of the Scale was completed by Masuda and Holmes (1967). Three statistics were calculated using the data generated by Holmes and Rahe (1967): the arithmetic mean, the geometric mean, and the median. The ranking of the geometric mean scores agreed very closely with the ranks assigned to the 43 life events on the Scale, and there was a close parallel in the ranking order of the geometric mean with the arithmetic mean and the median. Kendall's coefficient of concordance for the rank ordering of all three measures was 0.992 (Masuda & Holmes, 1967). This analysis indicated that the American population tested was homogeneous in item scoring, as well as rank ordering of the life event items.

Several cross-cultural studies were performed to assess the general validity of the Scale in various populations. In America, 168 white middle-class subjects rated the Scale, and their responses were compared to those of two Japanese populations: Hiroshima (55 respondents) and Sendai (57 respondents). All populations showed essential similarities, with some minor differences reflecting cultural variation (Masuda & Holmes, 1967). American subcultures were compared in a study of Japanese, Mexican, and Caucasian Americans. When the Social Readjustment Rating Questionnaire was
administered to these groups, all three populations ranked life changes in a significantly concordant manner (Komaroff, Masuda, & Holmes, 1968). Great similarities in response were found when groups in America, Japan, Denmark, and Sweden were asked to respond to the Questionnaire; correlation coefficients ranged between .629 and .943 on ranked items (Rahe, 1969). In a similar study involving French, Swiss, and Belgian subjects responding to a French translation of the Social Readjustment Rating Questionnaire, concordance between those three groups was high (Rhos: .93, .94, .96). A composite of this European sample of 139 subjects was compared with that of 195 Americans, and a high correlation (Rho: .89) of relative rank ordering of readjustment was seen (Harmon, Masuda, & Holmes, 1970). In a comparative study in Malaysia, the Questionnaire responses of 266 Malaysians and 195 Americans showed high concordance in ranking order but also some minor cultural differences; the Malaysians scored higher those events concerning religious activities, work attitudes, financial security, and personal habits (Woon, Masuda, Wagner, & Holmes, 1971).

The Social Readjustment Rating Scale made use of direct scaling methods involving magnitude estimations by subjects. In order to investigate the value of this
method, an alternative, indirect method was used, involving paired comparisons, to generate similar data about life events. The subjects included 211 adolescents and 394 adults. Although the direct and indirect methods were based on different assumptions, they produced similar ranking scales when applied to the same sample. The authors of this study felt that these results supported the hypothesis of a general value consensus about the seriousness and impact of life events (Ruch & Holmes, 1972).

Since Holmes and Rahe (1967) first developed their questionnaire to measure life stress as perceived by the individual, other instruments have been devised through modification of the original Questionnaire. Among these were Coddington's (1972) Life Events Record for school children, the expanded Life Events Inventory of Cochran and Robertson (1973), and the 51-item Presumptive Stressful Events Scale, developed for use in India from data obtained from 200 Indian adults who completed the Social Readjustment Rating Scale (Singh, Kaur, & Kaur, 1981).

The questionnaire designed for the present study consisted of two parts. Part One requested demographic information, such as age, gender, self-evaluated coping style, and type of cancer, if any. Part Two contained
a list of the twenty-one highest ranked stressful life events discussed above. The most stressful event was DEATH OF SPOUSE (mean value of 100), and the lowest rated event used in the questionnaire was LOAN FORECLOSURE (mean value of 30). The items were listed in random order (that order having been determined by use of a random number generating chart). The events were placed to the left of a time grid, in order that each respondent could indicate when each experience occurred, if at all, prior to the onset of cancer. For subjects who had never had cancer, the reference point was the moment at which the questionnaire was being filled out. (See instrument in Appendix A, end of this study).

Implementation

Access to the cancer patients and their support people was made possible by the Oncology Services Department at John Muir Memorial Hospital. The researcher, herself a recovered cancer patient, participated in the group activities with the patients and support people. The study began in September of 1984 and lasted until March, 1987. During that time, some participants died from cancer or complications, and some participants chose to terminate their part in the study. Newly diagnosed patients entered the study
at various times during the investigation. Some participants maintained contact throughout the study and have continued to communicate with the researcher. All respondents were given a code name to ensure confidentiality.
CHAPTER FOUR
RESULTS OF STUDY

Thirty-one women and twenty men volunteered to participate in the study. Of this total, twenty-one women and twelve men were cancer patients. Of the cancer patients, five women and three men died of cancer or its complications during the course of the study. Of the surviving participants, eleven women and six men maintained contact until the end of the study.

Findings

During the three-year investigation case histories of the respondents were accumulated and questionnaires were examined. The total amount of adjustment required by stressful life changes was rated, using the Social Readjustment Rating Scale of Holmes and Rahe (1967). In the following discussion, the actual names of the participants have been replaced with code names to protect their privacy.

Stressful life changes and cancer in women.

Of the twenty-one female cancer patients, only eight reported an accumulation of over 200 points of stressful life changes within the previous ten years. The most frequently mentioned stressors in such cases were loss of a spouse through death or divorce, loss of
a family member, employment difficulties, and financial strain. Of the ten women without cancer, six reported stressful life changes as large as those of the cancer patients; in some cases, these women had accumulated more stressful life experiences than did the women with cancer. The healthy women reported such stressors as marital problems and divorce, death of a spouse or close family member, financial difficulties, and problems with employment. During group and private sessions, cancer patients and their families talked about the nature of their recent life changes.

Lucy, a 43 year old women with ovarian cancer, stated that about one year before diagnosis, her husband was fired from his job and plunged into heavy drinking and depression. Lucy's husband was unemployed for thirteen months, a time she described as being extremely difficult for her and characterized by financial strain and escalating arguments with her spouse. Three months before diagnosis, Lucy was separated from her husband. Two-and-a-half years before diagnosis, Lucy's daughter was married, an event that Lucy considered quite traumatic. Although she reported that she had always handled stress well, Lucy believed that she had had more life change at one time than she could deal with.

Marta, a breast cancer patient in her early
fifties, was very unhappy in her marriage. She agonized over her sense of isolation and lack of communication with her husband; for over twenty years she had vainly tried to get closer to increase the intimacy in their marriage. His apparent coldness and indifference had been a source of increasing frustration for her for many years. Moving from her home in Europe only heightened her feeling of aloneness. Five years before her tumor was detected, Marta's husband took a job in Los Angeles and decided to keep the family home in the Bay Area, where Marta stayed during his long absences. During the course of the study, Marta's breast cancer recurred twice, and she died after a three-year battle with the disease.

Betty, a woman in her early thirties, considered her chaotic teen years a factor in her health history. Her Hodgkin's Disease was diagnosed when she was 19, following removal of a tumor from between her heart and lung. For three years prior to diagnosis, Betty suffered emotion disturbance serious enough to warrant treatment. One year prior to diagnosis, shortly after graduating from high school, Betty had an abortion, a process that was very traumatic for her. Although prognosis was very good at the time of her diagnosis, Betty has had several reoccurrences of the cancer. She has reported herself
to be "very good" at handling stress, but she cited several sources of great anxiety in her life since onset of the disease: a messy divorce, her mother's diagnosis and subsequent death from cancer, and abrupt changes in her finances that have left her struggling on an income below the poverty level.

Sharon, 39, was convinced that her husband caused her breast cancer and two recurrences. For several years preceding diagnosis, Sharon had endured a difficult marriage characterized by emotional and physical abuse from her spouse. Shortly after marital separation, a biopsied lump from Sharon's breast proved to be a fast-growing type of malignancy that responded well to treatment. While in remission, Sharon was divorced. Soon thereafter, her husband stopped child support payments; after several months of bitter legal battles, Sharon had a reoccurrence of her original cancer. Three years later, once more in remission, Sharon again was in a struggle with her husband when he again ceased to pay child support; Sharon again suffered a recurrence of her cancer.

Jane, a 48 year old woman with ovarian carcinoma, that had metastasized to the gallbladder, experienced a series of severe life changes from five to ten years prior to diagnosis. Within a relatively brief time,
Jane was divorced, remarried, and then widowed by her second spouse. She also saw a drastic change in her career, the death of a close friend, and a large drop in her income. Jane reported that she has always handled everyday stress well. The accumulation of life change adjustments required of Jane five years prior to diagnosis was quite high, a score of 361 on a scale that rated 200 as health-threatening.

Jenny, 52, found a lump in her breast that proved to be a carcinoma. Jenny felt that prior to diagnosis, she had not handled stress well; since diagnosis, she believed that she had improved her coping skills "out of necessity". During a two-year period starting five years before her cancer was discovered Jenny went through marital separation and divorce; she had just incurred a heavy debt, and her finances took a sudden drop. In addition, her mother fell ill and died. At this point Jenny re-entered the work force after a long absence, and she was despondent over a failed romantic relationship. Also during this time, Jenny acknowledged her dependency on alcohol and entered a program to help her deal with her addiction. One year prior to disease onset, Jenny remarried, changed the direction of her career, and moved from the East Coast to California. Jenny said, "You talk about changes,
I've done it all".

Nora, a woman in her fifties, was in a state of clinical depression when her breast cancer was discovered. In the decade preceding the appearance of her tumors, Nora had felt increasingly isolated as her close friends moved away. During this time Nora became estranged from her husband, whose drinking and abusive behavior of Nora escalated. As her husband's earnings shrunk, Nora was forced to take a menial job washing dishes in order to deal with the financial strain. In the meantime, Nora's husband took on a series of lovers, whom he brought home when Nora was working or visiting her recently divorced son. Less than one year after her mastectomy, Nora found a line of small tumors along the incision scar. The prescribed treatment of chemotherapy and radiation appeared to be ineffectual against the spread of the disease.

Another respondent, Irene, also felt that she was unable to cope well with stress. At the age of 37 years she had a positive diagnosis for cervical cancer. Five years before, Irene had experienced a difficult pregnancy, the birth of her child, the death of a very close friend, marital separation, and financial strain as a result of changes in her work situation. Her life settled into relative calm until six months before her
malignancy was discovered. In this brief period prior to diagnosis, Irene suffered further business readjustments, leading to another financial crisis, and arguments with her spouse increased in number and intensity. As long as things went smoothly in her life, Irene felt fine; however, she was quite unnerved by any major changes in her living situation and relationships. Her cancer was diagnosed while her life was in upheaval; the cancer itself was one of many stressors in Irene's life.

Female cancer patients with few life changes.

Of the cancer patients studied, over half had experienced relatively few stressful life events in the ten years prior to diagnosis.

Carol, 37, was rhapsodic about the decade preceding her diagnosis of lymphoma: "I have a wonderful life. Every year is better than the last". The mother of two teenagers, Carol has received strong emotional support from her husband and children, who also participated in the weekly support group meetings. Carol felt that the diagnosis and treatment of her lymphoma had actually brought her family closer together and broadened communication among the members of the family. Except for her disease, which threw the family into a panic initially, few changes had occurred in
Carol's life preceding discovery of her tumor.

Wendy, a 22 year old newlywed with Wilm's Tumor, a kidney cancer rare in adults, likewise reported few life changes in the ten years before her cancer was found. Her husband of three months was warm and supportive in "I Can Cope" sessions, as were Wendy's parents. Wendy married shortly after diagnosis, and the only changes that occurred before onset of disease had been graduation from college and an improvement in her finances six months before diagnosis. Wendy expressed an optimistic attitude about her future.

Louise, a young college student, reported no major life changes except high school graduation two years before she discovered a lump on her neck. Hodgkin's Disease was diagnosed a few months before her twentieth birthday. Louise felt that up to that point her life had been comfortable and stable. Louise felt that she was able to cope well with everyday stress, and that she had been presented with few difficulties in life that required adjustment on her part.

Linda, a 69 year old lung cancer patient who had never smoked was widowed twice, 30 years and 23 years ago. Otherwise, she felt that life had presented her with few major changes. She stated, "My life has been very good over the last twenty years".
At the age of 90, Ada was one of the oldest respondents. Widowed over 30 years ago, she has experienced relatively few life changes. In the last year, Ada saw the deaths of her son and a close friend, the first major stressors for over five years. However, although she has experienced relatively low amounts of stress in the past decade, Ada had a great deal of difficulty dealing with the sudden death of her son. Ada has felt unable to express profound feelings most of her life. Ada's Hodgkin's Disease was diagnosed a year after her son's heart attack. She has been in remission for a year following treatment.

Another patient, Pat, considered herself very good at handling stress. She was quite surprised by her breast cancer diagnosis at the age of 65. Pat reported few major life changes in the decade preceding the discovery of her tumor; however, twelve years before diagnosis, Pat experienced the deaths of her mother and sister, plus marital separation and divorce, all within one twelve-month period.

Several other cancer patients, whose ages ranged from 56 to 73, reported having relatively uneventful lives in the decade before the discovery of their cancers.
Stressful life changes and women without cancer.

Over half of the healthy women who participated in this study reported life changes as high as, or higher than, the most stressed cancer patients.

Gloria, in her mid-thirties, had experienced life changes that required very high adjustment within a short time, five years prior to the study. In one year, Gloria saw the death of her spouse, as well as a severe financial setback. In spite of these strong stressors, Gloria has shown no sign of any disease.

Tina, a women in her forties, experienced upheaval in her life three to four years before the beginning of the study, during which time she was separated and later divorced from her husband. Within ten years of the study, Tina lost two family members and a close friend to illness, and she herself underwent gall bladder surgery. Business changes and financial strain were also part of Tina's life during this time. Tina reported that she has usually handled stress well, but she has sometimes worried about many things, including her health.

Barbara, a 52-year old business woman, reported that she has had difficulty handling stress. Within a year of the beginning of this study, she experienced the death of a dear friend, a close family member, and
her husband. Barbara's husband, who was also her business partner, died of lung cancer; his death created a serious reduction in her income, which necessitated a very traumatic move to a small apartment. In spite of the large amount of stress in her recent history, Barbara has had no sign of illness.

A 37 year old medical professional, Lana, experienced many life changes in the ten years prior to her participation in "I Can Cope" as a patient advocate. In one year Lana married, became pregnant, and gave birth to a child with brain damage. She was also fired that year, after having taken on a large mortgage. Two years later, and following a grueling year in internship, Lana found out that she had rheumatoid arthritis. The last few years have been filled with the stress of caring for her special child, dealing with his many surgeries, enduring escalating arguments with her spouse, and a marital separation and reconciliation. Financial and career changes have been part of Lana's recent experience, as well as continuing conflict during this time concerning motherhood versus career. Lana reported at last meeting that easing her guilt over this conflict has coincided with an improvement in her own health. She has never shown any sign of cancer.

Donna, a woman in her fifties, reported that
she has moved four times in the past fifteen years. Working full time at a job she considers very stressful, Donna experienced financial strain three years before the study. Within the last three years, Donna has grieved over the deaths of four important people in her life: her father-in-law, mother-in-law, mother, and father. Within the last six months Donna has had to cope with her husband's newly diagnosed cancer, her daughter's move to the Philippines, and the previously mentioned death of her father. Seven years ago, Donna had an operation for the removal of a benign brain tumor, and the medication given her was very hard on her. Although Donna reported not being able to cope well with the many stressors in her life, she has never had a malignancy.

Carla, a woman in her late fifties, has been a support person for three cancer patients in her family. First, her daughter was treated for lymphoma; five years ago her husband was diagnosed with prostate cancer; and in the last year her mother discovered that she had lymphoma. Also, within the last five years, Carla has experienced the death of her brother and the birth of two grandchildren. Although Carla has smoked heavily for many decades, she has been free of serious illness, including cancer.
Although Emily, 30, did not report as many stressors as the previous respondents, she was very anxious over the recent diagnosis of cancer in her mother. In a two-year period, half a decade prior to the study, Emily married, got pregnant and gave birth, lost both a close friend and a family member to illness, took on a large mortgage which was foreclosed thereafter, and separated from her new husband. After marital reconciliation and the relative calm of the last three years, Emily has observed an increase in arguments with her husband. She has expressed distress at her husband's apparent lack of understanding of Emily's anxiety over her mother's cancer. Unable to communicate her feelings to her husband without causing him to get angry or to withdraw, Emily turned to the Cancer Support Group for a place to explore her fears and unhappiness. Emily told the group that she felt lucky not to have cancer, but that she also felt guilty sometimes for her good health.

**Stressful life changes and cancer in men.**

Of the twelve men with cancer, four had experienced excessive stressful life changes in the decade before the discovery of their diseases.

Allen, a 62 year old retired chemist, reported the occurrence of high levels of stress three to five
years before diagnosis of his prostate cancer. Within that time, he experienced the death of a close friend, a change in the number of arguments with his wife, a move several thousand miles to a new home, and retirement, which resulted in a reduction of income. Also during this time, Allen's mother-in-law came to live with him and his wife, resulting in conflict and tension in the house. Allen stated that he smoked heavily to relax, before and after diagnosis.

Steven, 74 years old, reported that he coped with stress very well, and that the past five years had been quite uneventful for him. However, he experienced a very high level of stressful life change (481 points) six to ten years before diagnosis. Within a short time, Steven remarried, retired, had a large change in finances and lifestyle, took on a large mortgage for the new house he moved into, and saw a rise in the number of arguments with his bride. He also experienced the deaths of a close family member and a very close friend. Steven believed that his tongue cancer was the result of his years of pipe smoking.

Mark, a 53 year old insurance broker, remarried four years before his lung cancer was found. His grown children opposed the marriage, and the resultant family tension was a great stressor to Mark. However, his most
chronic source of aggravation was his business; a year before diagnosis, Mark's biggest corporate customer cancelled its contract with him, causing Mark a large financial loss. Mark was very emotionally expressive, which he felt was an important way for him to relieve the constant tension in his life. A heavy smoker, Mark died of complications of his cancer and emphysema a year-and-a-half after diagnosis.

Sam, 55, had experienced several major stressors in a continuous pattern throughout the decade preceding discovery of his lung cancer. Sam became addicted to drugs and alcohol in his forties, and he smoked for thirty years. A few years before diagnosis, Sam entered Alcoholics Anonymous to quit drinking; later he joined a group for narcotics abusers. He continued to smoke until his malignant right lung was removed. His marriage dissolved in the face of his addictions, and he felt isolated socially.

Male cancer patients with few life changes.

Richard, a brain tumor patient in his early thirties, has had relatively few stressors in his life. He reported that the only major change in his life in the past decade was his move to California. Rich was optimistic that the experimental treatment he was receiving would prevent a recurrence of his tumor.
Art, a 52 year old patient with bronchial-alveolar lung cancer, reported very little stress in his life. The only change that he had experienced was the death of an elderly parent one year before his diagnosis. He accepted the loss with equanimity, and he claimed to be good at handling everyday stress.

Louis was a 53 year old man with multiple metastases to lung, kidney, and brain. Louis reported that his life was relatively calm the decade before his cancer was discovered. Except for a change in his business ten years prior to diagnosis, Louis felt that he had been living in moderation and stability most of his life.

Walter was an outgoing, active 67 year old colon cancer patient. He reported that he handled daily stress very well, and he was enthusiastic about the volunteer work he did with Contra Costa County Hospice and his church before and after diagnosis of his tumor. Five years before his cancer appeared, Walter took early retirement, and four years ago he lost a family member, but Walter said that he felt no acute distress over these events. He stated that he was grateful for his health, that the colon cancer was the first major medical problem he had encountered in his adult life, and that he was happy with progress of his recovery.
Larry, a 67 year old patient with prostate cancer, reported that he enjoyed his full-time job, and that he coped with minor daily stress very well. He lost a close family member to illness nine years before his tumor was detected; however, he felt that the decade prior to his diagnosis had held very few changes for him. Larry said that he enjoyed a good marriage and a good job, and he considered his cancer cured when radiation treatment ended.

Ron, a 51 year old businessman, had a warm and supportive relationship with his wife and two grown children. He enjoyed amusing the Cancer Support Group with his gentle humor. He felt that his life had run quite smoothly in all areas before he discovered the cancer growing on his spine. He was confident that radiation treatment had cured him, and he returned eagerly to his job. He took a vacation with his wife shortly thereafter, and he collapsed while on a cruise in the Mediterranean. Ron continued to display his good humor and positive nature until he died a few weeks after his collapse.

Stressful life changes and men without cancer.

Of the men without cancer who participated in the study, four reported high levels of stress in their lives.
Leo, a 61 year old unmarried musician and educator, had experienced a great deal of emotional upset at work. His work load had been increased by 33% without any increase in salary, and he found the nature of his teenaged students increasingly frustrating. Three years before the study, Leo's alcoholism became an issue with his employer, and he went through a rehabilitation program. Two years before he quit drinking, Leo lost a very close friend and colleague to cancer. Leo has smoked heavily most of his life, but he has had no serious medical problems other than alcoholism.

A widower in his fifties, Tom reported that he handled stress well. Eight years before the study, Tom experienced a major upheaval in his work, and he lost a very close friend to death. At this time he also became acutely ill, and his wife's breast cancer was diagnosed. Five years later, his wife died of her cancer; six months later he lost another close friend and a family member to illness. Two years ago Tom's finances were severely strained. In spite of the recent losses and changes in his life, Tom's health has continued to be very good.

Roger, a single man in his thirties, had experienced a series of changes in his life over the
past ten years. However, he felt that his job change and move to California two years before the study began had been a "huge" strain. In the two years since his move, Roger suffered a health decline, one of his parents died, and the other parent was diagnosed to have cancer. Three months before his participation in the study, Roger experienced a major financial disaster. In spite of the anxiety felt by Roger over these events, he has not shown any signs of serious disease.

Aaron, 70, felt that his life had been one long struggle. In the five years preceding the study, Aaron experienced escalating tension at work concerning conflicts with a new manager. At the same time, Aaron's wife has been under treatment for lymphoma. Although Aaron has felt apprehension about his wife's health and has worried constantly about his own health, Aaron has not had any serious illness.

Control and Cancer.

Of twenty-one women with cancer, five died and two others had poor prognoses; of these seven women, all but one exhibited hopelessness and helplessness. The remaining fourteen patients have responded well to treatment and have stayed in remission; these women have reported being in charge of their lives.
Women with lack of control over their lives.

Nora, a breast cancer patient in her fifties, displayed a sense of helplessness in the face of her disease. Frightened and resigned to her cancer, she endured the abuse of her alcoholic husband and did nothing when he brought home his girl friends. Nora felt she was powerless to reduce her sense of isolation, find a better job, effectively deal with her marriage, or fight her disease. Nora expressed fear and depression, and she was passive in the cancer treatments. Recurrence of multiple tumors along her incision line was unusually rapid, and her response to usually effective treatments proved disappointing. A year before the present study ended, Nora moved to another state with her husband. At the time contact with Nora was lost, her prognosis was grim.

Marta, also a breast cancer patient in her 50's, responded to the stressful lack of communication in her marriage by complaining that she was helpless to improve her life or change the situations that upset her. She often said, "What can I do? Nothing makes a difference". After attending a seminar on laughter as medicine, Marta decided to use humor to deal with her problems. During the time she felt she could do something to better her life, Marta's physical condition improved, and she was
able to resume many of her favorite activities, such as walking and making stained glass. When her new approach failed to elicit a response from her husband, Marta gave up hope of finding emotional intimacy with her spouse. As soon as she let go of her fragile sense of control over her destiny, Marta became increasingly weak and took to her bed, dying within a few weeks.

Kirsten, a 29 year old school teacher with an invasive brain tumor, felt that she had led a relatively stress-free life preceding the first seizure that indicated the presence of her tumor. Kirsten had radiation implant treatment, which she approached fearfully but with some hope of cure. She eagerly practiced imagery to "help" the treatment, and the tumor shrank enough for surgical removal. A side effect of the surgery was a loss of some physical function, and Kirsten became very discouraged as she attempted to regain use of her facial muscles and one side of her body. In spite of encouragement from her supportive family and friends, Kirsten felt that she could not get better, and soon thereafter she died.

A young mother of twenty-six, Jerry, had looked forward to her family's move to California. Before she and her husband bought their house, she had a lump biopsied. During the course of the disease, the cell
type of the tumor could not be determined, and this fact frightened Jerry and left her with a feeling of helplessness. She wanted to survive for the sake of her children, but she became resigned to the progress of her disease, and within a relatively short time she died.

Jane, 48, always put the needs of family and friends before her own. Even after diagnosis of her ovarian cancer, Jane continued to work hard at making the people around her happy. While Jane attended the Cancer Support Group and prayer healing sessions at her church, she felt that she had some control over her disease, and she continued to maintain her usual level of activity. After six months, Jane became discouraged that the tumor had not disappeared during chemotherapy. At this point, Jane decided that she could not affect the progress of the cancer, and she stopped taking an active role in her treatment. Shortly after this, multiple metastases to liver and lung were found. Jane's physical condition quickly deteriorated, and she died within a few weeks.

Anna was an attractive, youthful 49 year old woman who had successfully fought ovarian cancer many years before diagnosis of an unrelated kidney tumor. Determined to fight the cancer, Anna practiced imagery
and designed a macrobiotic diet for herself. After successfully completing treatment, Anna returned to her job. Within a few months, Anna's position was eliminated, an event which threw her into emotional turmoil. No longer the master of her professional life, Anna began to neglect her usually impeccable grooming, and she came to Support Group less and less. After several months, her husband brought Anna to the group to share that her cancer had spread to the spinal fluid, a difficult region to treat. Anna said that she was finished fighting, and that there was nothing more to be done; within a few weeks, Anna died.

Women with a sense of control.

When the lymphoma of Marlene, 74, was first diagnosed, she felt helpless to deal with the disease or her doctors. After participating in the Cancer Support Group for three years, Marlene has become confident in her ability to fight cancer and to stand up to her sometimes brusque doctors. She has become more active in the healing process, practicing imagery and confronting and questioning doctors. As Marlene's sense of control over her health increased, the side effects of chemotherapy diminished, and her tumors have disappeared.

Carrie, a breast cancer patient in her early
forties, has exercised strong control over her disease and treatment for three years. After asking her doctors to explain all her options, she has made several treatment choices, some of them less aggressive than the action recommended by the physicians. In spite of the moderate approach she chose for her estrogen related cancer, Carrie's prognosis is excellent. Carrie has thoroughly researched all aspects of her type of cancer, and she has shared her knowledge with newly-diagnosed cancer patients.

Carol, 37, came to the support group shortly after diagnosis of lymphoma in her spine. Carol was extremely frightened of pain and the prospect of chemotherapy; her first injection made her violently ill and left her weak for several days. After using relaxation and imagery methods taught in the Support Group, Carol was able to minimize the side effects of her treatments. Pleased that she could control her reactions to the drugs, Carol decided that she could influence the direction of the disease, and she joined a church healing group. As her sense of control increased, Carol's adverse reactions to treatments lessened, and her initially guarded prognosis has greatly improved. Carol has been in remission for two years.

Sharon, a woman in her late thirties, has also
approached her chemotherapy with a determination to manage the side effects. A strong-willed and assertive breast cancer patient, Sharon has continued to work a full-time job while taking treatments. Sharon has used her professional connections to gather large amounts of information for the participants in the Support Group. Sharon reported that she felt like a victim at the time of her initial diagnosis and recurrences, but that fighting the disease effectively and working around the chemotherapy had bolstered her faith in her own power to direct the course of her life.

Jenny, a 52 year old breast cancer patient, felt that she had cured her own disease, with a little help from the doctors. A graduate of Alcoholics Anonymous, Jenny felt that the AA program taught her how to order her life and take charge of its direction. Using the AA system, Jenny handled radiation treatment and surgery the same way she learned to control drinking five years earlier: one day at a time. Jenny also used relaxation and imagery to help herself through the treatment. Jenny reported that her life was far better than it had ever been before she learned what power she had over her physical condition.

Louise, who discovered that she had Hodgkin's Disease while she was still in college, was determined
to run her own life. When her doctors told her that she would have to drop out of school during her radiation treatments, Louise devised a compromise; she would take only twelve academic units instead of her customary twenty-two, and she would commute to the radiation facility three times a week. The doctors wanted a treatment of daily radiation, but Louise was adamant. Louise had studied relaxation and imagery to enhance her singing voice, and she used the techniques to help her with side effects of treatment. She has attributed her complete remission to her own "stubborness" and her drive to keep busy.

Men with lack of control over their lives.

Donald, a cancer patient in his fifties, was devastated by his diagnosis of metastasized cancer. He suffered severe side effects from chemotherapy, developing secondary infections like pneumonia, and his physical deterioration seemed to accelerate the more his family begged him to fight his disease. Donald felt that there was nothing that he could do to affect the course of the cancer; he considered himself powerless. Donald became more resigned and hopeless to his cancer, and he died suddenly at a social gathering.

Mark, a 53 year old lung cancer patient, also took the news of his cancer diagnosis very badly. His
general condition deteriorated very rapidly in the two months following his diagnosis, until Mark participated in a weekend cancer support workshop, "We Can Weekend". After learning relaxation and visualization techniques in the workshop, Mark quickly developed a sense of control. His original vigor returned, he resumed working, and he cheerfully told newcomers to the support group about the merits of the imagery techniques. Mark praised the way the techniques allowed him to participate in his recovery, and he was delighted to report that his doctors had readjusted their original prognosis of six months survival to "indefinite remission". Mark continued his robust lifestyle for over a year. At that point, Mark's oncologist casually showed him an X-ray of the diseased lung. When Mark saw the film of his tumor, his confidence in his ability to affect his physical condition disappeared, and he became helpless and despondent. Although his wife and friends encouraged Mark to continue his imagery and support group participation, he became listless and resigned to his fate, losing his vitality almost instantly from the moment he viewed the X-ray. He said that he felt that he had failed to shrink the tumor to nothing. Within less than a month of his loss of control, Mark died.
Men with control.

In contrast to Mark, Ron appeared to be in very good spirits until he died of cancer located in the spine. Ron willingly tried any treatment suggested by his doctor, and he seemed to be involved in his treatments. He was optimistic that he would beat the cancer. Ron went on an extended cruise with his wife to celebrate his success, but he became very ill in Greece and died within two months.

The other male cancer patients with a sense of control fared better than Ron. Sam, a 55 year old recovered alcoholic and drug addict, felt that his Alcoholics Anonymous training had given him the will and the means to fight his lung cancer. He was confident that he could prevent a recurrence of the cancer in his remaining lung, and he designed an exercise regimen to keep himself fit. In spite of the large amount of cancer found at the time of his original diagnosis, Sam's prognosis for survival has continued to be very good.

Allen, 63, had experienced many stressful life changes preceding and after the detection of his prostate cancer. However, he prided himself on being "in charge" of his life, and he actively participated in his treatment, researching options and making choices on
medical decisions. Allen took early retirement but continued to be active, working on his land and on community projects. He has remained free of cancer for three years.

Martin, a retired 65 year old, took charge of his health when his lung cancer was diagnosed. Martin was accustomed to being in control, and he viewed his cancer as a challenging nuisance. Martin liked to take notes during support group discussions; he recorded his reactions and observations to refer to later. Martin responded well to radiation treatment, and his prognosis was excellent.

Kurt, a lymphoma patient in his early thirties, refused to let his cancer hold him back. He was active in treatment, questioning his doctor on options and interpretations of laboratory results, and keeping a record of his symptoms during and after radiation treatment. He exercised often to keep fit, in spite of his physician's mild objections, and he was pleased with the results. Kurt was given a clean bill of health one year after his treatments ended.

Walter, 67, was very much the architect of his own life, even before he discovered his colon cancer. He retired early and fulfilled a dream to work with the local Hospice group. Walter enjoyed doing volunteer
work with ill people and with his church. He presented a very optimistic attitude in group sessions, and he often offered to help other patients. His prognosis for recovery was excellent.

Relaxation and imagery.

Patients responded in various ways to the relaxation and imagery exercises taught to them in Support Group sessions. (See Chapter 3 for description of exercises.) A very small number found the exercises to be useless or difficult, but most participants felt that the techniques were important and useful. Some of the patients reported that the exercises produced valuable results; five of the twenty-one women with cancer and four of the men with cancer perceived very marked improvement in one or more areas after beginning the relaxation and visualization exercises. Of the cancer patients, one woman and three men expressed disappointment or even aversion to the techniques. Of the healthy respondents, one woman and one man did not like the exercises. The remaining members of the sample found the relaxation and imagery methods to be pleasant and helpful in reducing anxiety, pain, insomnia, and other symptoms.

Relaxation and imagery and women with cancer.

The most striking response to the imagery
techniques was shown by Carol, a lymphoma patient in her late thirties. When Carol first arrived at the Support Group, she was physically tense with fear, and she expressed nervousness at her first attempt to follow the relaxation exercise. A week later, Carol used the technique when she received her second chemotherapy injection. Carol reported that she was astonished at how well she tolerated the treatment. She did not experience the wracking nausea and cramping that had followed her first treatment; this was even more impressive to her when she found out that her drug regimen tended to produce increasingly worse side effects with subsequent injections. Encouraged by her ability to control her nausea and pain, Carol visibly appeared more relaxed. She became very involved in her treatments, using the relaxation and visualization techniques regularly and actively pursuing answers to her questions about her cancer. Her initial guarded prognosis improved to excellent.

Lena, a 48 year old lung cancer patient, also used relaxation and imagery to combat the side effects of chemotherapy. When she was told that the drugs she was receiving would cause all of her hair to fall out, Lena visualized herself inside her own skull, knotting the roots of her hair together to prevent their falling
out. To her doctor's surprise, only one-quarter to one-third of Lena's hair was lost, and she never had to wear a wig. Lena also used relaxation and imagery to raise her blood cell levels. When the doctor told Lena that her leucocyte count was dangerously low because of chemotherapy, she visualized the tissue in her sternum dividing rapidly to produce many white blood cells. Lena's blood sample the following week showed a very significant rise in the number of white blood cells.

Sheila, a cervical cancer patient in her early forties, also used the relaxation and imagery method to increase formed blood elements. When she was informed that her red blood cell count had fallen below the acceptable minimum, she visualized the proliferation of red blood cells all over her body. Within a week, Sheila's blood cell count had risen well over the minimum amount.

Carrie used the imagery method to reduce the effects of chemotherapy and to reduce her tension over the loss of a breast. She pictured herself with a full head of hair and two healthy breasts. Carrie lost only a portion of her hair, and her mastectomy scar healed quickly and with a minimum of pain.

Louise, in her twenties, utilized the relaxation techniques to reduce tightness and soreness in her
throat following the removal of a tumor from her neck. After finishing radiation and chemotherapy treatments for her lymphoma, Louise experienced amenorrhea. Her doctor said that the drugs she had received sometimes caused menopause, and endocrinology tests confirmed that she had suffered "total and irreversible" ovarian failure. Louise visualized a "golden healing light" in her reproductive organs, and within two months of the hormone index, Louise astounded her doctor by becoming pregnant.

Relaxation and imagery and men with cancer.

Most of the male cancer patients found the relaxation and imagery exercises helpful. Mike, 65, liked the sense of control he felt when he was able to induce relaxation.

Kurt, in his early thirties, felt that the visualization had helped him heal faster. His lymphoma in the tibia responded to radiation by disappearing rapidly, and Kurt was able to hike and bicycle within weeks of his surgery.

Walter, 67, was so impressed with his results from imagery in healing himself, he used the methods in his work with hospice patients.

Mark, in his fifties, believed that the relaxation and imagery exercises greatly improved his
ability to function effectively. Following his biopsy surgery and diagnosis of lung cancer, Mark was slow to heal. When Mark's wife brought him to the weekend workshop, he was having increasing difficulty breathing and walking. After practicing the visualization method for two weeks, Mark was greatly improved; his listless behavior had given way to an enthusiastic participation in the support group. Mark returned to work and enjoyed a full life, until he lost confidence in himself and stopped doing the imagery exercises.

**Interpretation of Findings**

In spite of the small sample studied, a broad range of responses was noted. Because of the small size of the sample, it has been difficult to make generalizations concerning the larger population from which the subjects were drawn.

**Women and Stress.**

The results of questionnaires and interviews were not conclusive enough to support or to reject Hypothesis 1, which stated that women who experienced stressful life changes would be more likely to get cancer. Some women with cancer had experienced large amounts of stress preceding diagnosis; more of the cancer patients did not have as much stress in their histories. Eight cancer patients had high stress levels,
while thirteen had relatively uneventful decades before diagnosis. Some of the healthy women in the control group had experienced great amounts of stress before entering the current study, and some female control subjects had a relatively stress-free decade before filling out the questionnaire. Six control subjects had stress levels as high or higher than cancer patients with high levels of stress.

Men and Stress.

Hypothesis 2, which predicted a relationship between stressful life changes and the occurrence of cancer in men, was not supported by the findings. A third of the men with cancer reported that they had experienced excessive stress in the ten years prior to diagnosis. Half of the healthy men reported equally high levels of stress changes in the same time period. Most of the men appeared to be more stoical about the traumatic incidents in their lives than the female respondents, and most of them reported that they handled everyday stress well. Only one male respondent, a cancer patient, felt that he had been burdened with more than he could handle.

Within the limits of this study, stressful life changes did not appear to influence the health of individuals with a high enough frequency to allow one
to make a general statement concerning any link between the two factors.

**Women and Control.**

Hypothesis 3, which states that a sense of control affected the prognosis of cancer in women, was supported by the study. Of the women who died of their cancers, all had either recently lost the sense that they could control their own lives, or they had felt powerless for a long time. Of the two women with poor prognoses, one had a deep and chronic sense of helplessness; this patient moved away, and the outcome of her illness has not been determined. The other woman with a poor prognosis was optimistic about her situation and believed that she could improve her prognosis and level of comfort; she has survived beyond the time predicted by her doctor and has continued to do very well. Of the remaining fourteen cancer patients, all felt varying degrees of control and ability to have an impact on their health. Of these fourteen positive women, each one had a good prognosis of recovery or a vastly improved condition over original predictions at the time of diagnosis.

**Men and Control.**

Hypothesis 4, which stated that a sense of control had an effect on the course of cancer in men,
appeared to be supported by the results of the study. Of the three men who died, one seemed to be in control of his life; he still retained his good spirits and positive outlook until the moment he died. The other two patients demonstrated lack or loss of control and subsequent physical deterioration.

The remaining male cancer patients exhibited various degrees of confidence in an ability to control destiny. All of these men have improved in physical condition, or maintained a state of remission.

**Women and Relaxation.**

Hypothesis 5, which stated that relaxation exercises had therapeutic value in the treatment of female cancer patients, was supported by the results of the study. Only two women, one a cancer patient and one the spouse of a cancer patient, reported no positive effect from the relaxation exercises. Almost all of the women involved in the study expressed the opinion that the exercises were useful, and at least five of the female cancer patients found the exercises to be very valuable. Patients expressed satisfaction with the exercises for easing intractable pain and nausea, for preventing or reducing hair loss, for improving energy levels, for loosening tense muscles, and for improving the quality and quantity of sleep. Healthy women also
praised the techniques for reducing anxiety and insomnia.

**Men and Relaxation.**

Hypothesis 6, which linked relaxation exercises and improvements in the health of male cancer patients, appeared to be supported by the study. Of the twelve men with cancer, only one found the exercises to be ineffectual; this man was uncomfortable sitting for any length of time, due to the tumor in his spine, and he had a strong resistance to letting go of his control long enough to relax. The other male cancer patients found the relaxation exercises useful for reducing tension, easing tight muscles, improving energy levels, dealing with insomnia, and mitigating the side effects of chemotherapy.

A few individuals in the study were not helped by the exercises. As one subject stated, "This technique is not for everyone". However, the majority of respondents reported that the relaxation exercises produced positive effects.

**Summary**

Of the six Hypotheses, four appeared to be supported by the study. Hypotheses One and Two were neither supported nor rejected, as the results were inconclusive. Because the study was limited by the small sample size, the results cannot be declared as proof of any of the hypotheses.
Conclusions

The purpose of this study was to investigate the relationship between the onset of cancer and the psychological impact of stressful life changes. The results of the study were not conclusive; healthy individuals were just as likely as cancer patients to have experienced excessive life changes. Although some subjects appeared to respond to stress by developing disease, others with similar life histories were free from illness. Such results may have been caused by other variables; most cancers probably have developed because of a combination of factors.

One of those additional factors may have been a sense of control. Participants in the study who felt that they were in control of their lives seemed to be more resilient and adaptive in the face of change. Subjects who felt powerless to affect their destinies appeared to be more likely to develop tension, exhaustion, pain, and unhappiness than did the rest of the respondents. Of the patients who died of their cancers, all but one man and one woman exhibited helplessness and hopelessness before their final medical
decline. Most of the survivors in remission had entered the study with a determination to direct the course of their lives, or they had learned in the Support Group to take control of their situations and their progress in treatment. The information gathered in this study, based on a small sample, showed that a sense of helplessness hindered a patient's ability to fight disease, whereas a sense of power enhanced the patient's disease-fighting mechanisms.

Almost all of the subjects were capable of utilizing the relaxation and imagery exercises to improve their mental and physical states to some degree. Only a very small number found the exercise difficult or unhelpful. Although two participants complained that the techniques did not work for them, many cancer patients found the procedures to be of great value in dealing with pain, tension, and side effects of radiation and chemotherapy. All but two of the entire study group successfully used the relaxation and imagery exercises to improve some aspect of their lives. Therefore, the conclusion has been drawn that such techniques were shown to be a useful tool when working with cancer patients and their families.

Limitations of the study

This investigation was necessarily limited by
the fact that cancer patients and their closest circle of supportive relatives and friends have been thrown into a devastating situation and are therefore more concerned with their immediate emotional and medical problems; few of these people have the energy or desire to be bothered with extraneous activities, such as a Master's thesis study. Also, hospitals in the area were understandably reluctant to provide access to their patients, whose privacy had to be respected. Due to the delicate nature of recruitment etiquette when dealing with families who have been rocked by life-threatening illness, large numbers of subjects were difficult to obtain. As a result, the sample size investigated was too small to ensure scientific reliability.

In addition, the self-selection process introduced an additional source of error; since participation in the study had to be strictly voluntary, subjects would have been a certain type of person. The respondents in the study had to be ambulatory at the start of their participation, eliminating the more seriously ill patients from the process. Participants in the study were therefore more helpful and active than the average population in like circumstances. Since the group from which the volunteers were taken consisted
of those participating in John Muir Hospital's Oncology Department activities, the possible respondents were limited to only those type of individuals who would be inclined to enter into self-help gatherings, excluding a large segment of cancer patients and their families from the study. The skewed population and small sample size made it unlikely that the entire population of cancer patients was proportionally represented. Individual variation within such a small, non-representative group probably caused enough deviation to render the results suspect.

Another limiting factor was the nature of the study itself. Both the questionnaire and the interviews relied upon subject self-report, not always the best way to find out the truth. Although the researcher assumed honesty on the part of the respondents, such things as self-delusion and denial were possible within the study's design. As the patients developed a warm affection and trust for one another and the group facilitators, many intimate details and personal secrets were divulged. However, this writer felt that at least some of the respondents, particularly the male participants, may have put forth a "good face" and refused to admit, perhaps even to themselves, any weaknesses or fears. As with any study based on
self-report, these variables were unavoidable.

Because hospital policy required that the nature and objective of the study be explained to each participant, there may have been some influence on the outcome of the investigation resulting from the actions of "helpful" subjects, who may have supplied information in support of the study hypotheses in a subconscious desire to please the researcher. Many of the subjects had read one or more of the popular books about stress and illness, and their responses may have been influenced by that literature. Although the respondents seemed to be honest and genuine in their comments, the possibility of complicity with the researcher or self-deceit had to be considered. Participants were not told the hypotheses being tested, but many had read books about stress and cancer.

Recommendations for further research

Because of the many questions generated by this study, further investigations need to be conducted to clarify the relationship between a person's emotional history and the development of cancer.

To provide more detailed data on the link between stressful life events and the formation of tumors, longitudinal studies involving very large numbers of subjects should be designed and carried out. People
who are free of cancer could be screened for the many factors that may influence the genesis of neoplasms in humans, such as diet, age, and smoking. After grouping the subjects, they could be assessed for the degree of stressful life events in the preceding decade. At six-month intervals, the subjects would be re-evaluated for new life changes and health status. Those who developed cancer would be compared to matched respondents who had not shown signs of cancer. Such a study would necessarily take many years and enormous numbers of respondents.

Because of the complexity and multi-factor nature of cancer's etiology, it may be simpler to investigate the way in which psychological factors influence a cancer patient's remission or decline. An investigation following up on previous studies linking relaxation and imagery with increased lymphocyte function would be helpful in this area. Studies need to be designed to test whether the enhanced immunity is caused by the relaxation or the imagery, or a combination of the two. Again, large sample sizes would be needed to reduce the degree of deviation.

More information is needed on the possible effect of a sense of control on ability to fight malignancies. A scale to quantify a subject's sense of control could
be devised, and a relationship drawn between this variable and the multiplication and effectiveness of white blood cells. This type of study may support the work with holistic therapy, which is thought to encourage the immune system to fight cancer.

More conclusive results than those generated by this study are needed to show a link between the mind and the prevention and cure of cancer. Such investigations should be pursued in order to ensure that oncology patients receive all possible treatments for their illness. A holistic approach to cancer management, in conjunction with more traditional methods of treatment, may prove to be the most effective way to lengthen the lives of cancer patients.
REFERENCES


APPENDICES
I) GENERAL INFORMATION: Please circle the best response.

1. Sex: Male Female

2. Age: below 15 years 15-20 20-30 30-40 40-50 50-60 60-70 above 70

3. Marital Status: Single Married/Paired Separated/Divorced Other

4. Employment: Fulltime outside home Part-time outside home Work at home Student None

5. Annual Income: Below $5000 5000-10,000 10,000-15,000 15,000-20,000 20,000-30,000
   30,000-40,000 40,000-50,000 Over 50,000

6. Ethnic origins (optional): American Indian Hispanic Black Caucasian Asian Other

7. Have you ever had cancer? Yes No (If your answer was "No", please skip to #12.)

8. Age at which cancer was diagnosed:

9. Type/location of cancer:

10. Treatments you have received or are receiving: (Circle all that apply.)

   Surgery Chemotherapy Radiation Thermal Therapy Biofeedback
   Hypnosis No Treatment Other (specify)

11. Current status of your cancer: Cured In Remission In Treatment Untreated

12. How do you think you handle everyday stress? Very well----------Fairly well--------Not too well-----Can't!

II) On the next pages is a list of events that may or may not have occurred in your life. Following each
   event are blocks of time. If an event has happened to you, circle the time block that best represents
   the amount of time that passed between the occurrence of the event and the diagnosis of your cancer.
   (If you have never had cancer, circle the time block that represents the amount of time that has
   passed between the event and this moment.) If the event happened after diagnosis of cancer, circle
   "AD". If you can't remember whether or not an event has occurred, circle "DK".
<table>
<thead>
<tr>
<th>EVENT</th>
<th>TIME OF EVENT</th>
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<tr>
<td>Marriage</td>
<td>0-3mos. 3-6mos. 6mos-1 yr. 1-1½ yrs. 1½-2 yrs. 2-2½ yrs. 2½-3 yrs. 3-5 yrs. 5-10 yrs. Never AD DK</td>
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<td>Forclosure on loan</td>
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<td>Mortgage over $10,000</td>
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<td>Change in number of arguments with spouse</td>
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<td>Change in work/career</td>
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<td>Death of a close friend</td>
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<td>Change in finances</td>
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<td>Business readjustment (merger, etc.)</td>
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<td>Pregnancy</td>
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<td>Gain of new family member</td>
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<td>Retirement</td>
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<td>Marital reconciliation</td>
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<td>Fired at work</td>
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<td>Jail term 0-3mos.</td>
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<td>Personal injury or illness</td>
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<td>Marital separation</td>
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<td>Divorce</td>
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<td>Death of spouse</td>
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III) If there are any other major life events that you would like to discuss, please use this space and the back of the page for comments.

THANK YOU!!
In a study investigating the relationship between stress and disease, I, __________________________, on _______________ , 1985 hereby authorize Gemma Niermann of California State University at Hayward to gather information from me pertaining to the study, which will be reported in a Master's Thesis in the Department of Educational Psychology at CSUH, and which may shed light on future methods of treatment and prevention of illness.

I freely and voluntarily consent to participate in this study with no coercion used to elicit my cooperation. My participation will involve answering an anonymous and confidential written questionnaire. While there is no physical risk involved, answering some of the questions may cause me some psychological discomfort. If any of these questions causes me to feel too much anxiety, I may choose not to answer that particular question. I know I always have the option to stop answering the questionnaire and to end my participation in the study at any time.

I understand that my participation in this study or my refusal to take part in this study will in no way affect my treatment at any medical facility.

I realize I have a right to be informed of the nature and purpose of this study and to be given the opportunity to ask any questions I wish. I also know that I may have a copy of the written report on the study mailed to me on request, by writing or calling the researcher at the location given below. If I feel the need to discuss any concerns that may arise during the study, I can consult with the researcher on an individual basis.

I hereby acknowledge that I have received and read this document prior to consenting to participate in this study.

PATIENT (PARENT or LEGAL GUARDIAN) ___________________________ DATE ___________________________

If signed by other than patient, indicate relationship to patient.

Gemma Niermann
1253 Rudgear Rd.
Walnut Creek, CA 94596
937-8289
820-7317 (work)
### APPENDIX C

(Social Readjustment Rating Scale)
Life Change Index

<table>
<thead>
<tr>
<th>Rank</th>
<th>Life Event</th>
<th>Mean Value (Scale of Impact)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Death of spouse</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Divorce</td>
<td>73</td>
</tr>
<tr>
<td>3</td>
<td>Marital separation</td>
<td>65</td>
</tr>
<tr>
<td>4</td>
<td>Jail term</td>
<td>63</td>
</tr>
<tr>
<td>5</td>
<td>Death of close family member</td>
<td>63</td>
</tr>
<tr>
<td>6</td>
<td>Personal injury or illness</td>
<td>53</td>
</tr>
<tr>
<td>7</td>
<td>Marriage</td>
<td>50</td>
</tr>
<tr>
<td>8</td>
<td>Fired at work</td>
<td>47</td>
</tr>
<tr>
<td>9</td>
<td>Marital reconciliation</td>
<td>43</td>
</tr>
<tr>
<td>10</td>
<td>Retirement</td>
<td>43</td>
</tr>
<tr>
<td>11</td>
<td>Change in health of family member</td>
<td>44</td>
</tr>
<tr>
<td>12</td>
<td>Pregnancy</td>
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</tr>
<tr>
<td>13</td>
<td>Sex difficulties</td>
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<tr>
<td>14</td>
<td>Gain of new family member</td>
<td>39</td>
</tr>
<tr>
<td>15</td>
<td>Business adjustment</td>
<td>39</td>
</tr>
<tr>
<td>16</td>
<td>Change in financial state</td>
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</tr>
<tr>
<td>17</td>
<td>Death of close friend</td>
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<tr>
<td>18</td>
<td>Change to different line of work</td>
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<tr>
<td>19</td>
<td>Change in number of arguments with spouse</td>
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<tr>
<td>20</td>
<td>Mortgage over $10,000</td>
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<tr>
<td>21</td>
<td>Foreclosure of mortgage or loan</td>
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<tr>
<td>22</td>
<td>Change in responsibilities at work</td>
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</tr>
<tr>
<td>23</td>
<td>Son or daughter leaving home</td>
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<tr>
<td>24</td>
<td>Trouble with inlaws</td>
<td>29</td>
</tr>
<tr>
<td>25</td>
<td>Outstanding personal achievement</td>
<td>28</td>
</tr>
<tr>
<td>26</td>
<td>Wife beginning or stopping work</td>
<td>26</td>
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<tr>
<td>27</td>
<td>Begin or end school</td>
<td>26</td>
</tr>
<tr>
<td>28</td>
<td>Change in living conditions</td>
<td>25</td>
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<tr>
<td>29</td>
<td>Revision of personal habits</td>
<td>24</td>
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<tr>
<td>30</td>
<td>Trouble with boss</td>
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<tr>
<td>31</td>
<td>Change in work hours or conditions</td>
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<td>Change in residence</td>
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<td>Change in recreation</td>
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<td>Change in church activities</td>
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<td>Change in social activities</td>
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<tr>
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<td>Mortgage or loan less than $10,000</td>
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<tr>
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<td>Change in sleeping habits</td>
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<td>Change in number of family get-togethers</td>
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<tr>
<td>40</td>
<td>Change in eating habits</td>
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<td>41</td>
<td>Vacation</td>
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<td>42</td>
<td>Christmas</td>
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<tr>
<td>43</td>
<td>Minor violations of the law</td>
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